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Impacts of a primary school-based intergenerational engagement intervention on the cognitive, health and social outcomes of community-residing older adults and on participating schools

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A thesis submitted to University of Strathclyde in partial fulfilment of requirements for the degree of Doctor of Philosophy

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Glasgow
October 2022

Declaration

This thesis is the result of the author's original research. It has been composed by the author and has not been previously submitted for examination which has led to the award of a degree.

Signed: Anna Krzeczkowska

Date: 21.10.2022

Previously published work

I declare that this thesis consists in part of previously published work (Krzeczkowska et al., 2021). The systematic review presented in Chapter 2 was published in Ageing Research Reviews as “A systematic review of the impacts of intergenerational engagement on older adults’ cognitive, social, and health outcomes” by Anna Krzeczkowska, David M. Spalding, William J. McGeown (the second supervisor), Alan J. Gow (the third supervisor), Michelle C. Carlson and Louise A. Brown Nicholls (the first supervisor). I carried out literature searches, was the lead reviewer and created the first draft of the manuscript. My contribution and those of the other authors to this work have been indicated in Section 2.3 of this thesis.

Acknowledgments

"Our responsibility is to do what we can, learn what we can, improve the solutions, and pass them on."

Richard P. Feynman

It is not possible to conduct a complex research project and successfully finish a PhD without being taught, supported, inspired, motivated, and advised by others. I would like to recognise all those who have crossed my path in the past 4 years, and who have shaped my thinking about research, intergenerational work, as well as the importance of collaboration, and the value of 'giving back to society'.

I am deeply grateful to my supervisory team, Dr Louise Brown Nicholls, Dr William McGeown, and Prof Alan Gow. They had a profound influence on the evolution of the research project presented in this thesis. Their great, continuous support, words of encouragement, and professional advice throughout this programme, have been invaluable. I am also thankful to them for reading and revising my work exhaustively, and helping me deliver the best thesis I could manage to produce. I would like to thank Dr Brown Nicholls for teaching me how to plan my work methodically and consistently, how to engage with the external collaborators, present our research to wider audience, and for guiding me through the process of becoming a PhD researcher.

I would like to thank Prof Adele Dickson for all her expertise she contributed to the qualitative analyses presented in this thesis. I am also grateful to David Spalding for his great help with the systematic review while he was working hard on his own PhD project.

This research would not be possible without our wonderful volunteers who participated in this intergenerational programme. There are no words to express my gratitude for their commitment, dedication, amazing work, and continuous support for the project. I would like to thank them for their time,

patience, sharing their knowledge and experiences, and for going above and beyond.

I am extremely grateful to the Head Teachers who invited us to their schools, helped implement and co-ordinate the project. Their continuous support and pro-active approach allowed three cohorts of volunteers to experience intergenerational work. Great thanks to all teachers who welcomed volunteers to their classrooms and made them feel like a part of the school family.

I would like to thank Prof Michelle Carlson, Prof George Rebok, Dr Jeanine Parisi, Experience Corps volunteers and coordinators for their advice and support when embarking on the project.

I would like to express my appreciation to West Lothian Council for their approval and support. I am also extremely grateful to Generations Working Together for helping advertise and disseminate the project.

I would like to thank Prof Carol Holland and Prof Madeleine Grealy for agreeing to be my examiners, for their time, consideration, and feedback.

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List of Abbreviations

EC	Experience Corps
GDS-SF	the Geriatric Depression Scale-Short Form (Yesavage & Sheikh, 1986)
Gen4Gen	Generation for Generation
IADL	the Lawton Instrumental Activities of Daily Living Scale (Lawton & Brody, 1969)
IE	Intergenerational Engagement
IPAQ	International Physical Activity Questionnaire (Craig et al., 2003)
IPIP	the International Personality Item Pool
LSITA-SF	the Life Satisfaction Index for the Third Age-Short Form (Barrett & Murk, 2009)
MMAT	the Mixed Methods Appraisal Tool
MMSE	the Mini-Mental State Examination (Folstein et al., 1975)
NART	National Adult Reading Test (Nelson & Willison, 1991)
NIH	National Institutes of Health
PSQI	The Pittsburgh Sleep Quality Index (Buysse et al., 1989)
PVG	Protecting Vulnerable Groups
RCT	Randomised controlled trial
REPRINTS	Research of Productivity by Intergenerational Sympathy
STAC	the Scaffolding Theory of Cognitive Aging
WHO	World Health Organisation

Abstract

Intergenerational engagement (IE) interventions can benefit health and wellbeing in an ageing population and lead to a range of benefits in individuals and the larger community. Although potential positive impacts of IE for both older adults and younger generations have been demonstrated and promoted in past research, high quality and conclusive evidence regarding potential positive or negative impacts on older people is still limited. Therefore, this pilot study was conducted to 1) assess the potential impacts of intergenerational engagement on older adults' cognitive, social and health outcomes over 6 months; 2) explore benefits and challenges associated with intergenerational engagement from the volunteers', teachers', and pupils' perspective; and 3) evaluate perceptions of school climate over time from intervention vs control school staff's perspective. Generation for Generation is a moderate-intensity, IE intervention designed to promote cognitive, health and social function in older adults while also benefiting schools. Older adult volunteer participants assisted primary school teachers in the classroom by helping pupils aged 4-8 with reading, writing and numeracy tasks. They were asked to commit eight hours per week for six months during 2018-2020. A mixed-method design including a concurrent nested approach was applied in this project. The study consisted of 1) a pilot randomised controlled trial (RCT); 2) a qualitative component (a volunteer diary and focus groups); and 3) a pre- and post-intervention school climate survey. The pilot RCT was a mixed factorial design in which older adult volunteers (control or active condition) were assessed on three occasions (baseline, then at 3- and 6-month follow-ups). In total, 36 older adults aged 60-80 years were recruited from the Lothians area in Scotland on three occasions and allocated to three cohorts. Overall, older adult intervention participants, but not control participants, showed improvements in working memory, episodic memory, auditory verbal learning, daytime dysfunction (sleep quality domain), cross-age attitudes, and generative achievement. Reliable difference in the pattern of outcomes over time tended to be observed at 3 months and maintained at 6 months. Thematic analyses of older adults' diary and focus group data

revealed a range of intra- and inter-personal benefits and challenges of IE including regaining a sense of purpose, a sense of belonging, building new social connections, physical demands, financial issues, and fear of overstepping. Focus group data from teachers' and pupils' focus groups demonstrated additional potential benefits of IE on pupils' attainment and behaviour, and teaching efficiency. Finally, during the first school year of the intervention, five out of eight sub-domains of school climate (i.e., school satisfaction, parental involvement, creativity and the arts, learning climate, and school resources), as well as overall school climate, were maintained amongst staff in interventions schools, as compared to declines indicated by staff in comparison schools. The quantitative results of this pilot study offer promising, preliminary evidence suggesting that a 6-month, moderate-intensity engagement between younger and older generations can be an effective health promotion initiative. In addition, explanatory qualitative findings defined the context of IE and explored experiences of participating in the programme from different perspectives, indicating potential for future implementation and further development of the intervention. However, given the pilot nature of this study, all findings should be treated with caution and re-assessed in the context of a full trial in future.

CHAPTER 1. Impacts of ageing on cognition, health and social function, and the role of engagement.

1.1 Chapter overview

This chapter will provide an overview of the key changes that are associated with ageing. First, an overview of global population ageing and the implications for society will be provided. Then, the effects of ageing on cognition, health and wellbeing, and social functioning will be outlined. In addition, various ageing processes associated with those effects will be discussed in theoretical context and a description of the strategic capacities individuals use to modify or adapt to the age-related transformations provided. Finally, intergenerational engagement (IE) will be described as an example of a practical approach to health promotion and social participation in older adults, by outlining its purpose, strategies, and requirements.

1.2 Global population ageing - implications and opportunities

Ageing is a dynamic phenomenon associated with a number of changes that occur in a person's health and functioning (World Health Organisation, 2015). Despite attempts at defining ageing, there seems to be no method that is universally successful. Ageing is by definition a continuous process that may include decline, stability and/or growth, which can be caused or explained by a number of factors ranging from biological to social (Dixon, 2011). In other words, chronological, biological or functional changes that are typically considered in association with the ageing process are only a few indices that determine its trajectories, and chronological age itself is particularly problematic through the adult lifespan. For example, cultural and social differences can influence the views of ageing, encompassing its either positive, negative or neutral characteristics (Heckhausen et al., 1989; Kite et al., 2005). Cultural values and beliefs can possibly promote positive attitudes

and high esteem for older adults (e.g., common in Asian cultures) or undermine their societal status (e.g., more youth-oriented societies; Löckenhoff et al., 2010), potentially causing prejudices and negative stereotypes (Clarke & Griffin, 2008). From the social perspective, ageing can also be perceived as a transition in an individual's roles and relationships, which requires adaptation and adjustment. Thus, this transition may involve losing a work-related role, but strengthening family member or community member roles (Barnes-Farrell, 2003); narrowing social networks, but strengthening those that are stable and reliable (Charles & Carstensen, 2010).

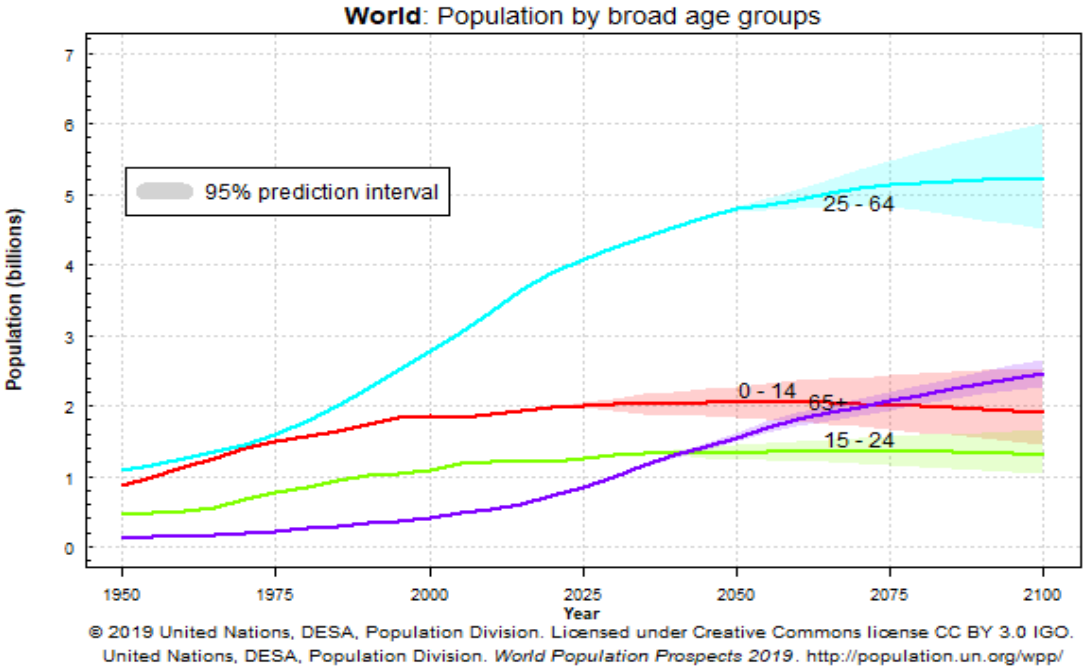
The trajectories of those changes may vary over time for individuals. Given its complexity and variability, ageing can be best explained and understood by looking at the processes that may affect people's general functioning as they grow older (Stuart-Hamilton, 2012). These age-related changes or transformations can include gradual declines in neurological, physiological, physical, and mental functioning (WHO, 2015). However, there is also inter-individual variability in the degree to which decline might be experienced, explained by genetic and environmental influcences that are modified over time (Birren & Schroots, 2001). In fact, growing research evidence suggests that the functional capacity of older adults can be maintained or even enhanced by individual behaviour (e.g., Baltes, 1987; Li & Lindenberger, 2002). For example, fitness-training or physical activity in general, as well as social engagement were found to have positive influence on cognitive function, by either slowing the rate of cognitive decline or improving the performance (Bassuk et al., 1999; Colcombe & Kramer, 2003; Sturman et al., 2005). Further, engaging in mentally stimulating/ demanding activities are associated with a reduced rate of cognitive decline (e.g., Schooler & Mulatu, 2001). Conversely, however, engaging in unhealthy behaviours such as smoking, excessive drinking, having a poor diet or sedentary lifestyle (e.g., watching television, physical inactivity) can contribute to an increased risk for mortality, a decline in health status and cognitive function (Cadar et al., 2012; Haveman-Niels et al., 2003).

Despite there sometimes being an often overly negative image of ageing, growing older can also be viewed in the context of positive changes observed in older people's lives. For example, older adults often show greater ability to regulate their emotions (Carstensen et al., 2003) and consequently, are less confrontational and minimise the likelihood of conflict (Magai & Passman, 1997). Older adults also appear to have greater self-acceptance (Ryff, 1991) and acceptance of their present situation (Carstensen et al., 2003). After experiencing loss, an inevitable part of ageing, they learn how to adapt quickly by accepting the new situation, protecting their self-esteem (Heidrich & Ryff, 1993), and concentrating on emotionally-rich and supportive relationships (Carstensen, 1995). They can also actively seek generative goals and actions by providing care to their children and grandchildren, as well as, by involvement in community-based activities such as intergenerational engagement (Cheng, 2009). Thus, older adults can use their accumulated experience and wisdom to 'give back' to society and younger generations. By engaging in meaningful, nurturing, and productive activities, they can help alleviate specific challenges that may exist within communities, such as limited resources within schools (Rebok et al., 2004).

In recent decades a greater proportion of people have been reaching older ages and their number is increasing faster than the rest of the population (Cowgill, 1974). An unprecedented situation occurred in 2018 when the number of people aged 65 and older exceeded the number of children under five years of age (United Nations Population Division, 2019). It is estimated that by 2050 one in six people globally will be 65 or above (United Nations Population Division, 2019; Figure 1.1). This new demographic transition is also apparent in the UK. There are currently nearly 12 million people aged 65 and over living in the UK and it is estimated that in 50 years this population will increase by 8.6 million (Age UK, 2019).

Figure 1.1

Young children and older people as a percentage of global population: 1950-2100.



Note. The figure reprinted from World Population Prospects 2019: Volume II: Demographic Profiles, by Department of Economic and Social Affairs Population Division. Reprinted with permission of the United Nations.

The recent trends associated with population ageing result mainly from declines in mortality rates and decreased fertility rates (ONS, 2018b). These two demographic trends can be perceived as measures of progress, and the current trend towards increasing lifespans as “the greatest triumph our species has achieved” (Kirkwood, 2001, p.5). This “triumph” was possible because of reductions of infectious diseases, improvements in consumption of nutritious food, improved health care, and declining mortality at young ages (WHO, 2015; UNFPA, 2012). Thus, increased longevity should be celebrated and the social and human capital of the older adult population perceived as relevant resources for societal growth (WHO, 2015). However, it is acknowledged that living longer is also associated with challenges for older people and for society as a whole.

Although people are living longer, they are likely to spend many of those 'extra' years in poor health (Public Health England, 2018; ONS, 2018c). For example, men aged 65 and over living in the UK might expect to live a further 19 years, with about 10 of those years being disability-free; for 65-year-old women, 10 years of disability-free living are also expected, but that is in the context of a further 21 years of life expectancy (ONS, 2018d). In Scotland in 2017-19, life expectancy was 77.1 years for males and 81.1 years for females (The National Records of Scotland, 2020), of which 61.9 years for males and 62.2 years for females might be spent in good health (ONS, 2018d). Furthermore, in the UK, more than half of the older population have at least two chronic health conditions (Kingston et al., 2018). Increasing disability and morbidity can profoundly affect older adults' daily functioning, and ultimately their independence, quality of life, and autonomy (Wittenberg et al., 2018).

Challenges of an ageing population can be considered in the context of economic and heath-related implications, as well as at the individual and societal level. At the individual and health-related level, living longer is associated with: 1) a decreased ability to perform activities of daily living (Wittenberg et al., 2018); 2) developing long-standing illnesses (e.g., diabetes, cardiovascular diseases; Melzer et al., 2015); 3) multi-morbidity (Kingston et al., 2018); 4) frailty (Gale et al., 2015); and 5) declines in mental health and wellbeing (Royal College of Nursing, 2018). At the societal level, a decreased level of health and wellbeing and higher dependency of the older adult population means that more formal and informal care services are required (Kelly & Kenny, 2018), which can present a profound challenge for health and social care systems (WHO, 2018). In terms of implications for economic development, the imbalance between populations in employment and those in older age dependency may lead to using existing economic reserves to support the pension and care system, instead of enhancing economic growth (Rutherford & Socio, 2012). At the individual level, living longer may mean, for many older adults, being supported by the low state pension and living in poverty (Department for Work and Pensions, 2019).

The emphasis on the economic impact of population ageing appears to be based on the assumption that old age is synonymous with increases in health care costs and challenges for welfare system. However, ageing does not need to imply burden to the social security system or increasing dependency on it (Spijker & MacInnes, 2013). Prevalence of late-life disability rates are declining due to advances in medical care as well as changes in social, environmental and economic factors (Schoeni et al., 2008). For example, early diagnosis and treatment can delay the progression of disease; and a higher educational attainment or income may help prevent onset (e.g., associated with avoidance of risky behaviours such as smoking or drinking) or manage the disabiliy (e.g., rehabilitation, treatment; Zimmer & House, 2003). Moreover, reaching older age and longer life expectancy can bring more opportunities than challenges. Older adults are often proactive and valued contributors to society and their own families. By perhaps providing unpaid care to their relatives or by volunteering in their communities, they not only enhance their wellbeing and reduce the risk of mortality (Okun et al., 2013), but also promote a sense of generativity and supportive, sometimes intergenerational relationships (Fried et al., 2004; Weiss, 2014).

Therefore, the health-related decreases associated with ageing are not inevitable and their level can differ across the older adult population. Substantial cross-sectional and longitudinal evidence suggests that maintaining an active lifestyle, engaging in occupations of high complexity, and higher levels of educational attainment can delay the onset of any age-related changes and contribute to healthy ageing (e.g., Stern, 2009, 2012; Valenzuela & Sachdev, 2006). Those factors seem to impact greatly the interindividual differences in ageing trajectories and predict which individuals will be more susceptible to age-related brain changes or neurodegenerative deseases (e.g., Jones et al., 2011; Scarmeas et al., 2001; Stern et al., 1994). In that regard, life experiences may contribute to developing cognitive (physiological robustness within functional brain networks) and social (e.g., social relations, social support) reserves that help maintain health and

functioning in older age (e.g., Cabeza et al., 2018; Ihle et al., 2019). Moreover, these two domains that can serve as buffers against decline, can be continuously accumulated with increasing age, by engaging in various cognitively and socially stimulating activities (e.g., intergenerational engagement, late life education, leisure activities; Fried et al., 2004; Hertzog et al., 2008).

However, the challenges resulting from population ageing can be addressed by first celebrating ageing, acknowledging the many important contributions older adults already make to society, and increasing opportunities for more older adults to contribute to their local communities and society in general (WHO, 2015). It is essential to create supportive environments that promote active ageing, which is defined as “the process of optimising opportunities for health, participation and security to enhance quality of life as people age” (WHO, 2002, p.12). Remaining active does not only mean working for longer or maintaining physical ability to do so, but being active contributors to family and community, despite any illness or disabilities. The majority of older adults are active contributors to family care, especially to grandchildren (Glaser et al., 2013), or to society as volunteers or in the paid workforce, which is increasing (Centre for Ageing Better, 2019). This active involvement of older adults can be further facilitated by new policies and community-based programmes (WHO, 2002). By promoting social connections, and health and wellbeing in the older adult population, the challenges of population ageing upon social and health services and national economy could be reduced (WHO, 2002).

In sum, in order to help maintain health and wellbeing in the ageing population and society as a whole, opportunities must be created to encourage older people to participate in, and contribute to, their communities (WHO, 2015). Community engagement can potentially provide older adults with more cognitive and physical activity, and social connectedness, while enhancing their health and independence. Enabling people to do meaningful work more flexibly in later life may also reduce demand on care and health

services, and contribute to the economy (Government Office for Science, 2016).

1.3 Impacts of Ageing on Health, Wellbeing and Social function

1.3.1 Ageing and Cognition

Cognitive ageing research has primarily focussed on understanding normal cognitive changes that occur across the lifespan. Identifying the determinants of those changes was considered to be crucial for identifying processes that are abnormal or pathological (Craik & Salthouse, 2011). However, those cognitive declines associated with the healthy ageing process are still not fully understood (Harada et al., 2013). Although aspects of cognitive change as a normal process of ageing has been well-documented in the scientific literature, there is still a number of methodological limitations that are inherent in studying normal cognitive ageing. For example, recruitment bias may lead to under- or over-estimation of the degree of cognitive decline, if older adults are deemed too ill or too healthy to participate (Minder et al., 2002), or if 'healthy' participants have in fact undetected, pre-clinical neuropathology such as the early stage of Alzheimer's disease development (Boyle et al., 2013). Further, longitudinal data can be influenced by practice effects which can inflate subsequent scores, whereas cross-sectional assessments can be confounded by cohort differences (e.g., the cross-sectional age differences) that may potentially overestimate the effects of ageing (Salthouse, 2009).

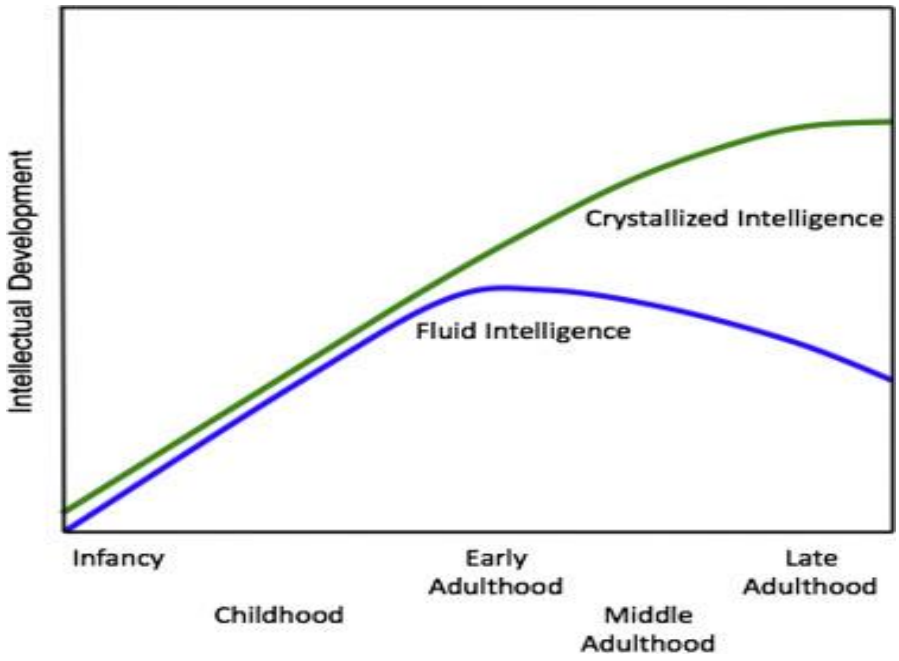
Age-related changes in cognition are determined by the complexity and heterogeneity of patterns of cognitive declines across individuals (DeCarli, 2003; Geda, 2012; Hofer & Alwin, 2008). Thus, although gradual declines in cognitive functioning during adulthood are typically observed, they can follow different trajectories and involve only certain aspects of cognitive domains (Harada et al., 2013). The most noticeable age-related declines in cognitive functioning occur within the domain of 'fluid' abilities such as speed of information processing, working memory, and problem solving (Horn &

Cattell, 1967; Salthouse, 1996; Salthouse & Babcock, 1991; Reuter-Lorenz & Lustig, 2016). Fluid cognitive abilities involve dynamic processing of incoming information, reasoning, or manipulating mental representations, and tend to be most affected by ageing (Craik & Bialystok, 2006). After rapid development until the mid-20s, these cognitive operations typically show linear decline until early old age (60-65 yrs) and possibly steeper decline in late old age (Christensen, 2001; Figure 1.2).

Conversely, crystallised abilities involve storing and maintaining knowledge acquired during the lifetime, through the process of learning and experience. These abilities are positively associated with ageing and can remain intact or even continue to increase through to later life (Craik & Bialystok, 2006; Park et al., 2002). As compared to decreases in fluid cognitive abilities, the relative stability of crystallised abilities can even be observed even in people with dementia (McGurn et al., 2004) or depression (Crawford et al., 1987). Therefore, crystallised abilities are often measured to estimate premorbid intellectual ability that can identify the extent of functional decreases in older adults experiencing cognitive deficits (Crawford et al., 2001). Specific, core cognitive abilities will now be considered in turn.

Figure 1.2

Crystallised intelligence (knowledge) usually increases throughout a person's lifetime, while fluid intelligence typically begins to decline after early adulthood.



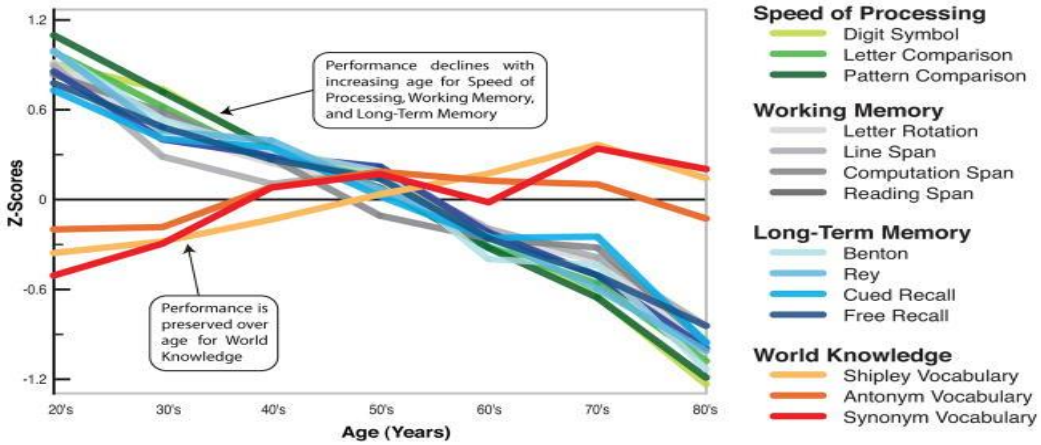
Note. Data source based on Cattell (1987); figure reprinted from Johnson, J., & Finn, K. (2017). Designing user interfaces for an aging population: Towards universal design; used with permission from Elsevier. Copyright © 2017 Elsevier Inc.

Processing speed. The speed with which people process incoming information and act upon it exhibits not only the greatest decline with age compared to other cognitive domains (Salthouse, 1996; Figure 1.3), but also considerable variability across individuals (Dykiert et al., 2012). It is hypothesised that declines in speed of processing are more evident as task complexity increases (Birren et al., 1980). Thus, general slowing, as measured by reaction time (RT), increases as processing demands become more complex and require performing multiple mental operations simultaneously, up to the available processing limits (Whitbourne & Whitbourne, 2010). As a result of those limitations of processing capacity or mental resources when performing difficult tasks, older adults may not be

able to complete those tasks accurately (Salthouse, 1996). Limited by the available time, they may become preoccupied by initial operations and have less time to perform later steps on the task. They may also lose what was achieved in earlier stages by the time that later task is accomplished (Salthouse, 1996). It was suggested that this slowed processing experienced with age could be related to changes in the central nervous system, including increased neural fluctuations and degradation of white matter that may impair cognitive functioning (Kennedy & Raz, 2009; Sexton et al., 2014; Welford, 1977).

Figure 1.3

Cross-sectional ageing data showing behavioural performance on measures of speed of processing, working memory, long-term memory, and world knowledge.



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This basic cognitive function is particularly sensitive to age and is also assumed to be an ability that mediates declines in higher-level cognitive functions, including memory, reasoning, and attention (Bashore et al., 1997; Kail & Salthouse, 1994; Lemke & Zimprich, 2005; Salthouse, 1996). That is, slowed mental operations may not only affect specific information-processing

components (i.e., initial stimulus encoding, response selection), but also logical thinking, and the ability to remember or respond to any perceptual stimuli (Cerella, 1985). This general slowing of information processing is also considered as a possible explanation of the age-related variance in short-term ('working') memory performance (Salthouse, 1996; see below). For example, evidence suggests that many age differences in working memory are particularly apparent on tasks requiring information processing (Salthouse & Babcock, 1991). More specifically, tasks that require simultaneous retention and processing of information (i.e., working memory performance) are typically subject to more reliable decreases (e.g., Bopp & Verhaeghen, 2007; Salthouse & Babcock, 1991; Brebion et al., 1995), as well as tasks using free recall of words that may engage long-term memory rather than working memory to encode or retrieve the required information (Naveh-Benjamin et al., 2005). Therefore, age-related declines in working memory appear to be more apparent when tasks are more demanding and rely heavily on speeded response (Logie et al., 2014).

Furthermore, the interrelationship between processing speed and working memory appears to predict age-related changes in the higher-level cognitive domain of long-term memory (Park et al., 1996; 2002). In other words, speed of processing determines changes in working memory, whereas the working memory construct relates directly to long-term memory measured by free recall and cued recall (Park et al., 1996). Several studies also demonstrated slowing and reduced rate of encoding and retrieval from long-term episodic memory as a function of older age (e.g., Anders & Fozard, 1973; Bacur et al., 2008; Head et al., 2008). Moreover, the impacts of processing speed and working memory on episodic memory can be mediated by inhibitory control (Head et al., 2008).

Although speed of processing is associated with rates of decline with age (Salthouse, 1996) and in turn seems to predict losses in other cognitive domains, it seems clear that decline might not be experienced by all individuals equally. It has been proposed that the rate of decline can be slower or its onset delayed in those with higher levels of educational

attainment, for example (Stern, 2002). The protective mechanisms conceptualised as cognitive reserve was explored in relation to declines in processing speed in a 5-year randomised controlled trial (Tucker-Drob, 2011). This longitudinal examination provided further evidence for the relationship between education and long-term differences in level of functioning. However, while decline may be delayed, it did not reduce the overall extent of decline. Those findings showed that education aquired over the lifespan, seemed to be an important factor that benefits individuals until the late adulthood, although it does not protect against eventual functional impairment.

Executive function. Normal cognitive ageing is also associated with declines in executive function, a higher-order cognitive domain responsible for the control of attentional resources, planning, and monitoring behaviour (Murman et al., 2015). Thus, advancing age can reduce ability to: 1) inhibit irrelevant information; 2) shift attention among different sub-tasks; and 3) update information in working memory (Hasher & Zacks, 1988; Miyake et al., 2000). Reduced efficiency of inhibitory processes can then lead to decreases in memory performance due to the prolonged retention and maintenance of irrelevant information with the loss of primary information. Inhibitory control can therefore be considered a potential indicator of variability in cognitive performance (Salthouse et al., 2003; Head et al., 2008). There is also age-related variability that pertains to selected sub-processes within executive functioning. For example, differences can be found in processes involving the maintenance of two distinct mental task sets, showing age-related declines in the accuracy of maintaining representations (Verhaeghen & Hoyer, 2007). However, age-differences are not present when switching representations outside the focus of attention (Dorbath & Titz, 2011). Age-related changes are also absent in local switching (i.e., the ability to execute the task switch itself), but they are found in global switching (i.e., maintaining two alternating tasks; Kray & Lindenberger, 2000).

Working memory. Advancing age is associated with poorer working memory that deals with the temporary storage, manipulation and integration

of information (Cornoldi & Vecchi, 2004). For example, the process of maintaining verbal and visuo-spatial information that occurs within working memory shows deficits due to age, but the decline for each of the domains is uneven (Fiore et al., 2012; Park et al., 2002). The existing literature provides some contrasting evidence regarding the extent of the effects of age-related differences on visuo-spatial and verbal memory that may indicate a domain-specific deterioration of working memory (e.g., Bopp & Verhaeghen, 2007; Vecchi et al., 2005). There is also evidence that deficits in working memory may vary depending on the information being processed across specific domains under investigation. That is, tasks that require simultaneous retention and processing of information have suggested strong decreases in working memory performance (e.g., Bopp & Verhaeghen, 2007; Brebion et al., 1995; Salthouse & Babcock, 1991), as well as tasks using free recall of words that may engage long-term memory rather than working memory to encode or retrieve the required information (Naveh-Benjamin et al., 2005). Therefore, age-related declines in working memory appear to be more apparent when tasks are more demanding and rely heavily on speeded response (Logie et al., 2014).

Long-term memory. Ageing affects not only short-term but also long-term-memory storage and recall. Long-term memory involves the potentially lifelong retention and recollection of: 1) past experiences that are rich in contextual information (episodic memory); 2) autobiographical information (autobiographical memory); 3) general knowledge of the world (semantic memory); and 4) a variety of acquired skills (procedural memory; Christopher, 2014). Although age-related declines were demonstrated on tasks assessing different types of long-term memory, not all of them were equally affected. For example, semantic memory is relatively resistant to ageing and may even continue to improve with increasing age (Giambra et al., 1995; up to age 65, Nyberg et al., 2003). Conversely, episodic memory displays the most consistent and the largest age-related deficits (Nyberg et al., 2003; Rönnlund et al., 2005; Schaie, 2005). Several studies demonstrated slowing and reduced rate of encoding and retrieval from long-

term episodic memory as a function of older age (e.g., Anders & Fozard, 1973; Bacur et al., 2008; Head et al., 2008). However, the accelerating decline that occurs within this cognitive domain is not homogenous. Evidence suggests that age differences are more apparent for recall than for recognition operations, indicating a reduced ability to acquire and recode information, while the ability to process generic information remains less age-sensitive (Nyberg et al., 2003; Nyberg et al., 1996). There is also an inter-individual variability in decline of episodic memory that increases with advancing age (de Frias et al., 2007).

Methodological issues in cognitive ageing research. Inter- and intra-individual variability in age-related changes in cognitive function can also be associated with several factors and mechanisms, including lifestyle, environmental and social factors, genetics and neurobiological processes, or health (Glisky, 2007; Hertzog et al., 1992; Li & Baltes, 2006). Longitudinal studies of ageing show that short-term changes in cognitive performance, such as greater cognitive plasticity (i.e., the brain's capacity to adaptive changes to optimise the cognitive performance; Lövden et al., 2010), decreased cardiovascular liability, or low levels of emotional diversity are positively related to long-term variability in cognitive abilities (Ram et al., 2011). In other words, successful cognitive ageing is predictive of and positively associated with greater cognitive plasticity, lower fluctuations in resting heart rate and in emotional states.

Variability in cognitive ageing can also be linked or mapped to decreases in neurobiological function. Structural changes in the prefrontal cortex and the hippocampus such as loss of volume and density, are associated with decreases in higher-order cognitive abilities, including declines in executive function (Raz & Rodrigue, 2006) or deficits in memory performance (Rosen et al., 2003). Volume shrinkage of grey matter and white matter that occur with advancing age (Jarnigan et al., 2001) relate to impairment in executive functioning, processing speed, and long-term memory function (Park et al., 2001; Ramanoël et al., 2018). However, despite the apparent linkage between the ageing brain and decreases in cognitive function, some

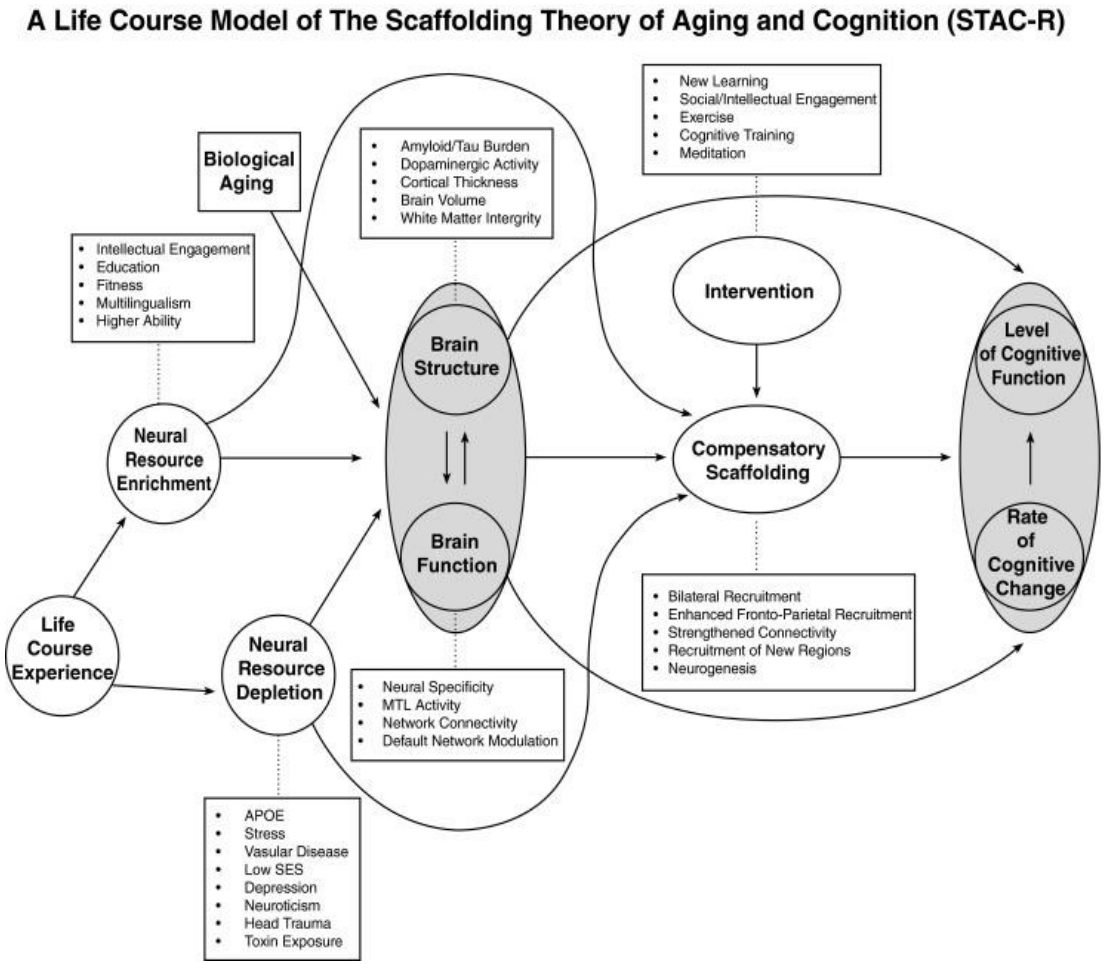
neurobiological losses do not map directly onto changes in associated cognitive processes (Cabeza et al., 2016). This suggests that the brain can, to some extent, maintain or support its functioning via plasticity, to restructure neural activity patterns to compensate for age-related neural insults. In the subsequent subsection, a theoretical model of this adaptive neural compensation will be described, in relation to age-related changes and preserved cognitive function in later life.

Ageing and Neurocognitive Scaffolding

Given the cognitive ageing effects discussed above, an important goal is to identify potential predictors of those changes. Adverse and compensatory mechanisms associated with the ageing brain are integrated and accounted for in the scaffolding theory of ageing and cognition (STAC; Park & Reuter-Lorenz, 2009; Figure 1.4). It was hypothesised that the ageing brain could compensate for neural changes (primarily structural changes) such as reduced grey matter volume and thickness, or white matter integrity (Hedden et al., 2016; Raz et al., 2005) by engaging supplementary neural circuitry, or scaffolds (Park & Reuter-Lorenz, 2009). This protective mechanism allows the ageing brain to maintain a higher level of functioning and engage in mentally challenging tasks.

Figure 1.4

A conceptual model of the scaffolding theory of aging and cognition-revised (STAC-r).



Note. Copyright © Reuter-Lorenz & Park (2014). Figure from Reuter-Lorenz, P. A., & Park, D. C. (2014). How does it STAC up? Revisiting the scaffolding theory of aging and cognition. *Neuropsychology review, 24*(3), 355-370. Reprinted with permission.

A key prediction from the STAC model is that various forms of intervention may positively contribute to scaffolding. In line with this, a number of cognitive training and engagement interventions have examined the impact of participating in novel and mentally challenging activities on different cognitive abilities. Experimental studies focused mainly on untrained abilities (e.g., learning and using strategy instructions) and used ability-specific training (e.g., memory training, reasoning training, and speed

training) to examine changes in neural function and brain structures (Tennstedt & Unverzagt, 2013; Valenzuela et al., 2003; Lövdén et al., 2010). For example, the Advanced Cognitive Training for Independent and Vital Elderly (ACTIVE) trial is a randomised controlled trial that targeted three cognitive domains – memory, reasoning, and speed of processing - through instruction and practice in strategy use, solving problems that contained a serial pattern, or ability to process increasing information in shorter times (Tennstedt & Unverzagt, 2013). In terms of intensity and duration of the trial, interventions were conducted in small groups in ten x 60–75-minute sessions over 5 to 6 weeks. In all three interventions (i.e., memory training, reasoning training, speed training), sessions 1–5 focused on strategy instruction and exercises to practice the strategy, while sessions 6–10 provided additional practice exercises. Content for each of the 10 sessions was scripted in a trainer's manual. Booster training (four 75-minute sessions) was provided at 11 and 35 months after training with a randomly selected subset of participants in each intervention arm who completed initial training (defined as at least 8 of 10 sessions). The trial demonstrated an immediate improvement in reasoning and speed of processing that lasted across five and ten years of follow-up (Rebok et al., 2014; Willis et al., 2006).

Other experimental research on cognitive training reported improvements in memory performance and neurochemistry of the hippocampus (a brain structure related to learning and memory; Valenzuela et al., 2003), and increases of the anterior part of the corpus callosum (a nerve fibre bundle that connects the left and right cerebral hemispheres; Lövdén et al., 2010). Thus, this evidence reveals experience-dependent plasticity of white matter and suggests that the association between mental engagement and enhancement of cognitive abilities appears to be plausible and reliable. It demonstrates that neuroplasticity of the ageing brain can be modified by experience and is amenable to new, challenging tasks. However, the research is lab-based and perhaps not achievable for/attractive to most older people or ‘scalable’ to the wider population. Therefore, real-world, community-based engagement programmes may be a more realistic and

popular approach to examine the relationship between cognitive ageing and increased engagement.

The Engagement Hypothesis

An engaged lifestyle during late adulthood has been suggested to be a key aspect for successful ageing (Rowe & Kahn, 1997). In line with this recommendation, the engagement hypothesis (Schooler & Mulatu, 2001; Schooler et al., 1999), one of the major theoretical approaches to cognitive ageing, seemed to offer a plausible solution to facilitate successful cognitive and social ageing. According to this theory, participation in socially and mentally demanding activities could contribute to reduction of age-related declines in cognitive functioning (Stine-Morrow et al., 2007), which aligns with STAC predictions on maintaining a higher level of functioning through engaging in challenging tasks (Park & Reuter-Lorenz, 2009). The engagement model originated in epidemiological studies on lifestyle demonstrating that people who engage in complex work (Schooler et al., 1999), social networks (Bennett & Gains, 2006) or generally stay busy benefit from enhanced cognition and health (Lövdén et al., 2005). In this sense, engaged minds are healthy minds.

Although a clear explanation of the correlation between an engaged lifestyle and a variety of positive effects is still not well established, some possible mechanisms that could promote cognitive vitality were suggested. One of the mechanisms, presented by Schooler's engagement hypothesis, indicated significant associations between substantive complexity of work and mental flexibility (Schooler et al., 1999; Schooler & Mulatu, 2001). This substantive complexity of the work environment that required the exercise of multiple cognitive abilities, including problem solving, verbal reasoning or immediate recall, could increase the level of individuals' mental functioning. Conversely, engaging in activities that were not mentally demanding might negatively affect their intellectual functioning. Moreover, this positive impact of participating in complex and cognitively demanding work on intellectual

abilities was found to be greater for older than younger adults (Schooler et al., 1999).

Intervention studies that involve holistic engagement provide strong support for Schooler's (1999) engagement hypothesis. Designed to be community-based programmes, cognitive interventions such as the Senior Odyssey (Stine-Morrow et al., 2008; Stine-Morrow et al., 2007), the Synapse Project (Park et al., 2014), or Experience Corps (e.g., Carlson et al., 2008; Fried et al., 2004), showed a clear link between engagement and cognition. These longitudinal studies involved a variety of cognitively stimulating activities ranging from problem-solving activities and digital photography training to providing support to children and teachers in the school environment. They found that substantive complexity of engagement could lead to improvements in executive function (Carlson et al., 2008), episodic memory (Park et al., 2014), speed of processing, divergent thinking (Stine-Morrow et al., 2008), and reasoning (Stine-Morrow et al., 2008; Tranter & Kautsaal, 2008).

In summary, most age-related declines in cognitive functioning occur within the domain of 'fluid' abilities such as speed of information processing, working memory, and problem solving (Reuter-Lorenz & Lustig, 2016). Although some of these gradual cognitive declines can be associated with healthy ageing, there is also considerable inter-individual variability in those changes. Threfore, it is important to understand potential predictors of the cognitive declines as well as protective mechanisms that allow the ageing brain to maintain a higher level of functioning (Park & Reuter-Lorenz, 2009; Schooler & Mulatu, 2001). Experimental studies targeting fluid abilities could be beneficial in terms of maintaining cognitive health status. However, to date, limited research has shown evidence of transfer of the exercised skills to daily living tasks (Rebok et al., 2014). Therefore, we need more Intervention studies that involve holistic, 'real-world' engagement that may promote not only older adults' cognition, but also their general health and wellbeing and social function (e.g., Carlson et al., 2008).

1.3.2 Ageing, Health and Wellbeing

In essence, health in later life and associated changes can be considered in terms of three main categories: physical health, mental health and wellbeing, and health behaviours (WHO, 2015). Age-related changes in these three categories are often interrelated, however, the direction of any impacts is still difficult to establish. For example, mental health problems of older adults can impact physical function, and conversely declines in physical health can result in mental health problems (Naylor et al., 2016). The links can also be identified between lifestyle behaviours (e.g., alcohol consumption, physical activity) and physical and mental health in older age (e.g., Skelton et al., 2018; RCPSYCH, 2019). Therefore, the mental health of older adults should be assessed alongside their physical functioning and physical declines due to their potential interaction (Naylor et al., 2016).

This complex interrelationship or potential coexistence of physical and/or mental health issues can have an adverse impact on older adults' functioning. For example, depression, which is the most prevalent mental health condition in later life, may have a greater impact on the older person's functional level if combined with heart disease or cognitive impairment (Tinetti et al., 2011). Thus, co-occurring depression and chronic physical conditions can significantly lower the number of activities of daily living (e.g., preparing meals, housework, walking) that an older person can perform, as compared to the effects of the individual health conditions (Tinetti et al., 2011). Conversely, limited functional ability, including reduced mobility, limitations in vision and hearing, increased frailty or other age-related health problems, can contribute to developing or worsening mental health problems (i.e., depression) and reduced quality of life (e.g., Jaul, & Barron, 2017; Davis et al., 2016).

The emergence of some of these age-related mental and physical impairments can also be explained at the biological level. In this sense, declines in physical and mental capacity are related to the accumulation of detrimental changes in molecular and cellular function of the ageing body (D'Onofrio et al., 2018). These gradual deleterious changes can result in an

increased risk of developing diseases and death. However, as with cognitive functioning discussed above, the trajectories of these biological changes and age-related diseases that occur with advancing age are not linear and vary across the older adult population (WHO, 2015). Furthermore, they can be influenced by social factors or life transitions such as bereavement, loss of socialising opportunities, or socioeconomic changes associated with retirement (Allen, 2018). All these adverse experiences in combination with mental and physical ill-health can lead, in turn, to social isolation, loneliness, or engaging in health risk behaviours (e.g., alcohol use, physical inactivity), which can accelerate the impacts of age-related conditions and functional declines (e.g., Sutin et al, 2018; RCPSYCH, 2019).

In order to prevent or reduce impacts of age-related transitions and health conditions, maintaining or changing health-related behaviours is needed. Healthy lifestyle behaviours such as moderate physical activity, healthy diet, or sensible drinking can contribute to successful ageing (Sabia et al., 2012) and decreased mortality risk in older adults (Hamer et al., 2011; SAPEA, 2019). In terms of healthy ageing, moderate-intensity physical activity, in particular, can bring substantial benefits for older populations, including decreased risk of falls (Gillespie et al., 2012), reduced cognitive decline (Blondell et al., 2014), improved mental health (Schuch et al., 2016), or even delay in the onset of dementia (Norton et al., 2014; Livingston et al., 2017).

Physical activity has also the potential to improve social outcomes by maintaining community engagement and establishing new social ties. However, level of physical activity decreases substantially in later life, specifically in the population of 85 years and over, of which 71% are inactive (active for less than 30 minutes/week; Sport England, 2018). This very low activity level can greatly affect older adults' healthy life expectancy (Sport England, 2016), predict disability (Sjölund et al., 2015), and ultimately increase mortality risk (Win et al., 2011). Particularly disadvantaged are older adults living in rural and deprived areas with limited access to community-

based services and activities, which in turn leads to social isolation and reduced mobility (UNECE, 2017).

Despite declining health, positive trends in three psychological aspects of subjective wellbeing including life satisfaction, worthiness (of things in life), and happiness observed among older adults indicate that psychological wellbeing may be influenced by factors other than health (Blanchflower & Oswald, 2008; Steptoe et al., 2015). In the UK, people aged between 70 and 79 indicate the highest satisfaction with life amongst other older adult age groups, but also as compared to young adult populations (ONS, 2018e). People aged 65 and over also score very high when rating that the things done in life are worthwhile, with the group 65-69 years of age giving the highest ratings across all age groups (ONS, 2018e). The same survey shows that the older adult population is also the happiest age group, with happiness peaking between 70 and 74 years. These findings can be explained by "the potential of recovery, adaptation and psychosocial growth in older age" (WHO, 2015, p. 64) or, alternatively, by a decreasing pattern of stress (Stone et al., 2010) and socio-emotional selectivity (Carstensen et al., 1999, 2003). According to the socioemotional selectivity theory (Carstensen, 1991; Charles & Carstensen, 2010), as people age and perceive their time left as more limited, they become less future- and more-present oriented. That can be observed in terms of prioritising present-oriented emotion-based close relationships over knowledge-related social contacts to maximise emotional satisfaction and wellbeing. Furthermore, older adults appear to proactively reduce the size of their social networks to people who promote their present wellbeing and are best able to influence their emotional states (Lang & Carstensen, 1994). This strategy reflects the increased importance of emotionally meaningful relationships and goals in older adulthood.

Conversely, the overall life satisfaction of older people can be affected by frailty (Wilhelmson et al., 2013), potentially debilitating conditions such as arthritis or heart disease, as well as sleep insufficiency, depression, pain, and anxiety (Strine, 2008). Higher levels of life dissatisfaction are also related to the prevalence of health risk behaviours, including heavy alcohol use,

smoking, and physical inactivity (Strine et al., 2008). These discrepancies in findings on older adults' self-rated health and wellbeing may reflect the variability of their life experiences and how they cope with change and loss (Nybo et al., 2001). In other words, the extent to which disability or other age-related changes affect older persons' wellbeing (e.g., life satisfaction) can depend on resources to cope such as social network/support or resilience (Silverman et al., 2015).

Close relationships can play an important role in maintaining health and wellbeing in older age and loss of such relationships can affect various aspects of people's quality of life. Bereavement is one of the leading risk factors that has the potential to impact adversely older adults' mental health and wellbeing (Buchan et al., 2015; Cole & Dendukuri, 2003). The loss of loved ones can elicit in older adults difficult to modulate emotional responses, which may reduce physiological flexibility (e.g., increased blood pressure) and delay recovery from the event (Charles, 2010). Research shows that widowhood can lead to psychological distress including depression and anxiety, unhealthy behaviour changes (i.e., smoking and drinking alcohol; Stahl & Schulz, 2014), poorer physical functioning and increased risk of mortality (including suicidal ideation; Buchan et al., 2015; Wilcox et al., 2003). The post-bereavement period is also associated with financial vulnerability that disproportionally affects older women (Gillen & Kim, 2009). The loss of a spouse produces a decrease in income that can be an important risk factor for transition into poverty, which in turn can lead to adverse health and psychological distress in late life (Darin-Mattsson et al., 2017). Economic insecurities affect not only bereaved older adults, but the older populations in general (DWP, 2021; Rank et al., 2014). The average old-age poverty rates for women and men in the OECD (2021) equal 16.2% and 11.6%, respectively. Lower earnings-related pension income and longer life expectancy are among the main predictors of higher poverty incidence among women as compared to men.

Finally, all the adverse factors including social losses, vulnerability to economic disadvantages and poor health can be associated with deficiencies

in social contacts (Age UK, 2019; Grenade & Boldy, 2008; Stewart et al., 2009). Although the direction of causality is still not well understood, a number of studies demonstrated an relationship between social isolation (and/or loneliness) and mental illness (e.g., depression; Bodner & Bergman, 2016), health deterioration (Victor et al., 2005), and poverty (Stewart et al., 2009). Overall, declines in social engagement in later life can be related to limited opportunities for social contact and changes (e.g., losses) in relationships. However, social isolation can also result from negative social image and stereotypes about ageing (Coudin & Alexopoulos, 2009) that can, in turn, be associated with an increased level of psychological distress (Rahman & Jahan, 2020) and decreased self-esteem (Bergman, 2022).

Considering the complexity of interactions between various mental and physical health problems and lifestyle behaviours that affect older adults' quality of life, both physical and psychosocial interventions are required. Therefore, in order to address some of the co-existing health and behavioural issues, more comprehensive approaches need to be developed, identifying potential comorbidities, their impacts, and best treatments for older adults (WHO, 2015). With this approach is in place, mental and physical health and wellbeing can be promoted and, consequently, healthy ageing maintained by creating community-based age-friendly programmes. These initiatives or services may not only strengthen older adults' physical and mental health, but also build new social relationships. The latter could help decrease the risk of disability (De Leon et al., 2001), and fight loneliness and social isolation (Dickens et al., 2011), that are major risk factors and predictors of the onset of dementia (Holwerda et al., 2014). Furthermore, they can also benefit wider society, due to facilitating a greater contribution from older adults.

1.3.3 Ageing and Social functioning

Social networks, social inclusion, and social support appear to play a central role in age-related transitions such as retirement, or coping with biopsychosocial changes (Huxhold et al., 2014). Friendships and family

relationships serve a protective function when mental and physical health of older persons is challenged by age-related illnesses, disability, and the loss of professional identity and of significant others (e.g., Chen & Feeley, 2014; Kwag et al., 2011). Thus, social relations and social engagement are key to healthy ageing (Whitley et al., 2016) and to recover from losses associated with ageing, for example after retirement (Topa et al., 2017) and after bereavement (Utz et al., 2002).

However, maintaining relationships or establishing new ones can constitute a challenge in later life, including losing family members and friends, as well as redefined post-retirement roles within the family and society in general (Coleman & O'Hanlon, 2017). An accumulation of these often co-occurring events or circumstances can create an extreme strain for an older person's health and wellbeing (Cesari et al., 2013). For example, age-related declines in social interactions and the transition into retirement can result in loneliness (Segel-Karpas et al., 2018), which, in turn, is associated with the risk of developing cardiovascular disease (Xia & Li, 2018), poorer sleep efficiency (Cacioppo et al., 2002), impaired executive functioning (Cacioppo & Hawkley, 2009), increased levels of depression (Cacioppo et al., 2010), and mortality (Tilvis et al., 2011).

Thus, age-related loneliness can have detrimental effects on health and functioning. Approximately 10% of the older population report feeling severely lonely and 30-40% occasionally lonely (Victor et al., 2005; Victor & Bowling, 2012). According to Age UK (2018), the main reasons for loneliness in older adults are perceived lack of people to open up to, widowhood, ill health, feeling disconnected from the community, living alone, or inability to do things one wants. Research on loneliness in later life has offered several possible explanations that depict the potential barriers of connecting with other people and the community. In terms of social barriers, older adults may avoid opportunities for fear of rejection or being stigmatised as old and dependent (Goll et al., 2014). Physical barriers such as lack of transport to social events or information about them can also prevent social participation (Coleman & O'Hanlon, 2017). Many of these barriers are transient and can

be overcome by developing age-friendly (i.e., more accessible and receptive to the needs of the older population) communities that help combat ageism and increase social inclusion (WHO, 2015). Making cities more age-friendly is one of the WHO's (2015) initiatives that promotes active participation in all areas of community life as well as independence and health of older people. However, there are also barriers that are prevalent and difficult to change.

Common barriers that increase the likelihood of social disengagement and isolation are stereotyped attitudes towards ageing and older individuals. Ageist attitudes are often based on the presumed or observable declines associated with older age and can include overprotection, ageist humour, or excluding them from society due to their perceived limitations such as physical restrictions (Palmore, 2001; Huang et al., 2014). Some older adults may also struggle with social "invisibility" that can be considered as a unique form of age-related discrimination that gradually excludes them from social life (McGuire et al., 2005, p. 444). In addition, health and social care personnel that should provide help and prevent declines in the most vulnerable patients, can also foster ageist perceptions (Gallagher et al., 2006). These negative attitudes towards older adults can make them feel passive, inferior, and isolated (Ekman et al., 1999), and ultimately lead to "self-stereotyping" (Swift et al., 2016, p. 21). Thus, older adults may start feeling and behaving according to social labels attached to them, which is in itself detrimental to health and wellbeing (Levy et al., 2020).

Despite various age-related social challenges, the majority of older adults (approximately 89%) in the UK report that they have regular contacts with and can rely on their close family and friends (Centre for Ageing Better, 2009). This shows that older adults try to maintain social relationships that have a protective value and, in light of age-related transitions, ensure external continuity in their lives (Atchley, 1989). The protective function of long-term social relations is of particular importance due to a range of physical and mental health challenges that occur in later life (Coleman & O'Hanlon, 2017). They also provide older individuals with an opportunity to fulfil their generative need to support the next generation, which in turn,

contributes to their emotional wellbeing and continued development (Erikson et al., 1986).

Continuity versus generativity

Lifespan theorists and researchers emphasise that development does not end in early adulthood, but extends across the entire life course and is associated with different manifestations of continuity and change (Baltes et al., 1998). This interplay between change and continuity is crucial for understanding the psychosocial nature of ageing process and its implications for successful development in later life. Two theoretical explanations – the continuity theory of healthy ageing (Atchley, 1981; 1999) and the concept of generativity (Erikson, 1951; 1982) – address the interaction between change and continuity, by looking at dilemmas of mainaining pre-retirement level of activity or disengagement, generativity or stagnation, that older adults are faced with. They also suggest how those dilemmas may be resolved by defining the meaning of older individuals' lives, despite age-related and sociocultural demands.

The core assumption of Atchley's continuity theory is that maintaining continuity in late life constitutes the first adaptive strategy that middle-aged and older adults use in the face of developmental discontinuity (Atchley, 1999). The view of continuity in this theory is both coherent and dynamic. The coherent aspect of continuity refers to applying familiar patterns of behaviour, familiar strategies, or personal values that are unique for individuals and based on their lifetime experiences. The dynamic view of continuity, on the other hand, occurs within the context of experience-based persistent patterns, in the form of a variety of changes. Thus, for Atchley (1999, p.3) change and continuity "exist simultanously in people's lives", but the change needs to be incorporated into one's pre-existing structure without causing a crisis or disequilibrium.

Atchley (1999) describes dynamics of internal and external continuity that older adults are predisposed to or motivated towards, depending on their preferences and capabilities. According to his theory, internal continuity

refers to the preservation of consistent frameworks of individual competence, ego integrity, self-esteem, or ideas of social reality. External continuity involves engaging in past social roles and activities, in familiar environments, using professional or personal skills, and maintaining social relationships (Atchley, 1999). For example, engagement in volunteer roles allow older adults short-term involvement around their skills, preferred activities and environments (Tang et al., 2010), while re-establishing a sense of control over life (Thoits & Hewitt, 2001), developing new skills (Hong et al., 2009), providing meaningful contribution (Fried et al., 2004), or gaining a sense of accomplishment (Hood et al., 2018). Applying this type of pro-active approach in the face of developmental challenges and losses, creates opportunities to preserve personal integrity and goals, and prevent crisis imposed by age-related changes (Boling, 2006) such as retirement or widowhood (Achtley, 1982).

Personal goals can also transform to adjust to changing life circumstances. Generativity, a need to guide/nurture the next generation, allows older adults to establish new relationships with others that result in personal growth, a sense of feeling needed by others, and productivity in those that provide the care (Eriksen, 1950). This seventh of eight stages in Erikson's (1950) psychosocial theory of development, can manifest itself through a variety of activities that aim to support younger people, while enabling older adults to leave a positive legacy or "outlive the self" (Kotre, 1984, p.10). Those activities may include sharing values and beliefs such as the importance of education, helping others or being kind and unique (Hunter & Rowles, 2005), but they can also involve raising and caring for offspring including grandchildren (Caldwell & White, 2006). Generative involvement can also involve the community-focused engagement such as volunteerism or all forms of community activism. For example, generative adults can engage in teaching or mentoring to pass on their experience and wisdom (Glass et al., 2004). The rewarding aspects of generative actions allow enhancement of the virtue of care and prevent stagnation and withdrawing from active involvement and guiding others (Erikson, 1998).

Thus, generativity comprises a productive contribution to future generations as a means to respond to a crisis in middle adulthood. Unlike the theory of continuity, the main aim of the generative approach extends beyond preservation of self-continuity into meaningful commitment that can benefit not only the individuals, but also their wider community. Although the process of self-preservation, assumed by continuity theory, also requires involvement in various activities, the purpose of engagement is rather focused on maintaining coherence in the individual's own life. Despite major conceptual differences between those two theoretical approaches, they represent two adaptive strategies that effectively steer the older population towards decisions and actions that benefit their health, well-being, social function and provide an opportunity to benefit the wider population (Baltes et al., 1998; Atchley, 1989; Grunewald et al., 2012; Fried et al., 2004).

1.4 Intergenerational engagement

The importance of generativity in later life is related to older adults' need to engage with and actively contribute to the next generations that can, in turn, decrease a sense of stagnation and disengagement (Erikson, 1950). As mentioned earlier, for many individuals, retirement may constitute a major lifestyle transition, associated with detrimental effects on psychological functioning (e.g., Smith & Baltes, 1997) or risk of cognitive decline (e.g., Xue et al., 2018). It is therefore important to identify mechanisms that can protect against negative impacts of a disengagement from an active and intellectually challenging lifestyle accompanying retirement, on individuals' cognitive, health, and social functioning.

Designing and implementing community-based engagement interventions for older adults are needed, particularly holistic forms of engagement that simultaneously provide cognitive, physical, and social stimulation. Example approaches that have been investigated in the literature include older adults attending educational courses, social walking groups, quilting classes, aerobic exercises, or creative problem-solving activities (Blocker et al., 2020;

Park et al., 2014; Stine-Morrow et al., 2014). Another potentially effective way to achieve holistic stimulation for older people, while also benefitting wider society, could be programmes designed to bring together different generations. Historically, IE was predominantly associated with interactions between younger and older members of the same family, where older adults provided care and maintained wellbeing of the children and grandchildren (Newman, 1989). However, changes in family structure, as well as in the age and composition of contemporary society, may decrease those traditional relationships across different generations (Keating et al., 2015). This intergenerational disconnect can then further affect psychosocial functioning of both younger and older people, lead to an increase of age-related stereotypes and, consequently, to age-segregated communities (Newman, 1989). Considering the significance and potential of intergenerational relationships and engagement, programmes that foster connections may constitute one useful approach towards maintaining healthy psychosocial development and ultimately a stronger, better-functioning society.

A strategy of IE generates the potential for mutually beneficial activities and experiences. However, to maximise the beneficial outcomes and effectiveness of intergenerational practice, the engagement “must be ongoing and systematic, must continue for an extended period of time at regular intervals and must benefit all participants - youth, older persons, and staff” (Henkin & Newman, 1985, p.14). This does not mean that intergenerational work needs to remain invariant and follow a strictly pre-determined plan. On the contrary, it requires flexibility in order to evolve and improve in response to changing needs of participating parties (Eheart et al., 2009; Glass et al., 2004). The crucial and uniform aspects of IE are, however, mutual contributions and benefits resulting from intergenerational work. One basic misconception related to establishing orientation and aims of intergenerational activities is that older adults need to be the main initiators, contributors, and often the main beneficiaries of the engagement, whereas both younger and older people should be equally prepared, involved, and rewarded for their participation (Ven, 1989).

Such mutually beneficial intergenerational activities can be effectively implemented as a component of a variety of interventions, developed to address current social issues such as ageism (Halpin et al., 2017), loneliness (Gaggioli et al., 2014), the educational attainment gap (Rebok et al., 2004), age-related health declines (Carlson et al., 2008), and child neglect (Saltz, 1989). Therefore, IE may be used in a structured way to address social challenges and for health promotion through experience and knowledge exchange between younger and older people. These intergenerational programmes require coordination of professional experts (e.g., psychologists, gerontologists) and public services (e.g., schools, care homes) to facilitate cultural values and solidarity which social systems can then utilise to provide care to children and older adults (Cruz-Saco, 2010). Therefore, the various roles and activities designed to facilitate intergenerational engagement need not only meet the needs of the populations involved, but also the requirements of institutions involved (Ven, 1989).

Therefore, prior to integration of IE programmes into specific public settings, an appropriate model needs to be carefully designed. This design should clearly define objectives, strategies, and anticipated impacts of the programme. Those need to specify eligibility criteria that would allow all parties involved in the programme to function effectively (Ven, 1989). Furthermore, to ensure optimal effectiveness and suffcient preparation to the role, training and education need to be provided to participants pre- and in-service (Fried et al., 2013). Training sessions and involvement itself should also serve as a means of adaptation to a new environment and promote a sense of community amongst persons involved. It is important to acknowledge that intergenerational initiatives of course can and indeed are developed within communities without the involvement of scientists or without being part of a formal, assessed programme or intervention. However, in order to determine impacts of the IE programme on all persons involved and the degree to which the implemented model successfully met the objectives, data need to be collected and analysed, reflecting multiple outcomes and perspectives (Bocian & Newman, 1989). A range of programmes and

methods used to examine benefits of IE will be presented in more detail in the subsequent chapter.

1.5 Summary

This chapter provided an overview of global population ageing and its implications for society. Empirical evidence on the effects of ageing on cognition, health and wellbeing, and social functioning was discussed and intra- and inter-individual variability in change considered. Ageing processes were also presented in theoretical context, offering potential explanations for age-related changes and suggested adaptive strategies to positively influence functional change. IE was suggested as an example of a practical approach to health promotion and social participation in older adults that could help ameliorate age-related deficits while also benefitting wider society. Chapter 2 will review existing evidence on IE and its potential benefits for older adults' cognitive, physical health, and social outcomes.

CHAPTER 2. A systematic review of the impacts of intergenerational engagement on older adults' cognitive, social, and health outcomes.

2.1 Chapter overview

This chapter comprises a comprehensive systematic review evaluating the impacts of intergenerational engagement (IE) on cognitive, social, and health outcomes for healthy older adults and older adults with mild cognitive impairment (MCI). First, the theoretical background on which this systematic review is based will be outlined. Then, the methods and results from the systematic review will be covered, before discussing the findings in the context of theory. It will be argued that there are potential benefits of IE, most notably regarding anxiety, generativity, cross-age attitudes, and physical activity. The discussion also highlights that more research is required involving gold standard and comparable models, enabling wider implementation and generalisability, and randomised, controlled trials (RCTs) providing the highest quality evidence.

2.2 Introduction

To help maintain or promote health and wellbeing in ageing populations, opportunities must be created for older people to participate in, and contribute to, their communities (World Health Organisation, 2015). Community engagement can potentially encourage older adults to be more cognitively and physically active, and socially connected, while facilitating their health and independence. Enabling people to do meaningful work more flexibly in later life may also reduce demand on health and care services (Government Office for Science, 2016).

Adult ageing is typically associated with a variety of positive changes such as increased wisdom (Ardelt, 2010), enhancements in aspects of work

performance (Ng & Feldman, 2008), and alterations in emotion regulation that can increase happiness (Charles, 2010). However, as indicated in the previous chapter, ageing is also associated with increased risk of developing diseases, and with declines in cognitive functioning, especially 'fluid' (speeded/processing intensive) functioning (Reuter-Lorenz & Lustig, 2016; see Section 1.3.1). Brain markers of cognitive ageing may include reduced grey matter volume and thickness, and white matter integrity (Hedden et al., 2016; Raz et al., 2005). Older adults may also be affected by neurological and mental disorders, of which the most common are dementia, depression and anxiety (WHO, 2017). The main stressors experienced in older age are a progressive decline in functional ability, decreases in general health, and a loss of close relationships through bereavement that can result in loneliness or isolation (Bodner and Bergman, 2016; Colón-Emeric et al., 2013; Finlay & Kobayashi, 2018). In addition, older adults may experience ageist attitudes from others, or hold negative attitudes about ageing themselves, that can negatively affect their physical and mental health (Bryant et al., 2012; Levy, 2009).

According to the engagement hypothesis, older adults may benefit from increased social and intellectual activity (Stine-Morrow et al., 2007; see section 1.3.1). The engagement model originated from epidemiological studies demonstrating that complex work, social networks, and general busyness benefit cognition and health (Bennett et al., 2006; Jopp & Hertzog, 2007; Lövdén et al., 2005). Regarding cognition specifically, the scaffolding theory of aging and cognition (STAC-revised; Reuter-Lorenz & Park, 2014) also states that cognitive stimulation, social and intellectual engagement, and physical activity can all benefit brain structure and functioning (see also Hertzog et al., 2008). Furthermore, through a life course developmental lens, Erik Erikson proposed that successful aging is accompanied by the desire to be needed by 'giving back' to younger generations (Erikson et al., 1986).

IE programmes are a specific form of community participation developed to provide resources and infrastructures to engage older adults and younger generations in scalable ways. IE typically involves scheduling activities that

are designed to bring members of different age groups together for the benefit of all participants (Henkin & Newman, 1985). For older adults, IE provides opportunities to contribute their skills and knowledge as volunteers in schools and the community at large (Fried et al., 2004; Wilson et al., 2013). Their experience-based competencies help establish their position as mentors, tutors, and role models to young generations, and in turn, lead to mutual understanding and better-connected communities (Hilson & Ennals, 2007). Thus, older adults use their accumulated experience and wisdom to 'give back' to society and young generations. By engaging in meaningful, nurturing, and productive activities, they can help alleviate specific challenges that may exist within communities, such as limited resources within school (Rebok et al., 2004). Although benefits of IE programmes have been demonstrated and promoted in a number of countries (Carlson et al., 2008; Fujiwara et al., 2009), both qualitative and quantitative evidence of the impact of IE on older adults has still not been sufficiently evaluated. Existing systematic reviews are focused on specific outcomes or only on large-scale interventions.

In a previous review, Canedo-Garcia et al. (2017) investigated the impacts of IE in the context of large, randomised, controlled trials (RCTs). They examined the effectiveness of evidence-based interventions, contrasting face-to-face, virtual, and combined (i.e., both face-to-face and virtual) programme modalities. Their review focused on three grouping variables including the general focus or quality-of-life dimension addressed by the study (e.g., emotional wellbeing, interpersonal relations), the characteristics of the reviewed study (e.g., intervention modality, duration), and empirically-based-interventions (EBI) indicators or controls (e.g., recording of sessions, follow-ups). No significant differences were found based on the intervention mode employed, but effectiveness was influenced by variables such as the participants' disabilities or literacy level. Ronzi et al. (2018), on the other hand, examined all empirical studies available, but were limited to physical and mental health outcomes and focused solely on interventions designed to foster respect and social inclusion. They found that

IE programmes were associated with an overall positive impact on health outcomes, such as depression, quality of life, and mental and physical health. Likewise, Peters et al. (2021) provided an overview of IE programmes that examined social, cognitive, and health-related outcomes. They highlighted that all included studies showed positive effects in general, and also that study quality was usually limited. However, their review was not intended to comprise a comprehensive evaluation of the impacts of IE in terms of specific outcomes, and did not capture all of the available evidence on the topic (e.g., 16 versus 44 studies included in the present review). Only four of the studies included in the Peters et al. (2021) review overlapped with those selected in our systematic review. Two of those four integrated evidence from different studies conducted within the Research of Productivity by Intergenerational Sympathy (REPRINTS; Yasunaga et al., 2016) and the Baltimore Experience Corps (Carlson et al., 2008; Rebok et al., 2004), as supplementary articles. Therefore, the reported outcomes did not reveal the extent of findings demonstrated in each individual study, nor their different aims, sample sizes, and measures used. Moreover, Peters et al. (2021) included studies that reported on outcomes for younger generations only, whereas the current systematic review was focused on the impacts of IE in older adults (e.g., Hannon & Gueldner, 2008). The authors also considered a few studies that did not provide evidence regarding potential change in older adults from baseline to a later timepoint, which was one of the inclusion criteria in this systematic review (e.g., Kuehne, 1988). Furthermore, the authors mainly focused on the state of social isolation as associated with adverse effects on health and wellbeing, which may be tackled by implementing IE.

The current objective was to review the impacts of IE on measures of cognition, health and wellbeing, and social function. Uniquely, we considered all available modalities of IE (e.g., older adults working with children or young adults, and in a school or wider community context), synthesised all available evidence on their impacts. The present systematic review is therefore more comprehensive than previous reviews and is the first to include both qualitative and quantitative research focused on specific cognitive, social,

and health outcomes of IE together, along with a detailed narrative review. We therefore aimed to identify a wider range of potential benefits of this form of holistic engagement for older people, while also carefully considering study quality and the extent of evidence available on each outcome.

2.3 Methods

This review followed the Centre for Reviews and Dissemination's guidelines for undertaking reviews in health care (CRD, 2009). The protocol was pre-registered with PROSPERO (Central Registration Depository: 42017082732) and is available at: http://www.crd.york.ac.uk/PROSPERO/display_record.php?ID=CRD42017082732.

2.3.1 Search strategy

A systematic literature search was initially conducted on 01/12/2017, with searches repeated on 01/03/2019 and 01/07/2020 to check for any new publications. Four electronic databases were used: PubMed, Web of Science, PsycInfo, and the Cochrane Library. Searches were restricted to the English language, but not by date of publication. The specific search strategy included the intersection of the following terms: [(intergeneration* OR cross-generation* OR civic engagement) AND (school OR community OR child* OR teaching OR learning OR teen* OR youth OR adolescen* OR college OR university) AND (older adult OR elder* OR senior OR aged OR ag?ing OR MCI OR mild cognitive impairment) AND (cognit* OR executive OR speed OR attention* OR memory OR brain OR neuro* OR social OR network OR interaction OR support OR physical OR attitude* OR stereotyp* OR mental health OR depressi* OR anxi* OR stress OR loneliness OR isolation OR health OR physical OR wellbeing OR fit* OR activ* OR exercis*)]. The search was supplemented by hand searches of references of prior reviews and

eligible studies, and expert recommendations, to ensure all relevant papers were included.

2.3.2 Inclusion and exclusion criteria

Studies were included if they: (1) involved participants aged 60 and older (individual studies with participants younger than 60 years were considered if the mean age was 60 or higher); (2) involved older adults with either healthy cognition or MCI; (3) described engagement between older adults and children (under 16 years) or younger adults up to approximately 25 years (e.g., college/university context); (4) included data regarding potential change in older adults from baseline to a later timepoint on at least one outcome within the cognitive, social, and health categories. All empirical study designs were considered eligible for the review including RCTs, observational studies, quasi-experimental studies, and qualitative studies (i.e., focus groups, interviews, field notes, survey).

2.3.3 Data screening and selection

Search results were uploaded into EndNote software and screened for duplicates. A first reviewer read and screened titles and abstracts of all the records against the predetermined inclusion criteria. Following the Centre for Reviews and Dissemination (CRD, 2009) guidelines, the general steps for avoiding bias in selecting studies for inclusion and minimising the risk of missing any eligible records were applied. As such, records that were clearly not relevant or addressed the topic but failed on one or more criteria (e.g., population) were excluded. Further, if the records appeared to meet the inclusion criteria, but the decision could not be definitely made at that stage of selection, the reviewer opted for over-inclusion. A second reviewer independently conducted the title and abstract screening on a randomly selected 25% of the records, following the same steps of the decision-making process. Whenever there were disagreements, the two main reviewers

discussed the discrepancies and decided which records were to be included. A third reviewer was available to help resolve any discrepancies if required. After screening the 25% sample, the reviewers obtained a Cohen's kappa (κ) of .64. To increase the reliability of the decision process and minimise the risk of error, following the CRD (2009) guidelines, the full text of all remaining records was then screened by two reviewers independently who achieved κ = .69, indicating substantial agreement.

2.3.4 Data extraction

Two reviewers conducted data extraction for all included records, using separate standardised extraction forms for qualitative and quantitative data, to reduce bias and improve inter-rater reliability. Both forms were completed if studies used mixed methods. The form for extracting quantitative data contained tables tailored to the review question and based on protocols from the Cochrane Collaboration (EPOC, 2017). Qualitative studies and qualitative elements of mixed-methods studies were extracted based on the criteria derived from the NICE data extraction form (National Collaborating Centre for Mental Health, 2007) and the Cochrane Collaboration (Noyes & Lewin, 2011). The third reviewer validated the extracted findings against records and discussed any disagreements with the lead reviewer. Where there were any uncertainties, authors of the included studies were contacted to request clarification.

2.3.5 Quality appraisal

Each record was assigned a quality evaluation for each methodological component using the Mixed Methods Appraisal Tool (MMAT; Hong et al., 2018). This provided appropriate criteria for each of the research designs involved. Qualitative, RCTs, and non-randomised controlled studies were each assessed on five criteria. Mixed-methods studies were evaluated on 15 criteria, including an evaluation of the qualitative component, the quantitative

component, and the integration of both sources of findings. Each criterion was rated as being sufficiently met or not, leading to scores out of 5 for qualitative and quantitative studies, and out of 15 for mixed-methods studies. Two researchers independently conducted the appraisal and established final ratings through discussion and in consultation with the third reviewer. No overall score from the ratings of the included studies was calculated, as advised by Hong et al. (2018; see also Glenny, 2005), as an overall score does not provide enough information on which aspects of the studies are inadequately addressed or performed (Hong et al., 2019; Viswanathan et al., 2012). Therefore, we used the MMAT to detail the ratings of each criterion to better inform readers about the perceived quality of the included studies (see Table 2.1 for MMAT evaluations at the end of this chapter; also see Appendix A for evaluation notes).

2.3.6 Data synthesis

Results were grouped according to measured outcomes and a narrative synthesis produced. The three main outcomes were cognition, health and wellbeing, and social functioning. The Popay et al. (2006) guidance was used for tabulation and grouping of the outcomes (i.e., preliminary synthesis), two useful techniques in the process of narrative synthesis. The findings were organised and grouped according to similarity of outcomes.

2.4 Results

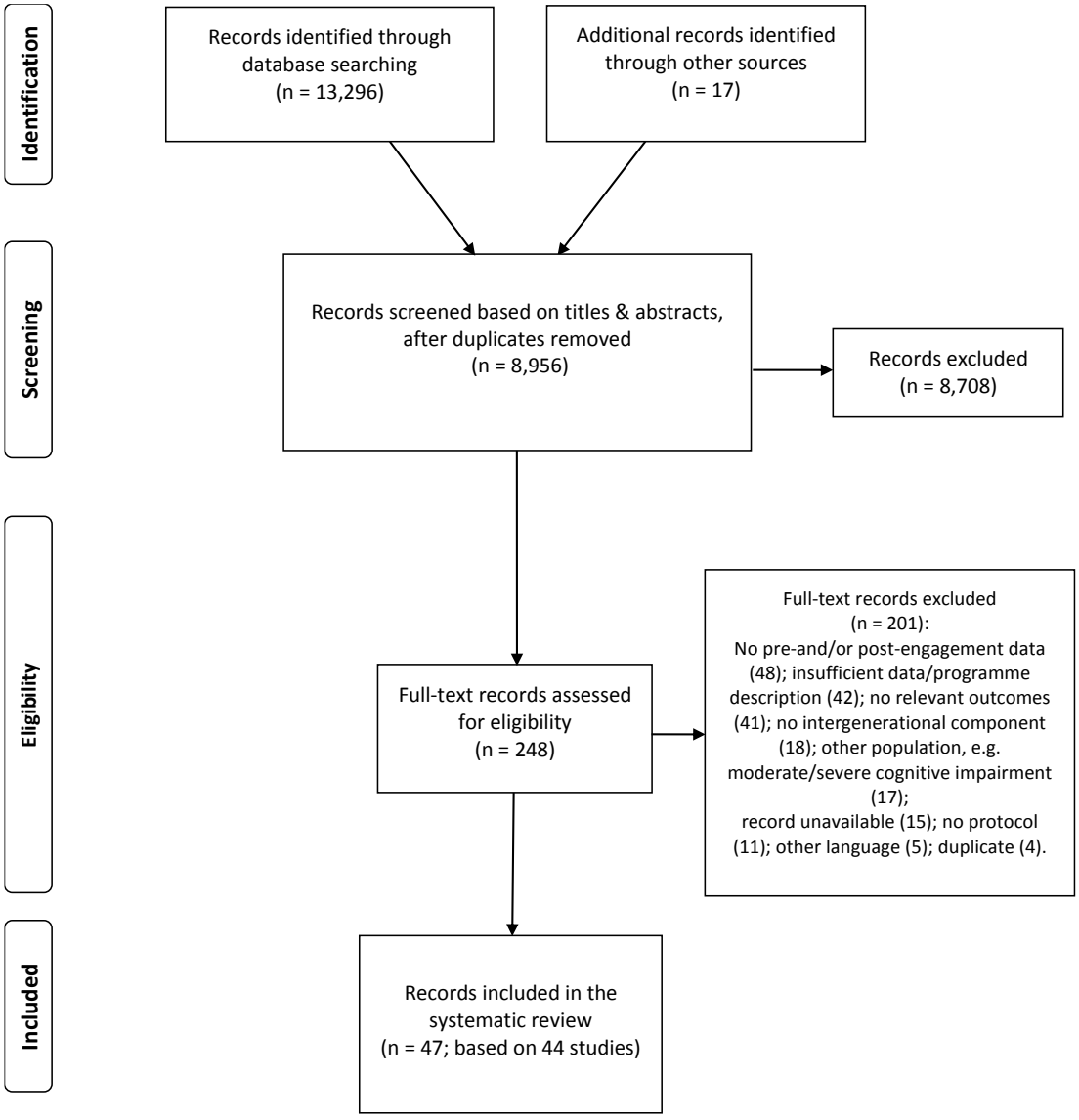
2.4.1 Studies included

Initially, 13,313 records were obtained from the searches. After removing duplicates, the titles and abstracts of 8,956 records were screened for eligibility. Then, 248 records were filtered based on the full text, determining their relevance. Reasons for exclusion included insufficient research data (e.g., no outcome measures, results only for young participants) or

incomplete methods description. Following the guidance of good practice provided by the CRD (2009), multiple reports from the same study were treated as a single study, while still referring to all the records [e.g., Carlson et al. (2008), Fried et al., (2004), and Tan et al., (2006) were classed as one study as they drew upon the same data]. A total of 44 articles and 3 theses (based on 44 studies: 26 quantitative, 4 qualitative, 14 mixed-methods), met all inclusion criteria and were selected for further analysis (see Preferred Reporting Items for Systematic Reviews and Meta-Analyses – PRISMA – flow diagram, Figure 2.1; Moher et al., 2009). Eligible studies were published between 1982 and 2020.

Figure 2.1

PRISMA (Moher et al., 2009) flowchart of record selection process.



2.4.2 Study designs

Of 40 studies providing quantitative data, five used RCTs and 35 applied experimental/quasi-experimental designs [14 non-randomised controlled trials, in which people were allocated to different intervention groups using methods that are not random, including allowing participants to self-select

their condition (Sakurai et al., 2016), and 21 pre- and post-intervention studies with no control group; see Table 2.2]. Controlled trials included a range of control groups: 1) wait-list; 2) other activities; 3) older adults involved in the same activities, but no intergenerational contact allowed; 4) older adults receiving in-home service from youths; and 5) passive (no new activity or wait-list) controls. One study used two comparison groups – a non-intervention control group and an intervention involving professionals.

The 18 studies that reported qualitative findings (i.e., qualitative studies, and quantitative studies with a qualitative component) used the following methods to collect data: focus groups; interviews; field notes; qualitative pre- and post-intervention survey; reflective journal; post-intervention survey (open-ended questions); post-intervention written description of the programme; and written reflective assignments.

2.4.3 Study participants

The sample size of the selected studies ranged from 6 to 702 participants. The majority of participants were female in most studies, with four studies including females only and two involving males only. Study participants were recruited from either the areas around the chosen intervention setting or from the programme location itself (e.g., nursing homes, community centres).

Participants ranged from 50 to 100 years of age. Generally, the samples comprised healthy older adults, but two also included older adults with MCI (Carlson et al., 2008; Posada, 2006). Of the 44 considered studies, 17 clearly specified the health status of their participants. In the remaining 27 the health status could be assumed as relatively good considering: participants' eligibility for the roles assigned in the programmes; that medical approval was provided when the programme involved physical activity; and participants' ability to function independently. Seven studies screened participants using the Mini-Mental State Examination (Folstein et al., 1975); eleven collected self-assessments of health status; one used the Mini-Cog (Borson et al., 2000); one applied the Short Portable Mental Status

Questionnaire (Pfeiffer, 1975); and two applied the Short-Form Health Survey (Fukuhara & Suzukamo, 2004; Ware et al., 1996). Twenty-seven studies did not screen their participants' health status.

2.4.4 Intervention formats and settings

All programmes were community-based, and the majority were conducted in one local setting. Interventions were implemented in: kindergarten/elementary schools (helping children with their academic activities); senior centres (exergaming, computer training, reminiscence groups, knowledge exchange with students, writing stories, making puppets); nursing homes (playing games, sharing stories, musical activities); community centres (computer training, talks, excursions); Men's Sheds (craftwork and social interaction); a high school (discussion groups); a college (games and handicrafts); a university (interviews); a youth centre (photography); a community gym (tai-chi classes); and a health centre (health promotion sessions). Some of the studies involved activities organised in a range of different locations, including churches, museums, or private houses (mentoring, 'exergaming', discussion groups, tutoring).

2.4.5 Intervention durations and intensity

The programme durations ranged from one week to seven years (Table 2.2). Duration of a single session ranged from 15 minutes to 7.5 hours. The majority of studies involved only one session per week that lasted between 30 minutes and 3.5 hours. The most intensive studies reported four weekly sessions, each lasting for 15 minutes to 5 hours. The least frequent interventions involved only one intergenerational session per month. For nine studies, the intensity (i.e., hours of exposure) of weekly engagement was not specified.

2.4.6 Study quality evaluations

Eleven of the included studies met all MMAT assessment criteria (Hong et al., 2018; Table 2.1), indicating highest quality methods and scientific rigour. The main weaknesses of the quantitative studies included: small sample size; lack of control group in 21 of the evaluated studies; and high drop-out/data exclusion rates of up to 49% (6-year study; Sakurai et al., 2018) or 54% (7-year study; Sakurai et al., 2016; see also Appendix A for evaluation notes). A relatively high drop-out was even observed in a one-week intervention (27%; Xu et al., 2016). Some studies reported high retention rates, however, the percentage of participants that completed both pre- and post-intervention assessments (25%; Young & Janke, 2013) or attended intervention activities (22%; de Souza & Grundy, 2007) was sometimes low.

Overall, RCTs provided no description of the method used to generate the sequence of randomisation and whether outcome assessors were blinded to the intervention (Table 2.1). Many non-randomised controlled studies did not formally consider or account for confounding variables in their design and analysis, such as age, gender, education level, or health and socioeconomic status. Note, occasionally authors stated that a significant effect was found on an outcome, but the *p*-value reported was greater than the standard significance level (.05). In these instances, in this review we report the effect as not significant. Considering qualitative research, all studies used methods that were consistent with fulfilling their aims. However, some of them lacked an adequate description of data collection (Barnard, 2014; Santini et al., 2018), and interpretation of results was not always sufficiently substantiated by the data included (Barnard, 2014).

2.4.7 Cognitive outcomes

Of the 44 studies included in the analysis, eight examined cognitive outcomes (see Table 2.3). Three of the studies were RCTs (Carlson et al., 2008, 2009; Fried et al., 2004; Parisi et al., 2015), two were non-randomised

controlled trials (Sakurai et al., 2016, 2018), and three were pre- and post-intervention studies (Lee & Kim, 2019; Newman et al., 1995; Young & Janke, 2013).

The majority of studies involved large daily doses of cognitively stimulating activities, i.e., 3-4 sessions per week that lasted approximately 4-5 hours (Carlson et al., 2008, 2009; Fried et al., 2004; Parisi et al., 2015). The least frequent programmes involved only one 15-30-minute session per 1-2 weeks (Sakurai et al., 2016, 2018), however those also had the longest intervention durations identified (i.e., 6-7 years). For two studies, the duration of engagement was not specified (Lee & Kim, 2019; Young & Janke, 2013).

In terms of the programme settings, the moderate/long-term as well as the most intensive programmes were implemented in the educational environment, including elementary school, kindergarten, and childcare centres (e.g., Carlson et al., 2008; Sakurai et al., 2016). Participants in those programmes mainly provided numeracy and/or literacy support to very young children. Two programmes engaged older adults with college students and youths, and included a variety of mentoring (e.g., skill development) and socialising activities (e.g., arts and crafts, gardening) in various locations (Lee & Kim, 2019; Young & Janke, 2013). In all those programmes, participants were involved in activities that were designed to bolster their intellectual abilities and social function by exercising their language, mental flexibility, and developing new skills via social interactions with children or young people.

Participants ranged from 50 to 89 years of age. Generally, the samples comprised healthy older adults, but one also included older adults with MCI (Carlson et al., 2008). Individuals' cognitive functioning was examined at baseline using the Mini-Mental State Examination (MMSE; Folstein et al., 1975) in Experience Corps (e.g., Carlson et al., 2008; Parisi et al., 2015) and REPRINTS (e.g., Sakurai et al., 2016, 2018) studies; and the Short Portable Mental Status Questionnaire (Pfeiffer, 1975) in Lee and Kim's (2019) intervention. The initial screening was to ensure the participants were cognitively intact and capable of undertaking cognitively demanding tasks

involved in the programmes. Two studies did not specify explicitly participants' cognitive status, but it could be assumed that they were healthy considering the activities in which they were involved (Newman et al., 1995; Young & Janke, 2013).

Sakurai et al. (2018) reported no significant time x group interaction on global cognitive functioning (i.e., Mini-Mental State Examination score; Folstein et al., 1975). However, Sakurai et al. (2016) assessed overall intellectual functional capacity using the Tokyo Metropolitan Institute of Gerontology Index of Competence (TMIG-IC; Koyano et al., 1991) and found that, at 7-year follow-up, the control group had higher odds of intellectual impairment than the intervention group. The majority of the more specific cognitive outcomes were grouped into psycho-motor speed, memory, and executive function.

Psycho-motor speed

In two studies, measures of psycho-motor speed were included: the Trail-Making Test-A (TMT-A) and Digit Symbol Coding (Carlson et al., 2008; Sakurai et al., 2018). No significant intervention effects were reported on these measures.

Memory

All three studies that reported memory outcomes included objective memory performance measures on immediate and delayed recall. One of them observed a significant intervention effect on both immediate and delayed verbal (and not visuo-spatial) recall at the 8-month post-test, but only in the subgroup of participants who had impaired executive functioning at baseline and not when considering the full sample (Carlson et al., 2008; Table 2.3). Sakurai et al. (2018) found no significant effects on either verbal or visuo-spatial memory. Newman et al. (1995) reported variable directionality of changes in objective memory performance (visuo-spatial memory), with a decrease in performance at the 6-month test and an increase at the 8-month follow-up (as compared to the baseline; Newman et al., 1995). However,

Newman et al.'s (1995) results were not subject to statistical testing and so cannot be considered reliable.

Executive function

In three studies, measures of executive functioning were included: the TMT-B which involves planning and shifting between stimulus categories (Carlson et al., 2008; Sakurai et al., 2018), the Flanker Test which is a test of inhibitory selective attention (Carlson et al., 2009), and verbal fluency which assesses organisation and recall of categories of words from long-term memory (Sakurai et al., 2018). On the Flanker Test, significant improvement (group x time interaction effect) was observed in interference and inhibition-related accuracy and related prefrontal brain networks following a 6-month volunteer intervention (Carlson et al., 2009). In a separate study of the same volunteer intervention, an effect was also found on TMT-B following 8 months of exposure (Carlson et al., 2008), but only when the groups were stratified by baseline impairment in executive function. However, a long-term, six-year follow-up of another volunteer intervention assessment revealed no interaction effect on the TMT-B or verbal fluency (phonemic or semantic categories; Sakurai et al., 2018).

Cognitive and lifestyle engagement

In a 6-month RCT, Fried et al. (2004) reported on lifestyle activities outside of the programme, including cognitive engagement, and observed significant effects on television viewing hours. Controls' viewing time increased while volunteers' time reduced slightly. There were no effects on time spent on other cognitively demanding activities (i.e., grouped as low-, moderate-, or high-intensity activities, and books read per month). In a larger RCT of this programme, Parisi et al. (2015) repeated the same questionnaire and stratified intellectual (seven items, e.g., discussing local/national issues, reading a book, balancing a checkbook), creative (five items, e.g., preparing food, sewing/mending/fixing things), and passive [three items: watching TV,

listening to music, listening to radio (not music)] domains of activity. Significant increases were found on intellectual activities at 12- and 24-month follow-ups, and in passive activities (specifically, regarding listening to music or the radio, as opposed to watching television) at 24-month follow-up (but not at 12 months) suggesting a duration-dependent benefit of IE volunteering.

Young and Janke (2013) observed no intervention effect (i.e., effect of time) on perceived knowledge and skills or perceived ability to carry out the IE activities. However, Lee and Kim (2019) reported qualitative findings indicating some gains in learning following exposure to an intergenerational mentoring programme. Based on the data derived from the post-programme interviews with older adult participants, the intervention allowed them to acquire new technological knowledge, learn new skills, and use these to explore various leisure activities.

Cognitive outcomes - summary

In summary, the reviewed studies generally provide limited support for the short-term, but not necessarily long-term, impacts of IE on specific components of cognition. In particular, two of the three studies on executive function observed short-term benefits across measures, but these were not evident when considering long-term exposure (Carlson et al., 2008, 2009; Sakurai et al., 2018). A reliable long-term effect of IE was however found for global intellectual capacity in one study (Sakurai et al., 2016). Time spent on intellectual and passive lifestyle activities may also benefit from IE, particularly with longer exposure (Fried et al., 2004; Parisi et al., 2015), and qualitative data showed perceived benefits for learning (Lee & Kim, 2019). Finally, no reliable effects were observed for psycho-motor speed, and memory outcomes exhibited only very limited effects (i.e., when the sample was stratified by initial ability; Carlson et al., 2008). Those findings suggest that ‘real-world’ interventions implemented in academic settings may offer both immediate and long-term benefits, specifically for those with mildly impaired executive function. It remains to be understood whether the dose of

cognitively stimulating activity and duration of the exposure contribute to those observable improvements. Finally, it has not yet been clearly determined whether IE in higher functioning older adults can mainly lead to enhancing or maintaining their cognition.

2.4.8 Health and wellbeing outcomes

Health-related outcomes were grouped into: mental health and quality of life; physical activity; and physical functioning. Most of the included studies used standardised scales, with only a few studies involving non-standardised measures for self-rated health (Fujiwara et al., 2009; Hsu et al., 2014; Young & Janke, 2013), intergroup anxiety (Sng & Jung, 2020), lifestyle activity (Parisi et al., 2015), and falls (Fried et al., 2004).

IE studies that considered health and wellbeing outcomes differed substantially in terms of overall duration, weekly intensity, and daily doses of engagement. Four studies offered 4 sessions per week that lasted between 10 minutes and 4 hours (Carstensen et al., 1982; Fried et al., 2004; Parisi et al., 2015; Tan et al., 2009). The least frequent programme involved only one 15-30-minute session per 1-2 weeks (Sakurai et al., 2016, 2018), but it was implemented over 7 years. The shortest intervention involved only one week of engagement that included three intensive 35-40 minutes sessions. For three studies, the duration or frequency of engagement was not specified (Lee & Kim, 2019; Wilson et al., 2013; Young & Janke, 2013).

Those programmes were predominantly conducted in one location (e.g., schools/kindergarten, senior centres, community gym), but some of them, especially those involving youth and young adults, were implemented in several locations (e.g., private houses, churches). The shortest in terms of duration, yet relatively intensive (3 x 30-40-minute sessions/week) interventions included video gameplay that required simple but repetitive actions (Sng & Jung, 2020; Xu et al., 2016). Exergaming was used in those studies to foster social interactions and improve psychosocial wellbeing in older adults. Another programme that implemented the method additionally

looked at increasing physical activity in older participants (Strand et al., 2014). However, the most common mode of IE with the focus on health and wellbeing outcomes, involved different forms of support, including mentorship and tutoring. Mentoring IE was found to be an effective way to bring youths/young adults/students and older adults together and included helping students facilitate knowledge and improve communication skills (e.g., Gamliel & Gabay, 2014; Halpin et al, 2017), as well as develop meaningful occupation (Wilson et al., 2013). Programmes, in which older adults participated as tutors for school-aged children, were aimed at improving children's literacy and numeracy skills (e.g., Fried et al., 2004; Sakurai et al., 2016). These looked at a wide range of health and wellbeing outcomes in older adults, including mental health, quality of life, physical health, and physical functioning.

Participants ranged from 50 to 100 years of age. In terms of mental and physical health, the samples comprised healthy older adults, but two programmes also included older adults with cognitive impairment (MMSE < 23; Posada, 2006) and depressive symptoms (Geriatric Depression Scale-15 ≥ 5; Kamei et al., 2011).

Mental health and quality of life

Depression and anxiety. Nine quantitative studies considered depression (six non-randomised controlled trials and three pre- and post-intervention studies). Three studies found that IE reduced depression scores: at the 3-month time point, but only in the more depressed older adult subgroup (Kamei et al., 2011); at 8-month post-intervention evaluation (Hernandez & Gonzalez, 2008); and at 2-year post-test, mediated by the sense of meaningfulness scale (indirect effect; Murayama et al., 2015). One study showed a decrease of 16.6% in perceived depression reported at the 8-month follow-up (Newman et al., 1995), inconsistent with a smaller increase at the 6-month post-test. Lack of statistical testing again reduces the quality of these latter findings. Four other studies reported no significant effect of IE on depression (Adam, 1992; Johnson, 2015; Posada, 2006, Sakurai et al.,

2016). Three quantitative studies (one non-randomised controlled trial and two pre- and post-intervention studies) considered anxiety. All three showed a significant decline in intergroup anxiety (Sng & Jung, 2020), social anxiety (Xu et al., 2016) and anxiety regarding ageism (Halpin et al., 2017).

Quality of life. Out of four quantitative studies (one non-randomised controlled trial and three pre- and post-intervention studies) that considered quality of life, three showed a significant increase on a single subscale of the outcome over 3 weeks and 6 months exposure. Gaggioli et al. (2014) showed an increase in the subscale of Past, Present and Future Activities of the World Health Organisation Quality of Life Scale for Older People (WHOQOL-Old; WHOQOL-Group, 1995), which evaluates satisfaction about achievements in life and about things to look forward to. Kamei et al. (2011) and Mahoney et al. (2020) observed an increase in the mental health component of the Health-Related Quality of Life scale (HRQOL; Fukuhara & Suzukamo, 2004) and the 36-Item Short Form Health Survey (SF-36; Ware and Sherbourne, 1992), respectively. Five out of six subscales of the WHOQOL-Old and seven out of eight subscales of the HRQOL and SF-36 showed no significant changes (Gaggioli et al., 2014; Kamei et al., 2011; Mahoney et al., 2020). Finally, using the CASP-19 (Hyde et al., 2003), Johnson (2015) observed no effect of IE on overall quality of life.

Self-esteem/self-representation/empowerment. Four quantitative (two non-randomised controlled trials and two pre- and post-intervention studies) and three qualitative studies considered self-esteem or self-representation. All four quantitative studies (Barbosa et al., 2020; Chapman & Neal, 1990; Gaggioli et al., 2014; Sakurai et al., 2016) demonstrated no significant effect. Conversely, three qualitative studies suggested that IE enhanced self-esteem or sense of self-worth (Barnard, 2014; Wilson et al., 2013; Santini et al., 2018). In these studies, participants' excerpts revealed factors that might have led to improvements in their self-perception. These were: the opportunity to pass on knowledge to young people and to learn from them; the realisation of their emotional potential and self-worth; the genuine respect

and interest shown by the younger generation; and feeling accepted, noticed, and valued. However, in Barnard's (2014) study, the conclusion that participants demonstrated increased self-esteem was not supported by data from their written survey or observable responses.

One quantitative (pre- and post-intervention) study examined empowerment; an outcome closely linked to self-esteem (Gamliel & Gabay, 2014). A positive effect of IE was found on all three subscales of the measure, including self-confidence, self-efficacy, and communal involvement.

Life satisfaction. Six quantitative studies (one non-randomised controlled trial and five pre- and post-intervention studies) measured life satisfaction over 3 weeks – 1.5 years programme exposure. Two of these studies demonstrated significant improvements on either the whole life satisfaction scale (Satisfaction with Life Scale, Diener et al, 1985; Meshel & McGlynn, 2004) or the past-life subscale only (Temporal Satisfaction with Life Scale, Pavot et al., 1998; DeMichelis et al., 2015). The remaining four studies reported no reliable effects (Adam, 1992; Carstensen et al., 1982; Johnson, 2015; Young & Janke, 2013).

Purpose in life. Three studies (one non-randomised controlled trial and two mixed-method studies) considered sense of purpose in life. Chippendale and Boltz (2015) demonstrated significant positive effects of their 4-week intervention on change in sense of purpose and meaning in life. Conversely, Carstensen et al. (1982) reported no significant interaction between group and time on this outcome following 2 months exposure. Qualitative findings on purpose in life were not substantiated with sufficient evidence (Barbosa et al., 2020).

Loneliness. Four quantitative studies (one non-randomised controlled trial, two mixed-method studies, and one pre- and post-intervention study) assessed loneliness. One of the studies considering loneliness as a component of the social isolation measure found a significant decrease on the outcome following the completion of the programme (Lee & Kim, 2020). Another one showed significant post-programme decreases in general and

emotional loneliness, but not in social loneliness (Gaggioli et al., 2014). No significant main effects were found in the remaining studies (Xu et al., 2016; Barbosa et al., 2020).

Happiness. Three studies (two non-randomised controlled trials and one mixed-method study) examined happiness. Only one of these found a main effect of group at follow-up, with the intervention group feeling happier and controls reporting a decline in happiness over 8 weeks (Hsu et al., 2014). No significant intervention effects were found in two other studies (Barbosa et al., 2020; Carstensen et al., 1982).

Self-rated health and wellbeing. Seven quantitative studies (one RCT, two non-randomised controlled trials, three mixed-method studies, and one pre and post-test study) and two qualitative studies addressed self-reported health and wellbeing. Two non-randomised controlled trials and one pre- and post-intervention study showed significant improvements at 8-week (main effects of group on perceived health status and emotional wellbeing; Hsu et al., 2014) and 21-month follow-up (time x group interaction effect on self-rated health; Fujiwara et al., 2009). In three studies (de Souza & Grundy, 2007; Strand et al., 2014; Young & Janke, 2013) there were no significant intervention effects on self-reported physical or mental health, while one pre- and post- study (i.e., with no control comparison) showed a significant decline after 9 months on a mental health component of self-rated health (Halpin et al., 2017). Qualitative data from three other studies ranging in exposure from 4 weeks to 8 months supplemented these findings, revealing positive effects of IE on wellbeing by providing cognitive stimulation and improving mood (Barnard, 2014; Chippendale & Boltz, 2015; Santini et al., 2018). However, the conclusion regarding improved wellbeing in one of the qualitative studies was not substantiated by the data included (Barnard, 2014).

Physical activity levels

Five studies (two RCTs, one non-randomised controlled trial, and two pre- and post-intervention studies) considered physical activity outcomes. Two studies demonstrated positive effects on overall physical activity levels at 4-8 month (Fried et al., 2004; Tan et al., 2006), and 3-year follow-ups (Tan et al., 2009). However, baseline physical activity levels moderated the results, with Tan et al. (2006) reporting significant overall change in physical activity only in those with low initial levels. One study also showed an improvement at 8 weeks in those with low baseline activity levels (Strand et al., 2014). Tan et al. (2006) additionally reported a positive intervention effect in the percentage of participants who remained active in their 'active' baseline group. On the other hand, Perry and Weatherby (2011) showed no significant increase in physical activity. However, qualitative data from this study revealed that many of the older adults felt that participating in the eight-week tai-chi class made them more comfortable and likely to be physically active. Finally, Parisi et al. (2015) considered the physical (three items: shopping, gardening, hunting/fishing/camping) domain of a lifestyle activity measure. They reported positive IE effects on physical activities at 12-month follow-up (but not at 24 months).

Physical functioning

Three quantitative studies (one RCT and two non-randomised controlled trials) that assessed various aspects of physical functioning demonstrated significant positive effects of IE on: hand grip strength at 21-weeks and 7-years post-test (time x group interaction, with less decline in the intervention group; Fujiwara et al., 2009; Sakurai et al., 2016); self-reported strength and proportion of participants reporting feeling stronger, at 4-8 month follow-up (Fried et al., 2004); functional reach (time x group interaction, with the control group declining and the intervention group remaining stable; Sakurai et al., 2016); and walking speed (a smaller decline in intervention vs control; Fried et al., 2004). These results indicate positive effects of IE on some measures

of physical functioning. However, Sakurai et al. (2016, 2018) and Fujiwara et al. (2009) did not report intervention effects on walking speed measures. The studies also reported no reliable effects on other aspects of physical function such as fall rates, cane use, or ability to stand on one leg (see Table 2.3).

Health and wellbeing outcomes – summary

In summary, this section covered a range of health and wellbeing outcomes. As the outcome measures varied across studies, this often prevented strong conclusions from being drawn. Additionally, where significant effects were occasionally observed for some outcomes (e.g., depression, quality of life, life satisfaction), this was only for a proportion of the available studies and/or for specific subscales. The most consistent improvements were, however, observed in relation to anxiety (Halpin et al., 2017; Sng & Jung, 2020; Xu et al., 2016) and physical activity levels (Fried et al., 2004; Tan et al., 2006, 2009; Strand et al., 2014). Those benefits of IE were observed in studies that varied substantially in terms of intensity (1 session/month - 5 x 3hrs/week) and duration (1 week – 3 years) of exposure. Therefore, it could be assumed that any IE interventions that foster social interactions between the older and younger generations offer an opportunity to increase physical activity and promote active ageing. However, as with the findings on cognitive outcomes discussed above, it would be of great importance to determine the optimal exposure that would allow older adults to increase their level of physical activity, without negatively impacting their usual activities outside the programme that could also be beneficial.

2.4.9 Social outcomes

Social outcomes were grouped into: generativity; cross-age attitudes, comfort, and perceptions; and social interactions/activity.

Similar to the previous section, IE studies that evaluated social outcomes varied substantially in terms of duration, weekly intensity, and daily doses of engagement. Thus, the programmes lasted between 1 week and 7 years; their frequency of exposure ranged between one session per 1-2 weeks and 4-5 sessions per week; and the intensity of engagement ranged between 15 minutes and 7.5 hours per session. The most intensive studies that offered 4-5 hours of IE weekly (Gruenewald et al., 2016; Parisi et al., 2015) were implemented over two years and the least frequent programme lasted for 7 years (Sakurai et al., 2016). The shortest intervention involved only one week of engagement that included three intensive 35-40 minutes sessions (Xu et al., 2016). For eight studies, the duration, frequency, or the intensity of engagement were not specified (Adam, 1992; Alcock et al., 2011; Chung & Kim, 2020; Halpin et al., 2017; June & Andreoletti, 2020; Lee & Kim, 2019; Wilson et al., 2013; Young & Janke, 2013).

All these programmes were community-based and mainly conducted in the educational environment (e.g., schools, kindergarten, high schools, colleges), community centres, older adult community centres or other locations that were most convenient for older adult participants (e.g., their own houses, local churches, nursing homes). Since the programmes were aimed at examining the effects of IE on various aspects of social function, all of them included activities that provided opportunities for socialising and building cross-age connections. Selected activities were of interest to both age groups involved and gave them an opportunity to exchange knowledge/experiences. For example, participants assigned to schools were helping children with their academic activities, whereas those in older adult community centres engaged in exergaming, computer training, knowledge exchange with students, writing stories, or arts and crafts projects. All those types of engagement were aimed at bridging intergenerational gaps and facilitating intergenerational discourse through learning or play.

Generativity

Six quantitative (one RCT, two mixed-method studies, and three pre- and post-test studies) and two qualitative studies considered generativity (i.e., nurturing and guiding younger generations). Four out of six quantitative studies showed a positive effect of IE. These were observed for perceived generativity scores at 3-week follow-up (Ehlman et al., 2014), 4-week follow-up (Sanders et al., 2013), after one college semester of engagement (June & Andreoletti, 2020), and in both generative desire and perceptions of generative achievement at 4-, 12-, and 24-month follow-up (Gruenewald et al., 2016). The latter also reported an intensity-response relationship between intervention exposure and effect sizes on generativity. One mixed-methods study found no significant change from pre- to post-intervention on generativity (Mahoney et al., 2020).

However, qualitative evidence derived from this study revealed that intergenerational mentoring enabled retired men to express generativity by helping young adults with intellectual disability. Moreover, other qualitative evidence indicated that older adults had an intrinsic desire to support younger generations who were facing difficulties (Wilson et al., 2013). Additionally, IE was seen to provide an opportunity to contribute positively to young people's lives, which gave a sense of achievement and pride (Alcock et al., 2011). Positive emotions experienced by older adults engaged in IE programmes were also associated with the opportunity to take on the position of mentor or role model (Chippendale & Boltz, 2015). The qualitative data illuminated participants' desire and enthusiasm to share experiences and knowledge with the younger generation (Wilson et al., 2013; Chippendale and Boltz, 2015; Mahoney et al., 2020). The effects of IE on self-perceived generativity therefore appear relatively consistent across the studies and methods used.

Cross-age attitudes, comfort, and perceptions

Nine quantitative studies (two non-randomised controlled trials, four mixed-method studies, three pre- and post-test studies) and two qualitative studies considered age-related attitudes. Two non-randomised controlled trials reported positive group x time interaction effect on attitudes towards the younger generation participating in the intervention for baseline vs 6-week post-intervention (Sun et al., 2019) and baseline vs 6-week post-intervention vs 7-week follow-up (Pinquart et al., 2000). While ratings in the intervention group tended to increase at the post-test and that of the control group tended to decrease, the group x time (baseline vs post-test) interaction was not significant ($p < .06$), as was the case for baseline vs follow-up ($p < .23$), so these differences were not reliable (Pinquart et al., 2000). There was also no significant interaction on perceptions towards children in general (Pinquart et al., 2000). Two other studies found no significant change from pre- to post-intervention on cross-age attitudes, social distance, or enjoyment being with youths (Chapman & Neal, 1990), or on positive, negative, and overall cross-age perceptions (Chung & Kim, 2020). However, three other studies demonstrated increases in older adults' positive perception of the younger generation after a 3-week programme (Sng & Jung, 2020), 6-week programme (Meshel & McGlynn, 2004), and after one school semester of intervention (Gamliel & Gabay, 2014). Participation improved older adults' ratings of children's teaching skills and knowledge contribution, as well as increased feelings of closeness to the younger generation (Gamliel & Gabay, 2014). Two studies also assessed a sense of comfort with cross-age groups, demonstrating a significant increase after 4 weeks of engagement (Belgrave & Keown, 2018), and time x group interaction effect for baseline vs 6 weeks (Sun et al., 2019).

The qualitative component from Chapman and Neal's study (1990) provided supplementary evidence on positive attitudinal changes amongst older adults, who reported increased trust of the teenagers and reinforced pre-existing positive feelings about them. Generally positive perceptions of the younger generation at the outset were also personally validated and

substantiated after participating in the programme in two other studies (Barnard, 2014; Belgrave & Keown, 2018). Notably, one of the qualitative studies revealed a substantial positive shift in the older adult perceptions of young people, from generally negative views at the beginning of the programme to a positive image of the youths as helpful and relatable (Santini et al., 2018). Additionally, Johnson (2015) provided qualitative evidence of improved reactions about growing older and perceived disadvantages of older age.

Four studies included individual outcomes such as: expectations of ageism (Halpin et al., 2017); older adults' stereotyped perception of themselves (Hernandez & Gonzalez, 2008); attitudes towards ageing (Lin et al., 2017); and cross-age stereotypes (qualitative findings; Alcock et al., 2011). One of the studies showed positive changes such as a reduction of age-group stereotypes (Alcock et al., 2011). No significant effects of IE were found for expectations of ageism (Halpin et al, 2017), opinions about themselves (no inferential analyses conducted; Hernandez & Gonzalez, 2008), or attitudes towards ageing (Lin et al., 2017).

Social interactions/activity

Eleven quantitative studies (three RCTs, four non-randomised controlled trials, two mixed-method studies, two pre- and post-test study) and two qualitative studies assessed social interaction outcomes. Three controlled trials showed positive intervention effects on: neighbours' helpfulness and people's honesty (de Souza & Grundy, 2007); family relationships (de Souza & Grundy, 2007; Fujiwara et al., 2009); social activity (e.g., attending church/religious service, playing cards/ games, going to plays/concerts; Parisi et al., 2015); change in number of people one could turn to for help (Fried et al., 20014); and social networks, and receiving and providing social support (group x time interactions, see Table 2.3; Fujiwara et al., 2009).

However, despite the above improvements found in social interactions/activities, two RCTs and one non-randomised controlled trial found differences only on specific measures and one RCT when a specific

model of causal effects were used. Positive effects were found in one out of five (Fried et al., 2004), three out of nine (de Souza & Grundy, 2007), and six out of sixteen (Fujiwara et al., 2009) subscales. A significant effect was found in social activity at the 12-month follow-up, but only when Complier Average Causal Effect (CACE) Modelling was used, which takes adherence into account, and the effect was not found at 24 months (Parisi et al., 2015). Furthermore, two non-randomised controlled trials found no reliable change in social functioning (e.g., visiting friends at their homes, giving advice to family or a friend, Sakurai et al., 2016) and in older adults' sociability (Xu et al., 2016).

One of the pre- and post-test studies reported a significant decrease on a general score of social isolation (Lee & Kim, 2019). However, one of the components of the measure, perceived (lack of) social support, despite an observable decrease, did not reliably change over time. Interpersonal behaviour as one of the aspects of the IE was assessed in one of the non-randomised controlled trials (Sun et al., 2019). Older adult participants showed significant positive changes in three out of six behaviours, including visual attention to younger participants, initiating conversation, and frequency of physical contact with young group members. One study additionally considered an individual outcome of intergenerational solidarity, which was not reliably affected by IE (Chung & Kim, 2020).

Qualitative evidence from two programmes indicated a positive effect on sense of community (Alcock et al., 2011) and community involvement (Barbosa et al., 2020). However, the interpretation of results in Barbosa et al. (2020) was not substantiated by the data. Three other studies revealed the potential of IE to build intergenerational relationships through shared activities, an exchange of social experiences, and time spent together, and even encouraged expansion of social interactions outside of the programme (Kamei et al., 2011; Santini et al., 2018). Moreover, the knowledge and skills learned from the younger generation can serve as a means for older adults to connect with family, friends, and wider social networks, as well as enhancing

their sense of independent living and providing practical support in everyday life (Lee & Kim, 2019).

Social outcomes – summary

In summary, the measures presented in this section covered a wide range of social outcomes and varied across studies more than in any other outcome category. However, the most common social outcomes investigated across diverse IE programmes were cross-age attitudes and generativity, and those two outcomes were fairly consistently enhanced by IE (e.g., Ehlman et al., 2014; Gruenewald et al., 2016; Meshel & McGynn, 2004; Pinquart et al., 2000). Social interaction exhibited more mixed findings, with benefits typically being observed only for a minority of subscales assessed. Those findings suggest that engaging in meaningful activities that contribute to younger generations can, regardless of the duration, intensity or mode of engagement, positively alter self-perceptions of generativity in older adulthood. Furthermore, IE can also promote altering negative or enhancing positive perceptions and attitudes towards younger generations. One of the main limitations of the studies discussed in this section, however, was the use of self-developed questionnaires/scales or those adapted from other studies which would require validation. Therefore, in order to attain more reliable consensus about the effects of IE on older adults' social function, standardised instruments should be utilised as far as possible, but appropriately, in future to enhance data quality and comparability.

2.5 Discussion

This systematic review comprises a comprehensive evaluation of existing evidence regarding the effectiveness of IE for benefiting older adults' cognitive, social, and health–related outcomes. Based on the engagement hypothesis (Stine-Morrow et al., 2007), the scaffolding theory of ageing and cognition (Reuter-Lorenz & Park, 2014), and Erikson's model of late life need

for generative engagement (Erikson et al., 1986), IE programmes could be expected to benefit older adults' social and health-related outcomes, as well as to induce compensatory neural effects, resulting in cognitive behavioural benefits. Both qualitative and quantitative evidence was synthesised, revealing some positive findings. However, heterogeneity of IE (e.g., context, intensity, and duration) and study designs and methods, including selected outcome measures, was also identified. The available quantitative research demonstrated several consistent, positive changes related to cognitive, health and wellbeing, and social outcomes, while qualitative studies supplemented the findings primarily on the health and social benefits of IE from the perspective of programme participants.

2.5.1 Cognitive outcomes

Older adults derived some cognitive benefits from IE. Studies generally provide support for the short-term, but not long-term, impacts of IE on some components of cognition, although long-term exposure requires much more investigation. In particular, two of the three studies on executive function observed short-term benefits across measures of executive function (Carlson et al., 2008). These positive results therefore provide initial support for the theoretical model of cognitive and brain ageing proposed by Reuter-Lorenz and Park (2014) and for the potential health benefits of late-life generativity. IE may engage older adults in a more enriched environment that promotes neural scaffolding and reduces the cognitive declines associated with ageing. Specifically, long-term exposure to cognitively, physically, and socially demanding IE might stimulate brain plasticity and create new neural pathways that facilitate improved cognition (Hertzog et al., 2008; Lövdén et al., 2010). Notably, duration-dependent increases in intellectual lifestyle activities have also been observed post-intervention (Parisi et al., 2015).

Structural and functional brain outcomes fell outside the scope of the present review, but there is evidence that these may also be positively associated with IE, potentially explaining the positive behavioural effects

observed. For example, Carlson et al. (2009; 2015) reported positive IE-related neural changes in areas underlying memory and executive functioning (i.e., increased brain activity in left prefrontal and anterior cingulate cortex, and halted or reversed declines in hippocampal volume in male participants). Additionally, while Sakurai et al. (2018) observed no significant behavioural effects, hippocampal volume declined in their control group but was maintained in their intervention group. Additional high-quality studies are therefore clearly warranted in order to specify the range of influences of IE on cognitive performance as well as the underlying brain structure and functioning over time, bearing in mind that there may be neuronal changes that are not mirrored in cognitive testing, particularly over shorter study durations.

2.5.2 Health and wellbeing outcomes

Some significant, positive effects of IE were also demonstrated on health and wellbeing. The most consistent improvements were observed in relation to anxiety (Halpin et al., 2017; Sng & Jung, 2020; Xu et al., 2016). All three studies that assessed this outcome reported a significant reduction in anxiety, including its social and emotional dimensions. However, effects of IE on other health and wellbeing outcomes measures varied across studies and only a few reported reliable positive changes in depression (e.g., Hernandez & Gonzalez, 2008; Kamei et al., 2011), loneliness (Gaggioli et al., 2014; Lee & Kim, 2019), life satisfaction (DeMichelis et al., 2015; Meshel & McGlynn, 2004), and self-rated health and wellbeing (Fujiwara et al., 2009; Hsu et al., 2014).

Qualitative data from two other studies supplemented these findings, revealing positive effects of IE on wellbeing by providing cognitive stimulation and improving participants' mood (Chippendale & Boltz, 2015; Santini et al., 2018). IE constituted for participants a distraction from negative thoughts and health-related concerns (Santini et al., 2018) and offered a safe social space where the concerns and emotions could be shared (Chippendale & Boltz,

2015). These along with the quantitative findings provide support for the benefits of volunteerism that is incorporated in IE. Voluntary altruistic activities that are a part of social engagement may serve as a means to maintain older adults' quality of life and increase their levels of life satisfaction (Cipriani, 2007). They also promote their sense of purpose that, in turn, can contribute to improved wellbeing (Chippendale, 2013). Other benefits of volunteering can include better self-rated health (Morrow-Howell et al., 2003) and reduced depression and anxiety (Thoits & Hewitt, 2001). However, these benefits in wellbeing outcomes may depend on the individuals' and programme characteristics (Morrow-Howell et al., 2009), which could explain the variations in evidence demonstrated in this review.

Relatively consistent benefits of IE were demonstrated in relation to physical health (Fried et al., 2004; Tan et al., 2006, 2009; Strand et al., 2014; Perry & Weatherby 2011). Three out of four studies reported significant positive effects of IE on overall physical activity levels (Fried et al., 2004; Tan et al., 2006, 2009; Strand et al., 2014). Significant positive intervention effects were also demonstrated on other aspects of physical functioning, including hand grip strength (Fujiwara et al., 2009; Sakurai et al., 2016); self-reported strength, and proportion of participants reporting feeling stronger (Fried et al., 2004); functional reach (Sakurai et al., 2016); and walking speed (Fried et al., 2004). However, significant increases in physical activity and functioning were often reported among people who were physically inactive at baseline (e.g., Fried et al., 2004; Tan et al., 2006; 2009), and physical functioning measures were inconsistent and/or dependent on follow-up period. Therefore, more evidence is needed to be able to draw firmer conclusions on the influences of IE on physical activity and functioning as well as their interrelation with other health and wellbeing outcomes.

Despite observed positive changes in mental health and quality of life, physical activity levels, and physical functioning, 10 of 31 quantitative studies reported no significant effects (e.g., Adam, 1992; Carstensen et al., 1982; Johnson, 2015; Young et al., 2013), and those that did were often on specific measures or sub-scales (e.g., Gaggioli et al., 2014; Kamei et al., 2011;

Mahoney et al., 2020). Therefore, future studies should aim to include standardised, outcome-specific measures that have strong underpinnings in theoretical and empirical evidence and that are justified by their hypotheses. More evidence is also required on the individual subscales that showed any changes.

2.5.3 Social outcomes

One of the most common social outcomes investigated across diverse intergenerational programmes was cross-age attitudes and perceptions. Four out of seven quantitative studies that statistically analysed the impacts of IE on cross-age attitudes, revealed their positive impact on older adults' perceptions of young people's skills and their personal qualities (e.g., teaching skills, trustworthiness; Gamliel & Gabay, 2014; Meshel & McGynn, 2004; Pinquart et al., 2000). Generally positive perceptions of the younger generation reported at the outset of the IE seemed to be validated and substantiated through participating in the programme (Barnard, 2014; Belgrave & Keown, 2018; Chapman & Neal, 1990; Chippendale & Boltz, 2015). Initially negative views were also improved substantially over the course of IE (Santini et al., 2018). This can enable connectedness, improved the level of cross-age comfort (Belgrave & Keown, 2018; Sun et al., 2019), and reduced distance between the generations that consequently reduced age-group stereotypes and anxiety over ageism (Alcock et al., 2011; Halpin et al., 2017).

Increased intergenerational connectedness could be also translated into a feeling of affinity with the wider community. Social networks involving the younger generation, established via the programmes, increased frequency of contact with their grandchildren and with children outside their neighbourhood (Fujiwara et al., 2009). IE could also enhance communication skills that, in turn, may enable interchange with members of other generations and social networks. The new supportive relationships built within IE were found to be a motivator to provide social support to friends and

neighbours (Fujiwara et al., 2009). They also facilitated participants' perceptions of people's honesty and neighbours' helpfulness (de Souza & Grundy, 2007), and resulted in a significant increase in the number of people they can ask for help (Fried et al., 2004).

However, in this review we also found potential intervention effects in terms of shifts in social support. For example, a decrease in the number of people providing emotional support (Fried et al., 2004) or in received support was reported (Fujiwara et al., 2009). The findings might indicate that participants perceived themselves as needing less support, as a result of getting more active via participation in the programme. However, the authors suggested that a decrease in the outcome could be associated with participants' personal commitments (e.g., care for family members) and culture-based values rather than with participating in IE (Fujiwara et al., 2009). A sense of pride and inhibited ability to accept help were provided as possible explanations for the effect on receiving social support (Fujiwara et al., 2009). Therefore, implications of social, cultural, and political mechanisms need to be taken into consideration when developing and evaluating the effects of IE.

An outcome that seemed to be consistently enhanced by IE was generativity (Ehlman et al., 2014; Gruenewald et al., 2016; Sanders et al., 2013). All studies that evaluated this variable, whether quantitative or qualitative, demonstrated consistent positive effects of IE on perceptions of generativity. Although the perception of being generative is generally associated with later life, those studies showed that it could be further increased by engagement in actual generative behaviour (Cheng, 2009). Active IE restored older adults' sense of purpose and self-worth resulting from the opportunity to share their knowledge and experiences with the younger generations and positively contributing to their growth (Barnard, 2014; Chippendale & Boltz, 2015; Mahoney et al., 2020; Wilson et al., 2013). The new role as mentor or educator gave them an opportunity to inspire the students and validate their own skills and potential.

Given the potential implications of positive self-perceptions of generativity on mental health, cognitive and physical functioning, and longevity (Grossman & Gruenewald, 2020; Gruenewald et al., 2009), an examination of these interconnections should be an objective of future research. In the current review, generative desire was a common feature among different intergenerational programmes and an important factor contributing to improvements in participants' psychological wellbeing (e.g., Ehlman et al., 2014; Sanders et al., 2013). This conclusion is consistent with Erikson's (1950) hypothesis that older adults need to be generative for their health and wellbeing and was supported in several studies on the relationship between generativity or a sense of meaningfulness and health outcomes (e.g., Hofer et al., 2014; Landes et al., 2014; Murayama et al., 2015). However, generative activities may only bring health benefits when those actions are valued and respected by others (Cheng, 2009).

2.5.4 Strengths and limitations of this systematic review

Regarding limitations of this systematic review, by necessity our searches were restricted to records that were published in the English language. Therefore, we might have produced language bias since, according to the CDR (Egger et al. 1997), studies from non-English-speaking countries are less likely to be published in English if they report non-significant results. We also included only published studies and theses (available online), and therefore there is the possibility of publication bias affecting our results. However, 25 of the assessed programmes reported non-significant changes in outcomes under consideration, which may to some extent limit any overestimation of intervention effects.

Despite these limitations, this review provided a comprehensive synthesis of a variety of IE programmes. Our searches were not restricted to the date of publication, as compared to other reviews (Canedo-García et al., 2017; Ronzi et al., 2018), which allowed us to identify additional records and extend our analysis on the effectiveness of IE on a range of outcomes. The

scope of this review was also not restricted by the type of research methodology used, research setting, study duration, or number of participants involved. Our review appraised a diverse range of intergenerational interactions and summarised evidence from qualitative, quantitative, and mixed-methods studies. We were therefore able to gain more insight into the complexity of the constructs under investigation.

Studies reviewed here indicate that valuing and exercising life experience through IE may lead to health benefits in cognition, well-being, and health. We can now infer that these systems remain plastic throughout life and remain ready to incorporate new experiences (Reuter-Lorenz & Park, 2014). As we approach a time when the number of older adults equals the number of children, IE programmes may offer health benefits that outweigh reductionist approaches focusing solely on cognitive or physical exercise.

2.5.5 Implications for practice

This review revealed both short- and long-term IE programmes that demonstrated the potential to improve health outcomes and/or contribute to meaningful social benefits for older adults (e.g., Carlson et al., 2008, 2009; Fujiwara et al., 2009; Gamliel & Gabay, 2014; Hsu et al., 2014). These studies were implemented in different contexts and involved different activities, but all were community-based for participants' convenience and to tackle particular social issues (e.g., health and wellbeing in older adults, disengagement after retirement, negative cross-age attitudes). Although not all programmes may be translatable to all cultures and societies, the existing types of IE offer a wide range of options that can be adapted to different social needs and existing community approaches.

For example, studies that involved knowledge exchange between two generations and were based in the community or in centres for older people (e.g., Hsu et al., 2014; Johnson, 2015) are transferable for implementation in any countries and specific communities that have well-established venues where generations can meet. The purpose of IE meetings may also depend on the availability of resources and/or specificity of local groups. For

example, access to computers may facilitate technological knowledge and skills in older adults and teaching skills in the younger generation (Gamliel & Gabay, 2014; Johnson, 2015). Conversely, some community groups that target particular challenges of the older adult population (e.g., transition to retirement) and are involved in hands-on activities (e.g., woodworking, gardening), may be suited for selected groups of participants (Mahoney et al., 2020; Wilson et al., 2013).

School-based programmes such as Experience Corps (EC) in the United States or Research of Productivity by Intergenerational Sympathy (REPRINTS) in Japan demonstrate that long-term, effective intergenerational initiatives do not have to be high-cost and can result in positive outcomes for both the older adults and their communities (e.g., Fried et al., 2004; Murayama et al., 2015). This indicates that implementing even long-term intergenerational interventions that are purely voluntary is feasible. The REPRINTS programme did not provide the participants with any incentives, yet they were able to retain volunteers for up to 7 years (e.g., Sakurai et al., 2016). Moreover, although EC provided their participants with stipends to cover the costs related to participation, volunteers tended to commit more hours than they were reimbursed for (Fried et al., 2004). From a policy perspective, then, regular intergenerational initiatives like those described in this review, constitute an effective strategy to build age-friendly communities and potentially produce health and wellbeing benefits for older people. Our analysis also suggests that the impact of IE may differ depending on participants' baseline functional levels (Carlson et al., 2008; Kamei et al., 2011; Tan et al., 2006). Thus, future initiatives should ensure to consider potential baseline factors that may moderate the outcomes.

2.5.6 Future research

Although there is increasing public interest and need to promote physical, cognitive, emotional, and social functioning in older adults through programmes such as IE, there is a lack of comparable and widely applicable models for their implementation. The diversity of designs and assessments

used thus far within IE research limits the ability to draw strong, generalised conclusions. In order to attain greater consensus about the effectiveness of IE, standardised instruments should be utilised to a greater extent to enhance data quality and comparability across studies. They should be, if possible, specifically designed (e.g., The Life Satisfaction Index for the Third Age-Short Version; Barrett & Murk, 2009) or validated (e.g., International Physical Activity Questionnaire Short Form; Craig et al., 2003) for older adults to ensure they are appropriate for use and sensitive to potential effects of interventions.

In addition, the research community may also consider multisite/institution collaborative studies with agreed unified protocols so that larger datasets may be pooled and merged for analyses. Furthermore, the reviewed literature revealed a small number of RCTs used to examine impacts of IE. Randomly assigning participants to groups in controlled studies will facilitate higher quality demonstrations of potential intervention effects and, where possible, blinding the outcome assessors to the participants' groups can reduce detection bias. These will not always be possible, however, particularly in 'real-world' studies involving long-term participation. When this is the case, the lack of randomisation must always be borne in mind when interpreting results. Experience Corps (EC; e.g., Fried et al., 2004) and REPRINTS (e.g., Fujiwara et al., 2009), given their long-term and successful implementation, could constitute a possible solution in terms of effective programme designs and their application. Overall, however, it is important to highlight that efforts to ensure scientific rigour in both qualitative and quantitative research in this challenging form of 'real-world' research, which often takes place over extended periods of time, should be assessed with this context in mind. Efforts should be acknowledged as far as possible, for example when assessing study quality.

Differences in socio-political context of retirement and cultural norms regarding older adults' roles should be considered when designing and implementing IE, however. For example, the socio-political issues of Brazilian society, including inequalities and age-discriminations could influence some

of the participants' views of social interactions. As a result, their willingness to participate or adhere to the programme could be affected (de Souza & Grundy, 2007). EC, set in the United States, emphasised the importance of financial support for the programme volunteers to allow them cost-free participation (Fried et al., 2004) The EC stipends were also found to promote wider inclusion and increase retention in the programme (McBride et al., 2011). Additionally, methods applied may also be context-dependant. REPRINTS, as a high-quality, long-term intervention that aspired to implement all 'gold-standard' intervention procedures, was not able to randomise the sample as a result of 'political realities in the local municipality' (Sakurai et al., 2016; p.14).

Programmes may also usefully build upon existing 'grassroots' movements in the particular cultural context. For example, Men's Sheds was established for men to address the challenges associated with the transition to retirement (Mahoney et al., 2020; Wilson et al., 2013). Men's Sheds allowed both the young and older generations to bond through 'hands-on', traditionally masculine activities. Understanding the conception of masculinity in Australia that indicates a causal relationship between engaging in masculine activities and social support, sense of achievement, or sense of identity (Drummond, 1995), was crucial to developing positive intergenerational interactions, beneficial for all involved.

Thus, future research studies should implement controlled randomisation wherever possible, and should draw upon design features and outcome measures from previous successful studies, while considering the cultural and socio-political context. If these three conditions are adhered to, future interventions may have the potential to provide more robust, scientifically rigorous and translatable evidence of the causal attribution of effects. All these will help identify roles and activities for older adults that are most effective in enhancing their health and wellbeing. Studies included in this review primarily reported on psychosocial and health and wellbeing effects of IE and relatively few investigated impacts on cognition. Thus, more large-scale interventions are recommended to allow stronger conclusions to be

drawn about the potential benefits of IE, particularly regarding cognitive function in older adults.

There is also a lack of studies examining the potential effects of IE intensity. Only two studies included in this review demonstrated an intensity-response relationship, suggesting a more positive intervention effect on generativity as a function of the greater level of exposure to the programme (Gruenewald et al., 2016; Parisi et al., 2015). This evidence suggests that high-intensity engagement for an extended period of time may be particularly beneficial for older adult participants. However, little is known about the impact of intervention exposure on other aspects of older adults' functioning. Therefore, future research should explore the impact of intensity and duration of engagement, and where the threshold for improvement lies. In addition, the nature or more precise modality of the IE programme (e.g., knowledge exchange, exergaming, handicraft sessions) could be considered as a potential predictor of effectiveness, particularly as more evidence accrues over time. Hence, future interventions could usefully investigate the outcomes of various modes of IE, while also carefully controlling for the fidelity of implementation.

A wide range of IE programmes was covered in this review that differed in terms of intensity, duration, types of intergenerational activities and age of the younger generations involved. There was however very limited evaluation available regarding how these characteristics could potentially impact the outcomes of IE, which prevents us from defining an overarching theoretical framework of successful IE implementation. Although Experience Corps studies (e.g., Carlson et al., 2008; Fried et al., 2004) used a large dosage per week (15hrs/week) to encourage cognitive stimulation, benefits of IE were also observed across various outcomes in other IE studies using a much lower dose of engagement. Thus, the role of engagement intensity still needs to be explored to understand whether the high dosage is really necessary and to identify an optimal dose that can bring benefits. Therefore, suitability of the programmes for the targeted populations, unique elements of the interventions, as well as programme duration and dosage should be

assessed and discussed in future research. All programmes included in this review were community-based, which suggests appropriateness of choosing local settings for both the older and younger generations. Some of the studies involved activities organised in a range of different locations, including churches, museums, or private houses, which could also potentially affect outcomes and programme success. More examination of facilitators and/or challenges encountered during implementation across those locations would provide more insights about the role of context on IE outcomes.

It is also crucial to understand the long-term effects of IE following the intervention. All the included research records examined changes from pre- to post-intervention test, but only one programme conducted a further follow-up with participants, eight weeks after the completion of IE (Newman et al., 1995). An increase in longitudinal interventions with further follow-ups after months or years post-programme would strengthen the evidence related to IE, indicating whether any changes endure at a later timepoint. Furthermore, mixed-methods designs should be considered as a more standard approach in IE research, providing comprehensive evidence on the perceived impacts and experiences of participating in IE programmes, from various perspectives. In addition, multiple comparison conditions should be used to a greater extent in future, to help determine the specific effects of intergenerational interactions. For example, a non-engagement group as well as a social engagement (non-IE) only group would help to control for the potential effects of increased social interaction vs IE specifically. Finally, we suggest that greater adoption of 'open science' practices (e.g., using Open Science Framework; https://osf.io/) and promoting data-sharing (i.e., making raw data openly and freely available) would further enhance this research area. More study pre-registrations and openly available preprint publications, for example, could help to minimise selective reporting of results and increase publication of both significant and null results.

2.6 Summary

This chapter provided a comprehensive review of a wide range of potential benefits of IE for older adults. The heterogeneity of the form of IE and the chosen outcome measures have been identified indicating many possibilities for future research and practice, but also accounting for the many discrepancies in findings. Those differences may also indicate that more explanatory research is required to reveal when, where, and how the benefits might be derived. Nonetheless, some relatively consistent, positive effects were found on several outcomes, including anxiety, generativity, cross-age attitudes, and physical activity. The impacts of intergenerational programmes on specific cognitive outcomes were not reliable across multiple studies, and need to be addressed more in future, ideally in gold-standard and large-scale interventions. Overall, this review suggests that more research is required that involves: 1) both quantitative and qualitative measures; 2) 'gold standard' and comparable models, allowing wider implementation and generalisability of findings; and 3) RCTs, wherever possible, to generate the highest quality evidence. In sum, this chapter provided context and the rationale for the current mixed-method research on the impacts and experiences of a school-based IE intervention for community-residing older adults, as well as the impacts on teachers, pupils, and schools. An overview of the present research programme including the associated pilot RCT will be presented in the next chapter.

Table 2.1

Assessment of research quality using the Mixed Method Appraisal Tool (MMAT; Hong et al., 2018).

		1. QUALITATIVE STUDIES					2. QUANTITATIVE, RANDOMIZED CONTROLLED TRIALS					3. QUANTITATIVE, NON-RANDOMIZED STUDIES					5. MIXED METHODS STUDIES				
First author	Year	1.1. Is the qualitative approach appropriate to answer the research question?	1.2. Are the qualitative data collection methods adequate to address the research question?	1.3. Are the findings adequately derived from the data?	1.4. Is the interpretation of results sufficiently substantiated by data?	1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?	2.1. Is randomization appropriately performed?	2.2. Are the groups comparable at baseline?	2.3. Are there complete outcome data?	2.4. Are outcome assessors blinded to the intervention provided?	2.5. Did the participants adhere to the assigned intervention?	3.1. Are the participants representative of the target population?	3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?	3.3. Are there complete outcome data?	3.4. Are the confounders accounted for in the design and analysis?	3.5. During the study period, is the intervention administered (or exposure occurred) as intended?	5.1. Is there an adequate rationale for using a mixed-method design to address the research question?	5.2. Are the different components of the study effectively integrated to answer the research question?	5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?	5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?	5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?
Adam, J.E.	1992											Yes	Yes	Yes	No	Yes					
Alcock, C.L.*	2011	Yes	Yes	Yes	Yes	Yes															
Barbosa, M.R.	2020	Yes	Yes	No	No	No						Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No
Barnard, D.	2014	Yes	Yes	No	No	No															
Belgrave, M. J.	2018	Yes	Yes	Yes	No	No						No	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No
Carlson, M.C.* Fried, L.P. Tan, E.J.	2008 2004 2006						Yes[a]	Yes	Yes	Yes[b]	Yes										
Carlson, M.C.*	2009						Yes[a]	Yes	Yes	Yes[b]	Yes										
Carstensen, C,	1982											Yes	Yes	Yes	No	Yes					
Chapman, N.J.*	1990	Yes	Yes	Yes	Yes	Yes						Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Chippendale,T	2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No[b]	Yes						Yes	Yes	Yes	Yes	No
Chung, S.	2020											No	No	Yes	No	Yes					
de Souza, E.M.	2007						Yes	Yes	Yes	No[b]	No										
DeMichelis, C.	2015	Yes	Yes	Yes	Yes	Yes						No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes

Ehlman, K.*	2014											Yes	Yes	Yes	Yes	Yes					
Fujiwara, Y.	2013											Yes	Yes	No	Yes	Yes					
Gaggioli, A.	2004											No	Yes	Yes	No	Yes					
Gamliel, T.*	2014	Yes	Yes	Yes	Yes	Yes						Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Gruenewald, T.* Parisi, J.M.	2016 2015						Yes[a]	Yes	Yes	Yes[b]	Yes										
Halpin, S.N.	2017	Yes	Yes	Yes	Yes	No						No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hernandez, C.R.	2008											Yes	Yes	Yes	No	Yes					
Hsu, S.*	2014											Yes	Yes	Yes	Yes	Yes					
Johnson, W.	2014	Yes	Yes	Yes	Yes	Yes						Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes
June, A.	2020											No	Yes	Yes	No	Yes					
Kamei, T.	2011	Yes	Yes	Yes	No	No						No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Lee, O. E.-K.	2019	Yes	Yes	Yes	Yes	Yes						No	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No
Lin, Y.-C.	2017	Yes	Yes	No	No	No						No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No
Mahoney, N.	2020	Yes	Yes	Yes	Yes	Yes						Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Meshel, D.S.	2004											Yes	Yes	Yes	No	Yes					
Murayama, Y.	2015											Yes	Yes	No	Yes	Yes					
Newman, S.	1995											No	Yes	Yes	Yes	Yes					
Perry, C.K.	2011	Yes	Yes	Yes	No	No						No	Yes	No	No	Yes	Yes	Yes	Yes	No	No
Pinquart, R.	2000											No	Yes	Yes	No	Yes					
Posada, M.M.	2006											No	Yes	Yes	Yes	Yes					
Sakurai, R.	2016											Yes	Yes	No	Yes	Yes					
Sakurai, R.	2018											Yes	Yes	No	No	Yes					
Sanders, M.J.	2013											Yes	Yes	No	No	Yes					
Santini, S.	2018	Yes	Yes	Yes	Yes	No															
Sng, J. R. H.	2020											No	Yes	Yes	No	Yes					
Strand, K.A.	2014	No	Yes	No	Yes	Yes						Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No
Sun, Q.*	2019											Yes	Yes	Yes	Yes	Yes					
Tan, E.J.*	2009											Yes	Yes	Yes	Yes	Yes					
Wilson, N.J.*	2013	Yes	Yes	Yes	Yes	Yes															
Xu, X.	2016											Yes	Yes	No	Yes	Yes					
Young, T.L.	2013											No	Yes	No	Yes	Yes					

NB: Criteria set 4 ('Quantitative Descriptive') not relevant for any included studies; *studies that met all the criteria; [a] randomisation protocol described by Fried et al. (2013); [b] further details received by authors.

Table 2.2

Characteristics and aims of the studies included in the review.

Study	Country	Sample Size[a]	Participants			Age (Years)		Gender (%)		Design	Duration	Intensity	Aims
			Control	IE 1	IE 2	*M*(SD)	Range	Women	Men				
Adam, J.E. (1992)	USA	34	-	34	-	83.3	51-100	79	21	pre-and post-uncontrolled study	1 school year	2 or more sessions per month (session duration not specified)	To assess the effect of increased contact with children on the wellbeing of nursing home residents.
Alcock, C.L. et al. (2011)	UK	13	-	13	-	-	65-80	77	23	focused ethnographic evaluation	7 months	36 x 90 min sessions (weekly engagement not specified)	To promote social inclusion and mental wellbeing.
Barbosa, M. R., et al. (2020)	PORTUGAL	12	6	6	-	80.5 (IE) 87 (Control)	72-90	83	17	pre- and post-controlled study with a qualitative component	1 year	1 x 2 hrs per month	To assess the effects of intergenerational relationships on the self-esteem, loneliness, depression, and happiness of
Barnard, D. (2014)	AUSTRALIA	8	-	8	-	-	88-95	25	75	pre- and post-qualitative survey	3 months	1 hr per week	To enhance a sense of personal well-being and increase understanding and collaboration between the two generations.
Belgrave, M.J. & Keown, D.J. (2018)	USA	18	-	18	-	69.29 (5.49)	61-79	72	28	pre- and post-uncontrolled study with a qualitative component	4 weeks	2 virtual exchanges (one session per week; no real-time streaming); half day 'live' workshop collaboration and a joint performance (session duration not specified)	To examine changes in cross-age comfort, expectations after experiencing "virtual" exchanges, and preconceived notions of younger persons enrolled in a distance-based intergenerational project.
Carlson, M.C., et al. (2008); Fried et al. (2004);	USA	128	58	70	-	-	60-86	83	17	RCT	1 school year	15 hrs per week (3-4 days per week)	To examine the impacts of the Experience Corps programme on physical, social, and cognitive functioning/activity.

Tan, E.J., et al. (2006)													
Carlson, M.C., et al. (2009)	USA	17	9	8	-	67.89 (4.4)	60+	100	-	RCT	6 months	15 hrs per week (3-4 days per week)	To assess the effects of the Experience Corps programme on brain plasticity in age-vulnerable cognitive functions among cognitively at-risk OAs.
Carstensen, L., et al. (1982)	USA	23	12	11	-	72 (5.6)	-	87	13	non-randomised controlled trial	2 months	15 mins per day (4 days per week)	To examine morale among older adult tutors.
Chapman, N. J. & Neal, M.B. (1990)	USA	107	-	25	82	73	53-92	80	20	pre-and post-uncontrolled study with a qualitative component	6 months	3-4 hrs per week	To investigate a) attitudes and behavioural intentions toward the other generation, and b) assumptions underlying
Chippendale, T. and Boltz, M. (2015)	USA	39	16	23	-	76.83 (9.7)	60+	90	10	RCT with a qualitative component	4 weeks	1 x 90 mins per week	To investigate the therapeutic benefits of life review writing plus intergenerational exchange.
Chung, S. & Kim, J. (2020)	KOREA	34	-	34	-	72.1 (5.5)	60+	32.4	67.6	pre- and post-uncontrolled study	4 months	8 x 2 hrs session (weekly engagement not specified)	To examine whether the programme increases intergenerational solidarity and positive perceptions toward the younger generation.
de Souza, E. M. & Grundy, E. (2007)	BRAZIL	266	117	149	-	69.5 (6.8)	60+	60.5	39.5	RCT	4 months	1 x 2 hrs per week	To assess the cognitive components of social capital and self-rated health.
DeMichelis, C. et al. (2015)	CANADA	10	-	10	-	72 (7.6)	60-89	-	-	pre-and post-uncontrolled study with a qualitative component	3 weeks	1 x 1.5 hrs per week	To assess development of psychological wisdom.
Ehlman, K., et al. (2014)	USA	124	-	124	-	78.4 (5.8)	65+	75	25	pre-and post-uncontrolled study	2-3 weeks	1 x 1 hr per week	To assess perceived levels of generativity.

Fujiwara, Y., et al. (2009)	JAPAN	141	74	67	-	68.45 (5.4)	60-69	73.27	26.73	non-randomised controlled trial	18 months	1 session per 1-2 weeks; reading and playing for 30 mins per class (kindergarten); reading picture books for 15 mins per class (elementary school)	To examine the effects of the REPRINTS intervention on older adult volunteers' physical health, subjective and psychological health, social participation, social network, social
Gaggioli, A., et al. (2014)	ITALY	32	-	32	-	67.53 (6.0)	-	-	-	pre-and post-uncontrolled study	3 weeks	3 x 2 hrs per week	To investigate effects of an intergenerational reminiscence group on OAs' perceived levels of loneliness, self-esteem, and quality of life.
Gamliel, T. and Gabay, N. (2014)	ISRAEL	29	-	29	-	-	66-77	-	-	pre-and post-uncontrolled study with a qualitative component	8 months	1 x 2 hrs per week	To explore empowerment in each generational group and the social relations between groups.
Gruenewald, T., et al. (2016) Parisi, et al. (2015)	USA	702	350	352	-	67.4 (5.9)	60-89	85	15	RCT	2 years	15 hrs per week (3-4 days per week)	To examine the impact of the Experience Corps programme on OAs' self-perceptions of generativity and daily lifestyle activities.
Halpin, S. N., et al. (2017)	USA	147	-	147	-	77.6	64-99	64.4	35.6	pre-and post-uncontrolled study with a qualitative component	11 months	1 session per month (session duration not specified)	To examine the impact of mentoring health professions students on OAs' mental, physical, and emotional health.
Hernandez, C. R. & Gonzalez, M.Z. (2008)	SPAIN	103	32	36	35	75 (6.0)	65+	83.5	16.5	non-randomised controlled trial	8 months	1 x 60 mins per week	To assess impacts on stereotyped attitudes towards OAs' and on OAs'' wellbeing.
Hsu, S., et al. (2014)	TAIWAN	118	63	55	-	70.75 (6.9)	60-92	71.2	29.8	non-randomised controlled trial	8 weeks	1 x 90 mins per week	To assess the impact on mutual understanding and inclusion between generations, and on OAs' physical and mental health.

Johnson, W. (2015)	USA	20	-	20	-	68.88	65-76	68.75	31.25	pre-and post-uncontrolled study with a qualitative component	8 weeks (6 weeks IG contact)	1 x 2 hrs per week	To explore the effects of an intervention in which OAs learned digital communication technologies from older adolescents, and its effects on OAs' life quality and satisfaction.
June A. & Andreoletti C. (2020)	USA	16	-	16	-	85.2 (9.4)	60-100	68.8	31.2	pre- and post-uncontrolled study	1 college semester	6 x 1 hr sessions (weekly frequency of intergenerational engagement not specified)	To determine whether older adults would experience increased feelings of generativity after participation in a few meaningful intergenerational interactions.
Kamei, T., et al. (2011)	JAPAN	22	8	14	-	72.1 (7.95)	_	100		non-randomised controlled trial with a qualitative component	6 months	3 hrs per week (2.5 hrs spent with children; 22 sessions total)	To examine the progression of intergenerational interactions among and between OAs and children and to evaluate the OAs' health-related quality of life (HRQOL) and depressive symptoms.
Lee, O.E.-K. & Kim, D.-H. (2019)	USA	55	-	55	-	73.82 (12.30)	_	63.6	36.4	pre- and post-uncontrolled study with a qualitative component	Not specified	6 x 1 hr sessions (weekly frequency of intergenerational engagement not specified). A total of 276 mentoring hours was provided.	To examine the effect of the Intergenerational Mentor-Up programme on older adults' experience of social isolation.
Lin, Y.-C., et al. (2017)	TAIWAN	9	-	9	-	69.33 (5.27)	65-80	77.8	22.2	pre- and post-uncontrolled action research project with a qualitative component	12 weeks	1 x 2 hrs per week	To develop and evaluate the effectiveness of an intergenerational health promotion programme.

Mahoney, N., et al. (2020)	AUSTRALIA	15	-	15	-	74 (Median)	50-81	-	100	pre- and post-uncontrolled study with a qualitative component	6 months	1 x 3-5 hrs per week	To investigate the experiences of older male mentors involved in an intergenerational programme with young men with intellectual
Meshel, D.S. & McGlynn, R.P. (2004)	USA	21	-	21	-	-	60-75	70.6	29.4	pre-and post-uncontrolled study	6 weeks	1 x 1 hr per week	To promote positive cross-generational attitudes.
Murayama, Y., et al. (2015)	JAPAN	136	82	54	-	69.1	65-79	83.8	16.2	non-randomised controlled trial	2 years	1 session per 1-2 weeks; reading and playing for 30 mins per class (kindergarten); reading picture books for 15 mins per class (elementary school)	To assess effects of the REPRINTS intervention on OAs' depressive symptoms and their sense of coherence.
Newman, S., et al. (1995)	USA	26	-	26	-	-	60+	84.62	15.38	pre-and post-uncontrolled study with further follow-up	6 months	A minimum of 1 x 3 hrs week	To examine OAs' everyday memory performance and perceptions of their memory performance as a result of a weekly intergenerational school programme.
Perry, C. K. & Weatherby, K. (2011)	USA	10	-	10	-	70 (8.0)	_	85.7	14.3	pre-and post-uncontrolled participatory research study with a qualitative component	8 weeks	1 x 1 hr per week	To assess the feasibility and efficacy of increasing physical activity and social interaction among OAs and youths through an intergenerational physical activity programme.
Pinquart, R., et al. (2000)	USA	20	8 to 10	8 to 10	-	71.7 (8.3)	_	100	-	non-randomised controlled trial	6 weeks	1 x 1.5 hrs per week	To investigate intergenerational attitudes in children and OAs.
Posada, M.M. (2006)	USA	20 (14 cognitively intact)	9 (6 cognitively intact)	11 (8 cognitively intact)	-	84.7 (11.06)	57-98	75	25	non-randomised controlled trial	9 weeks	10 mins per day (3 days per week)	To examine effects of interactions between children and nursing home residents on depression and positive behaviours of residents.

Sakurai, R., et al. (2016)	JAPAN	349	186	163	-	67.1 (5.2)	_	80.2	19.8	non-randomised controlled trial	7 years	1 session per 1-2 weeks	To investigate the long-term effects of REPRINTS, focusing on functional capacity and physical function.
Sakurai, R., et al. (2018)	JAPAN	118	62	56	-	68.2 (5.6)	_	82.4	17.6	non-randomised controlled trial	6 years	1 session per 1-2 weeks	To examine the effects of REPRINTS intervention on age-related hippocampal atrophy.
Sanders, M.J., et al. (2013)	USA	92	-	92	-	74.42	57-89	75.8	24.2	pre-and post-uncontrolled study	4 weeks	1 x 1 hr per week	To determine the impacts of a client-centred computer programme on computer skills and generativity in novice OA computer users, using a community-based participatory research approach.
Santini, S., et al. (2018)	ITALY	16	-	16	-	83	_	68.8	31.2	pre- and post-participatory qualitative study	8 months	1 x 2 hrs session per 10 days (25 sessions of intergenerational interaction)	To promote institutionalised OA's social inclusion, emotional well-being, and relational capabilities.
Sng, J.R.H. & Jung, Y. (2020)	SINGAPORE	50	-	50	-	71.9	_	80	20	Pre- and post-uncontrolled study	3 weeks	3 x 30 mins sessions (1 session per week)	To explore the effects of intergenerational video gameplay intervention on intergroup anxiety and improved intergenerational attitudes.
Strand, K.A., et al. (2014)	USA	68	-	68	-	-	60+	87	13	pre-and post-uncontrolled study with a qualitative component	8 weeks (programme = 25 weeks; 8 weeks were interactive)	2 x 60 mins per week	To examine effects of combining three health promotion approaches of intergenerational group design, exergaming, and theory-based wellness newsletters on OAs' physical activity participation and subjective health.
Sun, Q., et al. (2019)	Hong Kong	150	77	73	-	72.54 (7.18; IE);	-	80.82 (IE); 79.22 (Controls)	19.18 (IE); 20.78	pre- and post-non-	6 weeks (4 weeks were interactive)	2 x 2-hour sessions (no intergenerational interaction); 2 x 7.5-hour IE	To evaluate the effectiveness of the YOLG programme on

						73.95 (8.7; Controls)			(Controls)	randomised controlled trial		sessions; 2 x 2-hour IE sessions (19 hours of intergenerational interaction)	intergenerational attitudes and perceptions, sense of comfort with cross-age groups, and intergenerational interaction.
Tan, E.J., et al. (2009)	USA	420	336	84	-	72.1 (4.35)	65-86	100	-	non-randomised controlled trial	3 years	15 hrs per week (3-4 days/week)	To assess longer-term effects of the Experience Corps programme on physical activity.
Wilson, N.J., et al. (2013)	AUSTRALIA	6	-	6	-	-	60-75	-	100	qualitative study	6 weeks	1 session per week (session duration not specified)	To investigate mentors' experiences and views about the youths, the structure of the program, and the role of meaningful occupation.
Xu, X., et al. (2016)	SINGAPORE	89	63	26	-	75	60+	77	23	non-randomised controlled trial	1 week	3 x 35-40 mins per week	To examine effects of exergaming on OAs' social
Young, T.L. & Janke, M.C. (2013)	USA	197	-	197 (48 completed pre-and post-tests)	-	-	50-89	78	22	pre-and post-uncontrolled study	5-year initiative, but data collected over ~1.5 years	Not specified	To examine OAs' perceived benefits and concerns in a community-based intergenerational programme.

a. Baseline sample of older adults only. Reported sample is the number of participants who passed the initial screening and were included in the study. IE = Intergenerational Engagement.

Table 2.3

Available evidence related to older adults' (OAs') social, physical health, and/or cognitive outcomes, organised by study type.

Study	Outcomes			Findings*
	Social	Health	Cognitive	
Quantitative				
Randomised controlled trial				
Carlson, M.C., et al. (2008) Fried. L.P., et al. (2004) Tan, E.J., et al. (2006)	**Social Activity**: 1. Number of adults: a) One could turn to b) Who would check on you if sick c) One could depend on d) Seen in a typical week 2. Could have used more emotional support from other in the past year	**Physical Activity**: 1. More active at follow-up 2. Number of blocks walked/week 3. Proportion walking no blocks/week 4. Flights of stairs climbed/week 5. Proportion climbing no stairs/week 6. Activity in kilocalories/week 7. Number of hours lying down or sitting while awake 8. Intermediate outcomes a) Strength - very good/excellent (% reporting) - feel stronger at follow-up (% reporting) b) Fallen in the past 12 months (% reporting) c) Cane use (% reporting less often) d) Walking speed (m/s) 9. Physical activity/week (mins) 10. Physical activity/week (kcals) 11. Walking for exercise/week (kcals) 12. Household chores/week (kcals)	**Psycho-motor speed** (Trail-Making Test Part A; TMT-A; Reitan, 1958) **Executive function** (TMT-B) **Verbal memory** (word list memory; immediate and delayed) **Visuo-spatial EF and memory** (Rey-Osterrieth Complex Figure Test; Lezak, 1995; copy and delayed recall) **Cognitive Activity**: 1. Summed outside of programme activities: a) high-intensity activities (e.g., crossword puzzles) b) moderate-intensity activities (e.g., cooking) c) low-intensity activities (e.g., TV viewing) d) books read/month e) hours of television/day	**Social outcomes:** *A significant main effect of intervention group* was found on change in the number of people that participants felt they could turn to for help (intervention = 5.3 at baseline to 6.2 at follow-up; control 5.8 to 4.3; $p = .03$); *No significant effect* was found on the remaining social outcomes (all $p > .20$). **Health outcomes:** *A significant main effect of intervention group* was found on: (1) self-reported increased physical activity (63% of participants in the intervention group vs 43% in the control group; $p = .04$); (2) change in self-reported strength very good or excellent (an increase from 48 to 65% in the intervention group vs a decline from 52 to 36% in the control group; $p < .03$); (3) % participants reporting feeling stronger (intervention = 44% vs control = 18%; $p < .02$); (4) walking speed (a decrease from 0.95 to 0.92 in the intervention group vs a decrease from 1.06 to 0.86 in controls; $p = .001$); (5) change in household chores per week (intervention = 120 to 240 vs control = 100 to 110 kcals; $p = .02$, unadjusted; $p = .07$, when adjusted for age, gender, race, education, and health status); (6) self-reported increased physical activity (intervention = 53% vs control = 23%; $p < .01$). *No significant overall intervention effects* for changes in (1) physical activity in mins; (2) physical activity in kcals; (3) walking in kcals; (4) exercise; (5) leisure activity; (6) percentage who are active; (7) walking (blocks/wk); or (8) stairs climbed (all $p > .17$). Participants were also stratified by baseline physical activity, with 'active' defined as reporting at least 10 episodes in the last 2 weeks of moderate activity of at least 30 mins duration, and 'low activity' defined as those with less activity than this. In the low activity group, *significant intervention effects* were found for: (1) change in physical activity (kcals/wk: intervention = 420 to 880 vs control = 490 to 500; $p = .01$; and mins/wk: intervention = 120 to 210 vs control = 120 to 130; $p = .02$); (2) change in household chores per week (kcals: intervention = 70 to 240 vs control = 90 to 110; $p < .01$); (3) self-reported increased physical activity (intervention = 49% vs control = 18%; $p < .01$, unadjusted; $p = .05$, adjusted). *No significant effects* were found on the remaining variables for 'low activity' group (all $p > .72$).

		13. Exercise/week (kcals) 14. Leisure activity/week (kcals) 15. Percentage who are active 16. Self-reported increased physical activity at follow-up relative to baseline (percentage of participants reporting an increase)		In the 'active' group, *a significant intervention effect* was observed for percentage who are active (intervention = 100 to 65% vs control = 100 to 20%; p = .02, unadjusted; p = .17, adjusted). *No significant effects* observed for any of the remaining variables for the 'active' group (all p > .16). *No significant intervention effect* was found on the remaining physical outcomes (all p > .13).
				Cognitive outcomes: When the whole sample was analysed, *no significant effects of intervention group* were found on: (1) TMT-A; (2) TMT-B; (3) immediate word recall; (4) delayed word recall; (5) Rey-Osterrieth copy; or (6) Rey-Osterrieth delayed recall (all p > .05). When participants were stratified by presence or absence of baseline EF impairment (presence defined as TMT-B performance in the poorest tertile, > 203 s) *a significant effect* of intervention group was found on: (1) TMT-B (a 'clinically significant improvement' from 298 to 173 s in the EF-impaired intervention subgroup vs a decline from 260 to 237s in the EF-impaired controls; p < .05); (2) immediate word recall (an increase from 19.3 to 20.9 in the EF-impaired intervention subgroup vs a decrease from 21.6 to 19.6 in the corresponding controls; p < .05); (3) delayed word recall (an increase from 5.0 to 7.0 in the EF-impaired intervention subgroup vs a decline from 6.4 to 5.6 in the corresponding controls; p < .05); *No significant effects* on: (1) TMT-A; (2) Rey-Osterrieth-copy; or (3) Rey-Osterrieth-recall (all p > .05). *A significant main effect of intervention group* was found on change in time viewing television (intervention group's score changed from 4.6 to 4.4 vs 4.5 to 5.3 in controls; p = .02). *No significant main effect*s found on other outside-of-programme cognitive activities (all p > .43).
Carlson, M.C., et al. (2009)			**Executive function** (selective attention and inhibition using the Flanker Task)	*A significant group × time interaction effect* on: - RT-based interference scores (p < .04). Reduced interference from baseline to follow-up was observed for the intervention group compared to matched controls. Cue size (large/small) did not interact with this (p < .20 for the 3-way interaction). *A significant time x group x congruency effect* was found on: - accuracy (p < .03). Greater improvements from baseline to follow-up in the intervention group for 'incongruent' trials (i.e., containing interference; p < .05). Again, this was independent of cue size (p < .16 for the 4-way interaction).

Chippendale, T. & Boltz, M. (2015)	**Cross-age perceptions and generativity** (qualitative component; written description of IE)	**Sense of purpose and meaning in life** (the Meaning in Life Questionnaire- Presence; Steger et al., 2006) Mental wellbeing (qualitative component; written description of IE)		*A significant main effect of intervention group* was found on change in sense of purpose and meaning in life score (control = -3.5; intervention = 1.04; $p < .01$; Cohen's $d = 1.24$); Qualitative data revealed that intergenerational engagement (IE) was a positive experience in terms of: (1) enhancing positive views of younger generation; (2) allowing participants to share experiences and learn from each other; (3) promoting wellbeing (e.g. cognitive stimulation, positive mood); and (4) providing a supportive environment of value (e.g., safe social space).
de Souza, E. M. & Grundy, E. (2007)	**Social functioning** (questionnaires derived from the American General Social Survey; Kawachi, 1999; and the health survey for England; Bajekal and Purdon, 2001): a) People can be trusted b) Neighbours are helpful c) People are honest d) People take advantage e) People are helpful f) People are selfish g) Family relationship improvement h) Quality of family relationship i) Trust in family	**Self-rated health status** (derived from the Brazilian Old Age Scale; Veras, 1992)		Using Intention to Treat (ITT) analyses on follow-up data from control and intervention participants, *significant positive effects of intervention group* were found on self-reports of: (1) neighbours' helpfulness ($p = .007$); (2) the honesty of most people in general ($p = .008$); (3) quality of family relationships ($p = .014$; however, *not significant* using 'as per protocol' analyses, $p = .09$). *No significant intervention effect* was found on participants' self-reports of: (1) improvement in their family relationships ($p = .27$); (2) the trustworthiness of most people in general ($p = .82$); (3) trust in family ($p = .85$); (4) people's selfishness (p-value not specified); (5) people take advantage' ($p = .27$); (6) people's helpfulness (p-value not specified); or (7) health status ($p = .55$)
Gruenewald, T., et al. (2016) Parisi, J.M., et al. (2015)	**Generativity** (a self-developed measure): a) generative desire (e.g. 'I want to give back to my community') b) generative achievement (e.g. 'I feel like I am giving back'). **Social activity** (Lifestyle Activity Questionnaire, LAQ; Carlson et al., 2012)	**Physical and passive activities** (Lifestyle Activity Questionnaire; Carlson et al., 2012)	**Intellectual and creative activities** (Lifestyle Activity Questionnaire; Carlson et al., 2012)	*A significant effect of intervention group* was found on: (1) generative desire at the 4-month ($p < .05$; Cohen's $d = .18$), 12-month ($p < .05$; $d = .17$), and 24-month ($p < .001$; $d = .26$) follow-up; (2) perceptions of generative achievement at the 4-month ($p < .001$; $d = .29$), 12-month ($p < .05$; $d = .19$), and 24-month ($p < .05$; $d = .16$) follow-up; (3) overall activity level at the 12-month follow-up ($p < .05$; but not at 24 months); (4) intellectual activity at the 12-month follow-up ($p < .05$) and at 24 months [$p < .05$; but only on Complier Average Causal Effect (CACE) Modelling, which takes adherence into account, and not ITT analysis which is more conservative]; (5) social activity at 12-month follow-up ($p < .05$; but only on the CACE model, and not at 24 months); (6) physical activity at the 12-month follow-up ($p < .05$; but not at 24 months); (7) passive activity at the 24-month follow-up only ($p < .05$; and only on the CACE Model). *No intervention effect* on creative activity ($p > .05$).

				Effect size estimates as a function of intervention exposure also suggested a *intensity-response relationship* regarding generativity.
Non-randomised controlled trial				
Barbosa, M.R., et al. (2020)	**Qualitative findings** (focus groups): 1) community involvement; 2) intergenerational sharing.	**Self-esteem** (Rosenberg Self-esteem Scale; Rosenberg, 1965); **Happiness** (Subjective Happiness Scale; Lyubomirsky and Lepper, 1999); **Depression** (Geriatric Depression Scale; Yesavage et al., 1983); **Loneliness** (The UCLA Loneliness Scale; Russell et al., 1988); Qualitative findings (focus groups): 1) Wellbeing and positive emotions; 2) Purpose/meaning for older adults		*A significant effect of group* was found on change in depression (p = .014; r = – 0.714). *No significant group effects* were found on the remaining health outcomes. However, large and medium effect sizes were reported for loneliness and happiness, respectively (r = – 0.51; r = – 0.41). Note, results were derived from non-parametric tests only. The authors state that the qualitative data showed that IE provided an opportunity for intergenerational sharing and community involvement, and positively impacted wellbeing and purpose/meaning in life. However, these categories are not sufficiently supported by the data as the focus group excerpts from the older adults themselves are very limited and rarely reflect the highlighted categories.
Carstensen, L., et al. (1982)		**Life satisfaction** (Lohmann's Life Satisfaction Scale; Lohman, 1980) **Purpose in life** (Purpose in Life Test; Frankl, 1960)		*No significant interaction effects* between intervention group and time were found on either measure (p-values not specified). Additional data from programme evaluation forms suggested some benefits of the intervention (i.e., 80% of participants reported personally benefitting from participation; 70% reported feeling happier; and 70% reported feeling more in touch with the community).

Fujiwara, Y., et al. (2009)	**Social function** 1) Receiving social support (Noguchi's Index of Social Support; Noguchi, 1991): a) from family members living together b) from family members living apart c) from friends or neighbours. 2) Providing social support (Noguchi's Index of Social Support; Noguchi, 1991): a) to family members living together b) to family members living apart c) to friends or neighbours. 3) Social activity (a social activity checklist; Takahashi et al., 2000): a) social or volunteer activity b) individual activities c) lifelong study d) occupation (engaged in). 3) Social network(Noguchi's Index of Social Support; Noguchi, 1991): Frequency of communication with a) friends or neighbours b) grandchildren c) neighbourhood children d) distant children (outside of own neighbourhood) Number of persons a) friends or neighbours b) distant friends	**Self-rated health** **Physical function:** Hand grip strength (kg) Usual walking speed (m/min)		Using General Linear Modelling (adjusted for gender, age, and school years), *a significant intervention group × time* (baseline, 9-month follow-up) *interaction effect* was found on: (1) providing support to friends or neighbours (p = .046; intervention group score was 11.2 at baseline and 13.1 at follow-up; controls = 12.7 at both baseline and follow-up); (2) receiving support from friends and neighbours (p = .038; intervention group score = 9.9 at baseline, 8.8 at follow-up; control group = 10.5 at baseline, 11 at follow-up); (3) social networking with grandchildren (p = .007; intervention group score = 2.1 at baseline, 2.4 at follow-up; the control group = 2.7 at baseline, 2.4 at follow-up); (4) number of distant friends (p = .044; intervention group = 3.1 at baseline, 3.5 at follow-up; control group = 3.3 at baseline, 3.2 at follow-up); (5) frequency of contact with children outside their own neighbourhoods (through volunteer activity; p < .001; intervention group = 1.6 at baseline, 3.3 at follow-up; control group = 1.6 at baseline, 1.4 at follow-up); (6) occupation (p < .001; intervention group = 0.3 at baseline, 0.2 at follow-up; control group = 0.3 at baseline, 0.3 at follow-up). Note, however, no follow-up tests of the significance of any change within groups were reported. *No significant time x group interaction effect* was found on the remaining social outcomes (all p = n.s.). Using General Linear Modelling (adjusted as above), *a significant group × time interaction effect* was found on: (1) self-rated health (p = .012; intervention group score = 1.9 at baseline, 2.1 at follow-up; control group = 2.1 at baseline, 2.0 at follow-up); (2) hand grip strength (p = .005; intervention group score = 25.7 at baseline, 25.4 at follow-up; control group = 26.6 at baseline, 25.1 at follow-up). Again, no follow-up tests of the significance of any change within groups were reported. *No significant time x group interaction effect* was found on usual walking speed (p = n.s).

Hernandez, C.R. & Gonzalez, M.Z. (2008)	**Stereotyped perception of themselves** (negative old age stereotypes questionnaire; Montorio and Izal, 1991)	**Depression** (Geriatric Depression Scale; Yesavage, 1983)		No inferential analyses were conducted on the social measures. *A significant group x time interaction effect* was found on depression ($p < .0001$). There was a significant reduction of depressive symptoms in the intervention group (baseline = 15.15; follow-up = 11.62; $p < .001$), whereas an increase was observed in the control group (baseline = 12.12; follow-up = 14.94; $p < .001$).
Hsu, S., et al. (2014)		**Perceived health status** **Emotional wellbeing** (Delighted-Terrible Faces Scale; Andrew and Withey, 1976) **Physical and mental functions** (short-form health survey (SF-12) with physical and mental components; Ware et al., 1996) **Happiness** (Chinese Happiness Index-Short Form; Lu, 1998)		*A significant main effect of intervention group* was found for the follow-up data on: (1) perceived health status ($p \leq .001$; control = 2.41; intervention = 3.13); (2) happiness ($p \leq .001$; control = 14.30; intervention = 17.76); (3) emotional well-being ($p \leq .001$; control = 5.14; intervention = 5.98). *No significant group differences* in the follow-up data for: (1) physical health component ($p = .07$); or (2) mental health component ($p = .05$). At baseline, *a significant group difference* only for perceived health status ($p = .042$; control = 2.48; intervention = 2.82; all other $p > .12$). *A significant main effect of time* within the experimental group was found for: (1) emotional well-being ($p \leq .001$); (2) happiness ($p = .007$). *No significant main effects* of time were found within the intervention group on: (1) mental health component ($p = .78$); and (2) physical health status ($p = .065$). There were *no significant effects* of time within the control group (all $p > .09$). Note, none of the analyses tested for interaction effects.
Kamei, T., et al. (2011)	**Qualitative findings** (interviews and observational field notes): a) Knowledge exchange b) Social interaction	**Health-related quality of life** (HRQOL; 8-item short form; Fukuhara & Suzukamo, 2004): a) general health b) physical functioning c) role physical d) bodily pain e) vitality f) social function g) mental health **Depression** (Geriatric Depression Scale-15; Niino, 1991)		*Main effect of time* was found in the OAs participating in the intervention on: (1) the mental health component of the HRQOL; $p = .03$, but not the other subscales (all $p > .10$). A significant improvement on mental health was found between baseline and after 6 months of involvement ($p < .05$; baseline = 48.3; 6-month follow-up = 53.3). (2) depression scores, but only in a subgroup of participants who scored ≥ 5 at baseline, the cut-off score for depression ($p = .045$; no significant effect in those scoring ≤ 4, $p = .46$). In those initially depressed, there was a significant decrease in depression at 3 months (baseline = 8.2; 3-month follow-up = 4.8). Note, none of the analyses tested for interaction effects. Qualitative data revealed that IE provided an opportunity to reminisce, to teach each other, and encouraged expansion of social interactions outside the programme.
Murayama, Y., et al. (2015)		**Sense of coherence** (the Japanese version of SOC-		*A significant group × time interaction effect* was found on:

		13; Togari and Yamazaki, 2005)**:** a) comprehensibility b) manageability c) meaningfulness **Depression** (Geriatric Depression Scale-Short Version-Japanese; Niino et al., 1991)		(1) sense of meaningfulness (p = .017). This increased in the intervention group from baseline (21.81) relative to all other follow-ups (3-months = 23.08; 1-yr = 23.62; 2-yrs = 23.69; p < .05), but there were no changes in the control group (p-values not reported). *No significant interaction effects* were found on the remaining outcomes (p-values not specified). There was a *significant mediated effect* of the intervention on depressive mood (p = .023), via sense of meaningfulness.
Pinquart, R., et al. (2000)	**Cross-age attitudes** **Self-concept** (using a semantic differential scale; Caspi, 1984)			*A significant group x time* (pretest vs posttest vs follow-up) *interaction effect* was found on: (1) cross-age attitudes towards the children participating in the intervention (p < .01). Ratings of the children tended to increase in the intervention group from baseline to post-intervention testing (baseline = 3.69, post-testing = 3.99), whereas ratings from the control group tended to decrease (baseline = 4.11, posttest = 3.61). However, the p-value for this interaction involving only pretest vs posttest scores was not significant (p < .06). The interaction was also not significant when considering baseline vs the 7-week follow-up after the intervention completed (p < .23; follow-up score for intervention group = 3.75; control = 3.72). *No significant group x time interaction* was found for cross-age attitudes towards children in general or in OAs' self-concept (all p > .44).
Posada, M.M. (2006)		**Depression** (Geriatric Depression Scale for 'cognitive intact' participants; Sheikh & Yesavage, 1986)		Using t-tests, *no significant main effect* of intervention group was found at time 3 (final follow-up) on depression scores for 'cognitively intact' (MMSE > 23) participants (p > .05; control = 2.83; intervention = 4.13; Cohens' d = .56). An ANOVA was also carried out, including the intervention group and time (baseline vs time 3) variables, but the main effect of intervention and the interaction effect were not reported.
Sakurai, R., et al. (2016)	**Social functional capacity** (Tokyo Metropolitan Institute of Gerontology Index of Competence; TMIG-IC; Koyano et al., 1991). Frequency of social interaction a) with friends (high/low) b) with children in the neighbourhood (high/low)	**Physical function**: a) grip strength (kg) b) comfortable gait speed (m/min) c) maximum gait speed (m/min) d) one-leg standing test (sec) e) functional reach (cm) f) Instrumental activities of daily living (IADL; TMIG-IC) g) frequency of going outdoors (high/low) h) subjective health (good/poor)	**Intellectual functional capacity** (TMIG-IC).	*A significant time* (baseline vs 7-yr follow-up) *x group interaction effect* was found on: (1) grip strength (p = .035); both groups declined at follow-up (all p < .001; control baseline = 26.2, control follow-up = 23.0; intervention baseline = 24.7, intervention follow-up = 22.9). (2) functional reach (p = .048); this decreased in the control group (p < .001; baseline = 38.5, follow-up = 34.7) and not in the intervention group (p-value reported as n.s.; baseline = 38.9, follow-up = 37.4). Functional reach was also higher in the intervention vs control group at follow-up (p = .007). *No significant time x group interaction effect* was found on: (1) depression; (2) self-esteem; (3) comfortable gait speed; (4) maximum gait speed; (5) one-leg standing test (all p > .21). Odds-ratios (OR) Logistic regression analyses (adjusted for sex, baseline age, education level, GDS scores, grip strength, and maximum walking speed), showed that the control group had higher odds for intellectual impairment [OR = 10.6; 95% confidence interval (CI) = 1.64-68.6; p = .013], and for having fewer interactions with neighbourhood children (OR = 3.79; 95% CI = 1.60-9.00; p = .003). The intervention group had higher odds for going outdoors less frequently (OR = 0.36; 95% CI = 0.13-

		Psychological variables: a) depression (Geriatric Depression Scale, GDS; Yesavage, 1988) b) self-esteem (Rosenberg Self-Esteem Scale; Mimura and Griffiths, 2007)		0.98; *p* = .045). There were no significant effects for: (1) social function; (2) frequency of interacting with friends; and (3) subjective health (all *p* > .25). Note, IADL was not assessed due to no impairments existing at follow-up.
Sakurai, R., et al. (2018)		**Physical function**: a) grip strength (kg) b) usual gait velocity (m/s)	**Global cognitive functioning** (MMSE; Mori et al., 1985) **Immediate and delayed memory** (Rivermead Behavioral Memory Test; RBMT; Matsuda et al., 2002) **Psycho-motor/processing speed** a) TMT-A (Reitan, 1958) b) digital symbol (Wechsler Adult Intelligence Scale-R; WAIS-R; Wechsler, 1981) **Executive functioning** (TMT-B) **Verbal comprehension** (WAIS-R Information subtest) **Perceptual organisation** (WAIS-R Picture Completion subtest) **Verbal fluency:** a) phonemic b) semantic	*No significant group x time* (baseline vs 6-yr follow-up) *interaction effects* were found on any of the variables (all *p* > .063).

Sun, Q., et al. (2019)	**Intergenerational attitudes** (The Age Group Evaluation and Description Scale; Knox et al., 1995) **Sense of comfort with cross-age groups (**COMFORT; single question measure) **Interpersonal behaviour** (behavioural observation tool; Belgrave, 2011)			*Significant group x time interaction effects* were found for: (1) intergenerational attitudes ($p < .001$; control pretest = 123.03, posttest = 124.26; intervention pretest = 120.88, posttest = 168.49); (2) sense of comfort with cross-age groups ($p < .01$; control pretest = 4.99, posttest = 4.92; intervention pretest = 5.00, posttest = 5.73). *Significant increases* were reported for intergenerational interaction behaviours, comparing sessions 2 vs 5: (1) visual attention to ($p < .05$; $d = .29$; pretest = .57, posttest = .70); (2) initiating conversation with ($p < .01$; $d = .46$; pretest = .24, posttest = .40); (3) touching the young participants ($p < .05$; $d = .30$; pretest = .00, posttest = .03). *No change* was observed for smiling, encouragement, or assistance (all $p > .05$).
Tan, E.J., et al. (2009)		**Physical activity**/week (mins, kcals) **Walking**/week (kcals) Household chores/week (kcals) **Leisure activity**/week (kcals) **Exercise**/week (kcals)		Using t-tests, at the 3-year follow-up, *a significant main effect of intervention group* reported only for walking ($p = .05$; control = 240, intervention = 371), and not for any of the remaining variables (all $p > .25$). An unadjusted regression model revealed *a significant increase* in overall physical activity (kcals/wk) over 3 years for the intervention group (575 kcals/wk at 36 months) vs controls (422; $p < .01$; $p = .04$ when adjusting for characteristics such as age and frailty). For subgroup activity analyses (i.e., walking, etc.) there were *no significant effects* in either unadjusted or adjusted models (all $p > .06$).
Xu, X., et al. (2016)	**Sociability** (Reynolds and Beatty, 1999)	**Social anxiousness** (The Interaction Anxiousness Scale; Leary, 1983) **Loneliness** (UCLA Loneliness Scale; Russell, 1996)		*A significant time* (pre- vs post-intervention*) x group* (play exergaming alone vs play with OAs vs play with youths) *interaction effect* was found on social anxiousness ($p = .015$). A decrease was found only in OAs who played with the youths ($p = .014$; baseline = 1.97, posttest = 1.66) and not for the other groups (all $p > .11$). *No significant interactions were* found on the remaining variables (all $p > .12$).
Pre- and post-intervention studies				
Adam, J.E. (1992)	**Self-concept** (semantic differential scale; Osgood et al., 1957)	**Life satisfaction** (Life Satisfaction Scale Index Z; Wood et al., 1969) **Depression** (Beck Depression Inventory; Beck, 1967)		*No significant differences* from pre- to post-intervention were found (all $p > .42$).

Belgrave, M.J. & Keown, D.J. (2018)	**Cross-age comfort** (a researcher-developed tool; single item measure**)** **Cross-age attitudes** (reflective journal) a) preconceived notions and expectations			*A significant increase* was found in cross-age comfort ($p < .05$; $r = 0.46$; pretest = 5.5, posttest = 6) Regarding cross-age attitudes, qualitative findings indicated that the programme enhanced OAs' positive views of children's attributes, skills, and knowledge.
Chapman, N.J. & Neal, M.B. (1990)	**Cross-age attitudes** (adapted from other studies semantic differential scale) **Social distance** (adapted from other studies social distance scale)	**Self-esteem** (Rosenberg Self-Esteem Scale; Rosenberg, 1965)		*No significant change* from pre- to posttest on cross-age attitudes, social distance, self-esteem (*p*-values not specified).
Chung, S. & Kim, J. (2020)	**Intergenerational solidarity (**Choi, 2014, revised from European Commission, 2009) **Cross-age perceptions** (revised from Hong et al., 2014)			*No significant differences* between pre- and posttest on any of the 14 items in the intergenerational solidarity scale (all $p > .05$). *No significant differences* were found in OAs' perceptions of young adults across the 8 scale items, as well as regarding the combined positive, negative, and overall perceptions (all $p > .05$)
DeMichelis, C., et al. (2015)		**Wisdom** (Self-Assessed Wisdom Scale; Webster, 2003) **Life Satisfaction** (Temporal Satisfaction with Life Scale; Pavot et al., 1998)		*Significant decreases* were found in OAs' estimation of their own critical life experiences ($p = .019$) and humour ($p = .031$; note, scores not reported). *A significant increase* was found in their past-life satisfaction ($p = .027$) Note, remaining sub-scales/non-significant findings were not specified.
Ehlman, K., et al. (2014)	**Perceived generativity** (Loyola Generativity Scale; McAdams and de St. Aubin, 1992)			*A significant increase* was found on the generativity scale ($p = .034$; pretest = 40.23, posttest = 41.24). Note, there were *no significant effects* when considering either the past contributions or current generativity subscales (all $p > .07$).
Gaggioli, A., et al. (2014)		**Self-esteem** (an Italian version of the Rosenberg Self-Esteem Scale; Prezza et al., 1997)		*Significant decreases* were found on: (1) general loneliness ($p < .05$; pretest = 1.88, posttest = 1.68); (2) emotional loneliness ($p < .05$; pretest = 1.76, posttest = 1.60). *A significant increase* was also found in the past, present and future activities subscale of quality of life ($p = .05$; pretest = 14.75, posttest = 15.40).

		Quality of life (World Health Organization Quality of Life Scale for Older People; WHOQOL-Group, 1995)**:** a) sensory abilities b) autonomy c) past, present and future activities (satisfaction with achievements/things to look forward to) d) social participation e) death and dying (concerns, fears etc.) f) intimacy **Loneliness** (Italian Loneliness Scale; Zammuner, 2008): a) emotional loneliness b) social loneliness c) general loneliness		*No significant effects* were found on the remaining measures (*p*-values not specified).
Gamliel, T. & Gabay, N. (2014)	**Attitudes towards children** (self-developed scale): a) social distance subscale (closeness to children) **Knowledge exchange** (self-report): a) own learning skills b) own knowledge contribution c) children's teaching skills d) children's knowledge contribution	**Empowerment** (self-report): a) self-confidence b) communal involvement c) self-efficacy (New General Self Efficacy questionnaire; Chen et al., 2001)		*Significant increases* found in OAs': (1) closeness to children ($p < .001$, $r^2 = .77$; pretest = 1.80, posttest = 3.50); (2) assessment of children's teaching skills ($p < .05$, $r^2 = .08$; pretest = 3.92, posttest = 4.62); (3) assessment of children's knowledge contribution ($p < .001$, $r^2 = .26$; pretest = 3.80, posttest = 4.43); (4) self-confidence ($p < .001$, $r^2 = .22$; pretest = 3.47, posttest = 4.08); (5) communal involvement ($p < .001$, $r^2 = .26$; pretest = 2.30, posttest = 3.04); (6) self-efficacy ($p < .01$, $r^2 = .18$; pretest = 3.76, posttest = 4.21). *No significant effects* were found on the remaining measures (*p*-values not specified). Qualitative results supported quantitative findings by indicating that the programme brought children and OAs closer together and increased their confidence and competence. It helped them to cultivate constructive feelings of being valued, accepted, and respected.

Halpin, S.N., et al. (2017)	**Ageism** (modified Ageism Survey; Palmore, 2001)	**Ageism** (modified Age-Based Rejection Sensitivity Questionnaire; Kang and Chasteen, 2009): a) concern/anxiety b) expectations **Self-rated health status**: a) general health b) physical function c) physical role function d) emotional role function e) social role function f) bodily pain g) vitality h) mental health		*Significant decreases* were found over the 9-month programme in: (1) concern/anxiety over ageism (p = .005; pretest = 22.12, posttest = 19.47); (2) physical role functioning (p = .033; pretest = 76.24, posttest = 68.07); (3) social role functioning (p = .004; pretest = 91.58, posttest = 85.64); (4) mental health functioning (p = .011; pretest = 85.07, posttest = 82.09); Note, these reflect a positive change relative to ageism but declines for the functional measures (the programme duration was 9 months). *No significant effects* were found on the remaining variables (all p > .13). Thematic analysis of OAs' experiences of the programme highlighted one theme relevant to the current review: 'meaningfulness' (i.e., purposeful contact with young people which makes a helpful, enriching contribution, including breaking down stereotypes).
Johnson, W. (2015)	**Perceptions of/beliefs about ageing** (open-ended questionnaire and focus groups)	**Depression** (Geriatric Depression Scale; Sheikh and Yesavage, 1986) **Life satisfaction** (Life Satisfaction Index for the Third Age; Barrett and Murk, 2009) **Quality of life** (CASP-19; Hyde et al., 2003)		*No significant effects* were found for any of the health variables (p-values not specified). Qualitative analyses (pre- and post-intervention open-ended questions) showed a decrease in negative reactions regarding growing older and in perceived disadvantages of older age.
June, A. & Andreoletti, C. (2020)	**Generativity** (The Loyola Generativity Scale; McAdams and de St. Aubin, 1992)			*A significant increase* was found on the generativity scale (p = .014; d = .72; pretest = 36.88, posttest = 44.06).
Lee, O. E.-K. & Kim, D.-H. (2019)	**Social isolation** (a perceived social isolation measure, Cornwell and Waite, 2009): a) perceived lack of social support b) loneliness **Communication** **Independent living** (qualitative component; interviews)		**Intergenerational learning** **Leisure activities** (qualitative component; interviews)	*A significant decrease* was found on the loneliness subscale (p < .001; pretest = 6.52, posttest = 4.26; d = 1.45) and on the overall social isolation measure (p < .001; pretest = 20.04, posttest = 17.04; d = 0.74), however perceived lack of social support did not significantly change (p = .21). Qualitative analysis showed that participating in the programme could promote intergenerational knowledge and skills exchange. Mutual learning served as a vehicle to connect generations, decrease the feeling of loneliness, and encouraged lifelong learning. The most commonly reported perceived positive change was using new knowledge to connect with family and to build a contact network. Learned skills also enhanced OAs' independence in daily activities and allowed them to explore online leisure activities.

Lin, Y.-C., et al. (2017)	**Attitudes towards ageing** (self-developed scale)	**Spiritual health** (self-developed scale)		*No significant effect* for attitudes towards ageing (p = .55). *A significant improvement* was found in spiritual health (p = .049; pretest = 66.33, posttest = 68.89).
Mahoney, N., et al. (2020)	**Generativity** (The Loyola Generativity Scale; McAdams and de St. Aubin, 1992) **Establishing relationships** (qualitative component; interviews)	**Quality of life** (SF-36 Version 2; Ware and Sherbourne, 1992): (1) Physical health summary: a) physical function b) role function c) bodily pain d) general health (2) Mental health summary: a) Vitality b) Social functioning c) Role emotional d) Mental health		*No significant effects* were found on the generativity scale (p = .23), physical health summary scale (p = .86), and mental health summary scale (p = .15). *No significant effects* for the vitality, social function, or role emotional subscales (all p > .058). For the mental health sub-scale, the scores were *significantly* higher at posttest (Mdn = 23) when compared with pretest (Mdn = 22; p = 0.012, r = 0.47). Qualitative evidence revealed that intergenerational mentoring could provide older men with an opportunity to exercise their generative desire to guide and help young generations and gain fulfilment for this desire. OA mentors reported that they were able to establish connection with their mentees via hands-on activities. Furthermore, IE led to mutual learning, developing communication skills, and learning new approaches and strategies to support young people with intellectual disability.
Meshel, D.S. & McGlynn, R.P. (2004)	**Cross-age attitudes** (self-developed semantic differential scale)	**Life satisfaction** (Satisfaction with Life Scale; Diener et al., 1985)		*Significantly more positive attitudes* towards younger people (p < .01; pretest = 5.32, posttest = 6.00). *A significant improvement* in life satisfaction (p < .05; pretest = 27.82, posttest = 29.00).
Newman, S., et al. (1995)		**Depression** (Geriatric Depression Scale; Yesavage, 1983)	**Objective memory performance** (Rivermead Behavioral Memory Test; Wilson et al., 1985) **Self-reported memory function** (Memory Functioning Questionnaire; Gilewski and Zielinski, 1986): a) retroactive memory b) mnemonic memory c) frequency of forgetting d) seriousness of forgetting	No inferential statistical analyses were carried out, and results took the form of outcome scores and percentage change only. Although the authors additionally stratified by age group and education, we note the percentage change scores for the whole sample (N = 26) only. (1) A +5.08% change in depression was reported at 6-months posttest (pretest = 5.71, posttest = 6.00) and a change of -16.64% at the 8-month follow-up (4.76). Lower scores indicate lower levels of depression. (2) Objective memory performance changed by -.40% at posttest (pretest = 20.23, posttest = 21.15) and by +6.97% at follow-up (21.64). (3) Retroactive memory changed by -.23% at posttest (pretest = 17.73, posttest = 17.69) and -2.65% at follow-up (17.26). (4) Mnemonic memory changed by -.81% at posttest (pretest = 23.54, posttest = 23.35) and -4.89% at follow-up (22.39). (5) Frequency of forgetting changed by -2.50% at posttest (pretest = 164.50, posttest = 160.38) and +.41 % at follow-up (165.17). (6) Seriousness of forgetting changed by +2.19% at posttest (pretest = 79.00, posttest = 80.73) and +6.33% at follow-up (84.00). In all cases higher memory-related scores indicate higher functioning.
Perry, C. K. & Weatherby, K. (2011)		**Physical activity** (mins in previous 7 days; 7-Day Physical Activity Recall; Blair et al., 1985)		*No significant effect* on physical activity level (p = .06; scores not reported). Further qualitative data revealed that IE was a positive experience by: 1) being challenging mentally; 2) enhancing physical strength; 3) allowing learning of new skills; 4) encouraging physical activity; and 5) stimulating IE.

Sanders, M.J., et al. (2013)	**Generativity** (Loyola Generativity Scale; McAdams and de St. Aubin, 1992): a) passing knowledge to others b) feeling productive c) having important skills to teach d) being creative e) like to teach f) being a source of advice			*Significant increases* observed in OAs' feeling that they: (1) are productive ($p < .016$; pretest = 2.61, posttest = 3.10). (2) have important skills to teach others ($p < .002$; pretest = 2.09, posttest = 2.70) *No significant effects* were found on the remaining measures (all $p > .08$).
Sng, J.R.H. & Jung, Y. (2020)	**Outgroup (cross-age) attitudes** (Semantic differential scale; Meshel and McGlynn, 2004)	**Intergroup anxiety (**Chua et al., 2013)		*A significant effect of time was found* on outgroup attitudes ($p < .001$; pretest = 4.88, posttest = 5.87). *A significant decrease* was found in intergroup anxiety ($p < .013$; pretest = 2.01, posttest = 1.69).
Strand, K.A., et al. (2014)		**Physical activity** (Stages of Change for Physical Activity Questionnaire; Cancer Prevention Research Center, 2010) **Perceived physical health/wellness** (qualitative component; written evaluations)		A *significant increase* in self-reported physical activity amongst participants who were inactive at baseline ($p = .001$; 52.4% of participants who were inactive at baseline were active by week 25). *No significant effect* in the overall sample (p-value not specified). Qualitative analysis showed that the most commonly reported perceived positive change was participating in regular physical activity. Improved subjective health was the second most reported perceived positive change, and participants also frequently reported improvements in their level of pain.

Young, T.L. & Janke, M.C. (2013)	**Perceived benefits** (a researcher-developed tool): a) openness to ideas b) community Involvement c) interest in youths' education d) social life **Perceived Concerns:** a) youths' responsiveness b) ability to get along with youth c) school environment d) youths' behaviour e) communication with teachers f) irregular youth attendance	**Perceived benefits:** a) physical health b) mental health c) life satisfaction d) feeling about self e) energy level **Perceived concerns:** a) personal health	**Perceived benefits:** a) knowledge and skills **Perceived concerns:** a) ability to carry out activities	*No significant effects* of time on any of the perceived benefits or concerns (all $p > .05$). Post-programme, linear regression analyses *significantly predicted benefits* regarding: (1) community involvement ($p \leq .01$; the significant predictor was being involved in community improvement projects, $p \leq .05$); (2) social life ($p \leq .001$; significant predictors were being black/Hispanic, $p \leq .05$, male, $p \leq .05$, and involved in mentoring, $p \leq .01$, or community improvement projects, $p \leq .01$); (3) knowledge and skills ($p \leq .05$; significant predictors^ were being black/Hispanic, $p \leq .05$, male, $p \leq .05$, and a mentor, $p \leq .05$). Linear regression analyses *significantly predicted concerns/difficulties* regarding: (1) youths' responsiveness ($p \leq .05$; the significant predictor was being black/Hispanic, $p \leq .01$); (2) ability to get along with the youths ($p \leq .05$; the significant predictor was participating in a community programme, $p \leq .05$); (3) irregular youth attendance ($p \leq .05$; the significant predictor was not being married, $p \leq .05$). ^Note, there is a discrepancy between the predictors of knowledge/skills as stated in the text vs Table 4 in this paper. We have listed the results according to Table 4.
Qualitative				
Alcock, C.L., et al. (2011)	Themes (derived from focus groups and field notes): **Age-group stereotypes** **Intergenerational inclusion/ exclusion** **Sense of community**			(1) Reduced age-group stereotypes (e.g. coming to accept, learn from, and give to each other); (2) Many articulated a positive sense of community and companionship for older people.
Barnard, D. (2014)	Themes derived from programme survey: **Cross-age perception**	**Self-esteem** **Personal wellbeing**		(1) Residents' perceptions of the students were often positive at the outset, and perceptions were either validated or improved by participating in the program. (2) Residents demonstrated increased self-esteem and well-being in their written survey answers and observable responses throughout the programme (this point was not substantiated by the evidence included).

Santini, S., et al. (2018)	Themes derived from in-depth interviews: **Representation of young people (cross-age perceptions)** **Intergenerational relationships**	**Self-representation** **Mood**		(1) Residents' perceptions of the students were generally negative at the outset (e.g. 'egoists', 'dishonest'), but their attitudes substantially improved at the end of the programme (e.g. 'polite', 'kind'). The initial negative image of youth echoed in their mistrust of ability to establish relationships with the teenagers. The post-programme interviews revealed that IE boosted reciprocity and initiated close relationships between young and older people. (2) IE and increased closeness to the students helped the residents to improve their self-perceptions. At the beginning of the programme, OAs reported feeling physically inadequate and a sense of uselessness due to their age. Over the course of the programme, these negative self-representations changed to a sense of vitality and realisation of feelings and life experience to share with the younger generations. (3) Residents reported that the presence of students improved their mood and constituted a distraction from negative thoughts and health-related concerns.
Wilson, N. J., et al. (2013)	Themes derived from interviews and a focus group: **Cross-age perception** **Intergenerational exchange** **Generative desire**	**Sense of self**		Results showed that some groups of older retired men have an intrinsic desire to: a) support younger generations who are facing difficulty; and b) give something back to their communities. The mentoring project provided an opportunity: a) for older men to reconnect with the younger generation, and b) to adjust older men's roles, routines and occupations appeared to have a protective function for maintain a positive sense of self.

* *p*-values are as specified in the records.

CHAPTER 3. Generation for Generation: Protocol of a pilot study to investigate older adults' cognitive, health and social outcomes of intergenerational engagement

3.1 Chapter overview

This chapter will provide a comprehensive overview of the protocol used for our pilot study to investigate older adults' health outcomes of our primary school-based intergenerational engagement (IE) programme, Generation for Generation (Gen4Gen). The chapter will begin by briefly summarising the overall design of this mixed-method research programme before providing a detailed description of the study design, sampling and recruitment, intervention programme features, and data collection materials and procedures associated with the pilot randomised controlled trial (RCT). Finally, ethical considerations will be described.

3.2 Research Programme Design

Overall, a mixed-method design including concurrent nested approaches was applied in this project. The study consisted of: 1) a pilot RCT, the methods for which are detailed in the present chapter); 2) a qualitative component (older adult volunteer diaries and focus groups with volunteers, teachers, and pupils; for methods see Chapter 5); and 3) a pre- and post-intervention school climate survey (for methods see Section 6.6.1). The pilot RCT used a 2 x 3 mixed factorial design in which the between groups factor was intervention status (wait-list control or intervention) and the repeated measures factor was time (baseline, and 3- and 6-month follow-ups). Eligible participants were randomly allocated to either the control or intervention group. Those randomised to the programme were assigned to one of four schools and the controls were placed on a wait-list for optional participation following the completion of the 6-month programme. This was intended to

allow all volunteers the opportunity to participate and contribute eventually, therefore they were not a basic control group.

3.3 Rationale for the pilot study

Existing research indicates that older individuals involved in intergenerational programmes can potentially experience a range of biopsychosocial benefits, including improvements in health and well-being (de Souza & Grundy, 2007); increased physical activity and cognitive ability (Tan et al., 2006; Carlson et al., 2008); improved mood and mental health (Chung, 2009); and positive impacts on perceptions of younger generations (Gamliel & Gabay, 2014; Meshel & McGynn, 2004). However, there has been no empirical translation of community-based intergenerational programmes in Scotland. Therefore, this project developed, implemented and tested the feasibility and efficacy of an evidence-based IE programme via a pilot RCT and associated qualitative research. The programme was implemented in Scottish schools during 2018-2020. The key aim of this study was to investigate whether a moderate-intensity IE programme (8hrs/wk) that requires a lower level of commitment than outlined in previous literature (e.g., Carlson et al., 2008; Fried et al., 2004), may be feasible and bring measurable benefits. We were also interested in the role of duration of engagement (i.e., how long must a participant engage before any potential benefits can be observed).

3.3.1 The Experience Corps model

The programme developed for the current research was inspired by success and promising evidence of health and social benefits demonstrated by the Experience Corps programme in the USA (EC; Fried et al., 2004; Figure 3.1). Having considered the multiple dimensions of targeted outcomes (i.e., various cognitive, social, and health-related factors) of the EC study (an elementary school-based programme), this ‘gold-standard’ model offered the most suitable framework for the current investigation (Gruenewald et al.,

2016). In the subsequent section, the EC protocol will be presented in more detail in order to provide the reader with an overview of the empirical foundations of the current IE project.

Experience Corps (e.g., Freedman & Fried, 1999; Fried et al., 2004; Glass et al., 2004) is a 'high-commitment' intergenerational programme that was designed in 1993-1995 by gerontologist Dr Linda Fried and Marc Freedman, the president of Civic Ventures Ltd, an organisation focused on utilising the potential of the older population. Drawing upon evidence from previous volunteer programmes and health-enhancing initiatives, they generated a social model for health promotion and engagement in older adults, and for academic improvement in younger children. Based on this model, the EC programme was launched in 1996 in 12 schools in five cities in the USA. To date, the initiative has expanded to a network of 24 cities across the U.S. (www.experiencecorps.org) and is currently coordinated by AARP (www.aarp.org/experience-corps) and the Greater Homewood Community Corporation (GHCC), inspiring similar initiatives worldwide [e.g., Research of Productivity by Intergenerational Sympathy (REPRINTS) programme; Fujiwara et al., 2009].

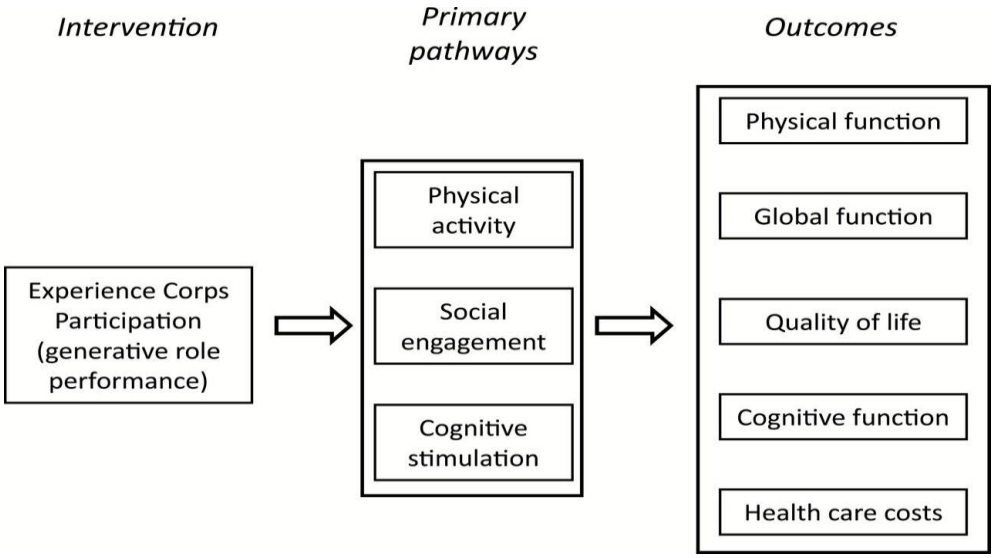
The underlying purpose of the programme was to identify an approach to respond effectively to the needs of a broad spectrum of older adults, while generating a 'win-win' situation for both volunteers and society. Therefore, the EC model established productive, meaningful roles for the post-retirement population by harnessing their "time, skills, and needs for "giving back'" to society (Fried et al., 2004, p. 65), while simultaneously aiming to improve older adults' social networks, cognitive and physical functioning (Parisi et al., 2015). Fried et al. (2004) hypothesised that this type of programme will attract older adult volunteers who want to contribute to society and future generations, and who might otherwise not engage in programmes specifically for their own health promotion. Therefore, emphasis was placed on defining socially valued roles that would harness "the untapped desire for generativity in an aging population" (Glass et al., 2004, p.

96), and consequently lead to late-life satisfaction (McAdams, Aubin, & Logan, 1993) and improvements in health (Fried et al., 2004).

One hundred and twenty-eight volunteers recruited for the EC pilot trial were cognitively healthy older adults, aged 60 years and over, who were trained and deployed into local primary schools for 15 hours of voluntary work per week, over the full academic year (Carlson et al., 2008). In essence, volunteers were asked to address high priority schools' needs, identified by the head teachers, and to engage in roles that maximised older adults' cognitive stimulation (Rebok et al., 2011). The specific volunteer roles primarily involved helping children with reading, writing, numeracy, comprehension skills, and assisting within school libraries to ensure cognitive stimulation and social engagement. However, to ensure that the programme met the needs of a diverse volunteer population, these core roles were also combined with activities that matched volunteers' skills or interests (Glass et al., 2004).

Figure 3.1

Conceptual framework for the Experience Corps programme.



Note. Figure reprinted from Varma, V. R., Carlson, M. C., Parisi, J. M., Tanner, E. K., McGill, S., Fried, L. P., Song, L. H., & Gruenewald, T. L. (2015). Experience Corps Baltimore: exploring the stressors and rewards of high-intensity civic engagement. *The Gerontologist, 55(6),* 1038-1049; by permission of Oxford University Press.

All these roles were designed to have high impact on volunteers' health through three primary pathways: physical activity, social engagement, and cognitive stimulation (Varma et al., 2014; see Figure 3.1). Fried et al. (2004) based this programme on the hypothesis that improvement in any of these pathways would have health and social benefits for persons involved. They hypothesised that engagement in the programme would primarily decrease mobility disability, defined as "any self-reported difficulty of walking a distance of 1 mile and/or difficulty walking several blocks" (Fried et al., 2013; p. 8). The secondary or indirect outcomes included improvements in physical function (falls, frailty, walking speed, strength), psychosocial measures (depression, social support, generativity), and in cognitive processes (decreased rate of decline in memory and executive function). The support for some of the initial hypotheses regarding both primary and secondary outcomes has been provided by the outcomes of the Experience Corps pilot trial and its follow-ups (e.g., Fried et al., 2004; Carlson et al., 2008, 2009, 2015). As outlined in Chapter 2, their findings demonstrated a number of positive effects of IE on older adults' health and well-being (e.g., Carlson et al., 2008, 2009). However, the benefits they reported were not always consistent (e.g., physical activity; Fried et al., 2004; Tan et al., 2006) and/or dependent on follow-up period (Gruenewald et al., 2016). Therefore, more research is needed, especially using similar protocols, but with different intensities of exposure and over different durations.

3.4 Pilot trial

Quantitative pilot studies are defined as small-scale investigations that should focus on evaluating feasibility of the methods and protocol used to provide the rationale for larger and more comprehensive studies (Everitt, 2006; Last, 2001; Thabane et al., 2010). The test of feasibility as an objective of a pilot intervention can include examination of (1) participant recruitment potential, (2) the optimal intensity of treatment, (3) collaboration potential, or (4) data collection methods (Tavel & Fosdick, 2001; Prescott & Soeken,

1989). Thus, pilot trials and the assessment of their practicability and potential efficacy can justify and improve the implementation of subsequent large-scale investigations. “Criteria for success” of a given pilot trial should be determined based on feasibility outcomes (e.g., recruitment rates, variance estimates), but can also include sub-group analyses and estimated treatment effect sizes (Thabane et al., 2010, p. 5; Moher et al., 2001). However, the results of a pilot study should be treated as preliminary and exploratory, and interpreted with caution.

Therefore, this study tested the feasibility of the Scottish, school-based IE intervention Gen4Gen in order to inform researchers of subsequent large-scale studies about the potential of the design and methods used, as well as to provide effect size estimates for the intervention and complimentary qualitative research. All aspects of the pilot investigation will be described and reflected upon in detail, including elements of the research process (e.g., response rates, drop-outs), resources (e.g., volunteer expenses, time needed for completing assessments or criminal record check), potential data management issues, issues associated with the assessment of the intervention effects and arising from the research process, as well as improvements that could be made to the intervention (Thabane et al., 2010). Although successful completion of a pilot trial may not be a strong indicator of the success of larger interventions (van Teijlingen & Hundley, 2002), this pilot study will offer procedural and methodological recommendations and consider implications of proposed modifications.

3.4.1 Sampling

There are limited general guidelines regarding the sample size for pilot studies and those available vary in their estimates of how large a pilot trial should be (Hertzog, 2008). For example, a sample size as small as 10 participants in nursing research (Nieswiadomy, 2002) or between 10-30 participants in survey research (Hill, 1998) was suggested as appropriate for piloting. In terms of clinical studies, a minimum of 12 participants per

condition was justified by feasibility objectives of a pilot investigation (Julious, 2005) and according to a general rule of thumb, the sample should consist of 10% of the proposed large-scale study size (Treece & Treece, 1982). The final decision concerning the sample size will also be determined by time and cost constraints and, if available, by previous investigations of similar designs and procedures (Julious, 2005; Hertzog, 2008).

The small sample size (N = 38) obtained for this intervention fulfils the above guidelines for a pilot study, with approximately 19 participants per condition. This study also achieved about 50% of the target for each condition (n = 40) as originally this research aimed to include 3 groups: 1) high-intensity intervention group (15hrs/week), 2) moderate-intensity intervention group (8hrs/week), and 3) wait-list group. Considering a wide range of sample sizes used in previous school-based IE programmes (e.g., Meshel & McGlynn, 2004; Fried et al., 2004; de Souza & Grundy, 2007), the target sampling in this study was initially estimated at approximately 120 participants, based on 'gold standard' pilot interventions in the area (Carlson et al., 2008; Tan et al., 2006). However, the sample size was ultimately limited by the number of participants responding within the recruitment period, researcher resources and associated number of schools involved in the study. Therefore, we kept to two conditions (intervention group and wait-list group) and focused on the core aspect of novelty that involved moderate-intensity exposure (i.e., 8 hrs/week) as compared to high-intensity implemented by EC (15hrs/week; e.g., Fried et al., 2004), while also uniquely assessing outcomes over 3 as well as 6 months. Despite the benefits of larger sample sizes for the precision of the estimates of intervention effects (Julious, 2005), small samples like ours can be considered as sufficient, given that the objective of this study was to provide estimates as preliminary information and not for delivering a powered analysis for hypothesis testing (In, 2017).

Inclusion and exclusion criteria

Individuals were eligible to participate in this study if they were:

1. 60-85 years old;
2. fluent in English;
3. generally healthy;
4. living independently and local to the participating schools;
5. free of neurological and psychiatric conditions;
6. with normal vision and hearing, or corrected-to-normal (e.g., glasses, hearing aids);
7. willing to commit up to 8 hours per week (over 2 days);
8. willing to join the Protecting Vulnerable Groups (PVG) Scheme.

Participants were excluded if they had:

1. functional impairment that limited their ability to volunteer independently in the schools;
2. self-reported diagnoses of Parkinson's, epilepsy, or other neurological conditions;
3. diagnosed cognitive impairment, such as mild cognitive impairment or Alzheimer's disease;
4. stroke with lasting, significant functional effects.

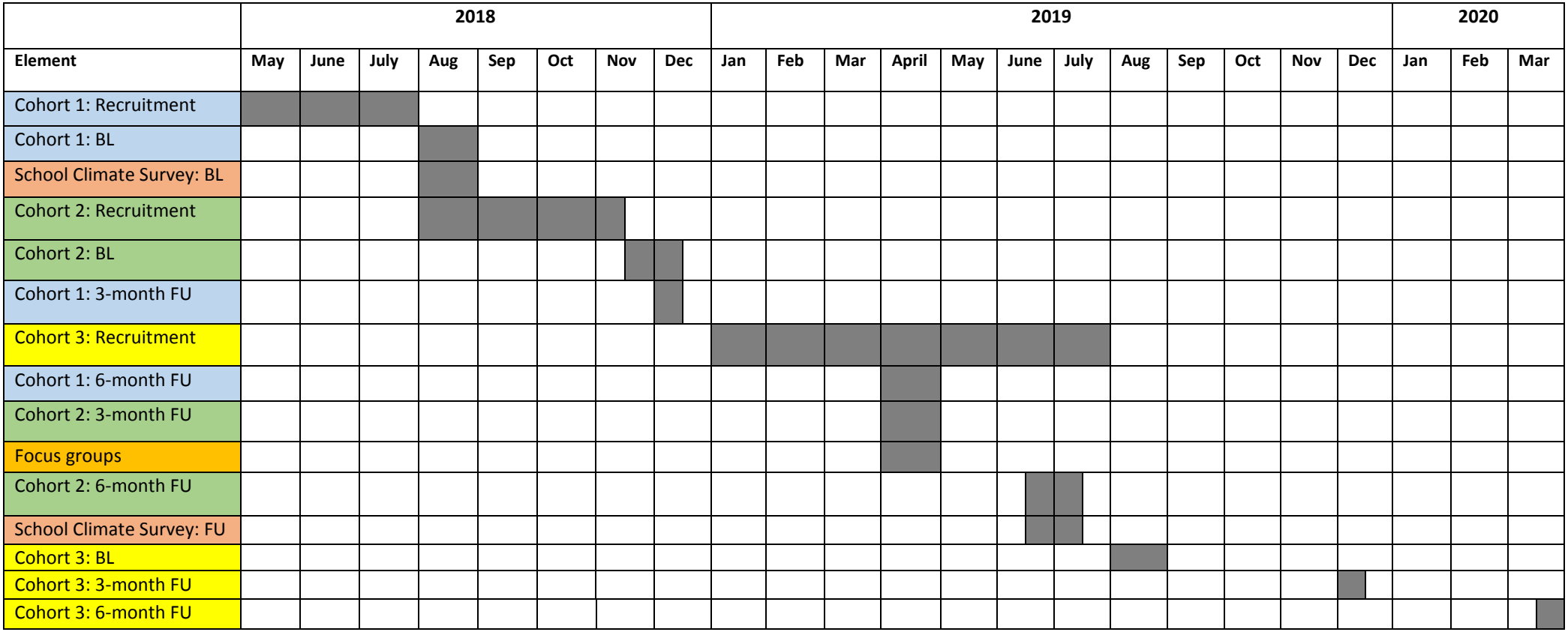
Sample size

Initially, 55 people expressed their interest in volunteering in the programme, though 17 participants did not subsequently take part in the study [the main reasons for refusal/withdrawal before baseline assessments included: the intensity and/or duration of the engagement (n = 5), distance to schools/commuting issues (n = 8), caring responsibilities (n = 2), ill-health (n = 1), and the Head Teacher's decision of participants' unsuitability (n = 1)]. Three of these completed the initial telephone screening. The remaining 38

older adults aged 60-80 years old (*M* = 66.53; *SD* = 5.08) recruited from the Lothians area in Scotland agreed to participate in the programme. They were recruited into three cohorts: Cohort 1 (n = 14; September 2018-March 2019), Cohort 2 (n = 9; December 2018-June 2019), and Cohort 3 (n = 15; September 2019-March 2020). After eligibility evaluation, formal telephone screening and baseline testing, participants were randomised to the intervention (n = 20) or control (n = 18) group of the pilot trial. A timeline of the current study, including the RCT, focus groups and school survey, is presented below (see Figure 3.2).

Figure 3.2

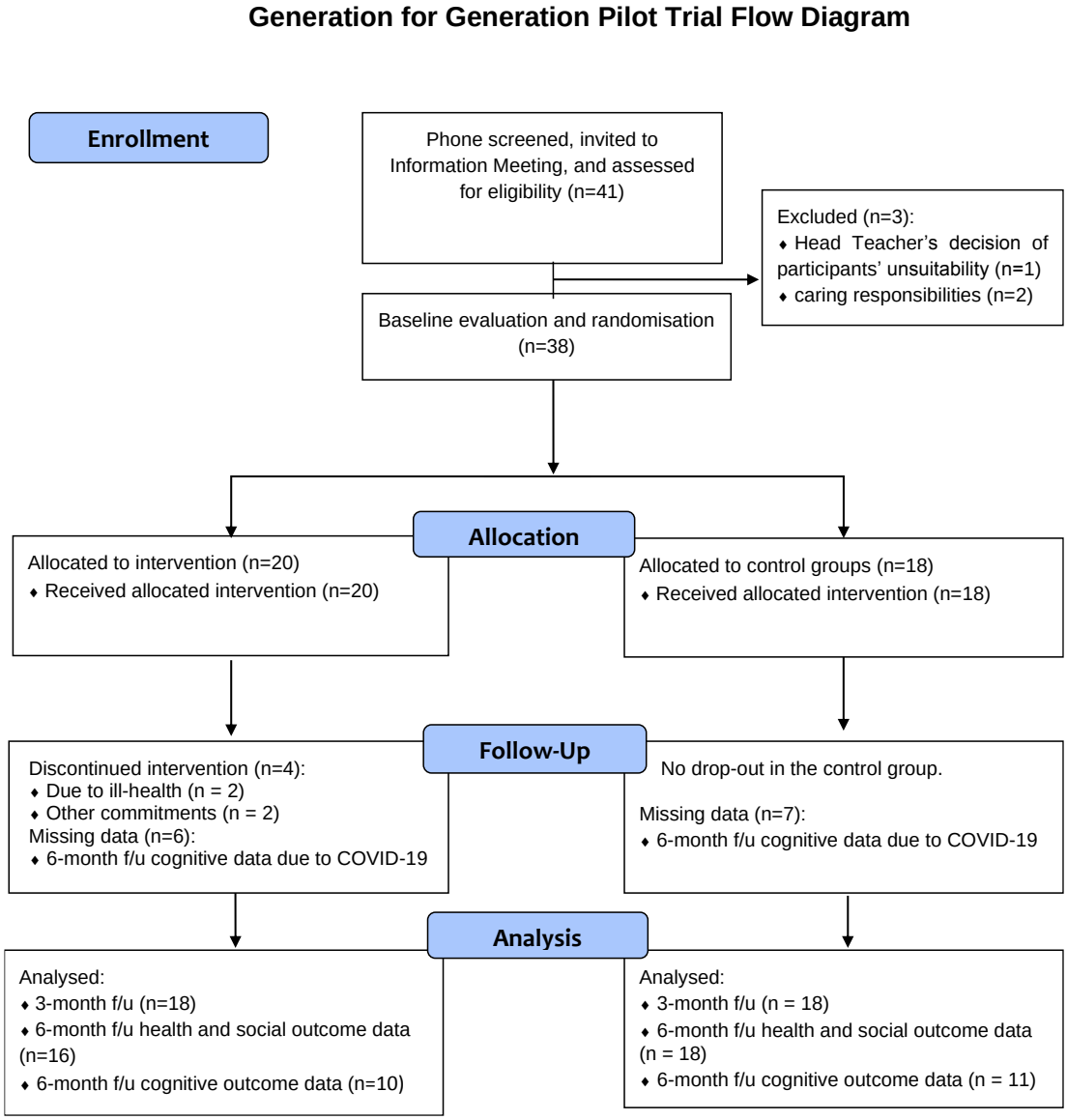
The study timeline including the pilot randomised controlled trial [RCT; comprising recruitment, baseline (BL), and 3- and 6-month follow-up (FU)], and the focus groups and school climate survey. Different elements/cohorts are represented by different colours.



Two participants decided to withdraw from the programme before completing the 3-month follow-up and a further two before completing the 6-month follow-up (decisions to discontinue involvement were due to their own or spouse's health, or other personal commitments; see Figure 3.3). In total, thirty-four participants completed assessments at baseline, 3-month, and 6-month follow-ups, showing a strong retention rate.

Figure 3.3

Sample selection for the intervention and control groups – CONSORT flowchart.



3.4.2 Pilot RCT Procedure

Recruitment

The recruitment process in this study consisted of two stages. The first stage involved the recruitment of schools and establishing close collaboration with their Head Teachers and the local council. The second stage involved the recruitment of older adult volunteers and initial screening for eligibility.

School recruitment and selection. In collaboration with a national charity, Generations Working Together (https://generationsworkingtogether.org/), the intergenerational programme was advertised on the organisation's website and the recruitment information circulated among its partners (Appendix B). One school in West Lothian responded to the programme advertisement and invited six other schools that belonged to the same cluster to participate. Two team meetings with the collaborating schools were organised by the Chief Investigator and the researcher prior to the commencement of the programme to introduce a detailed plan of the intervention, as well as schools' and the research team's roles in the process of the programme implementation. These meetings were essential to discuss potential issues and concerns, identify benefits of the enagagement for the schools and volunteers involved, specify resources and training required, and most importantly, to establish the final list of schools willing to participate.

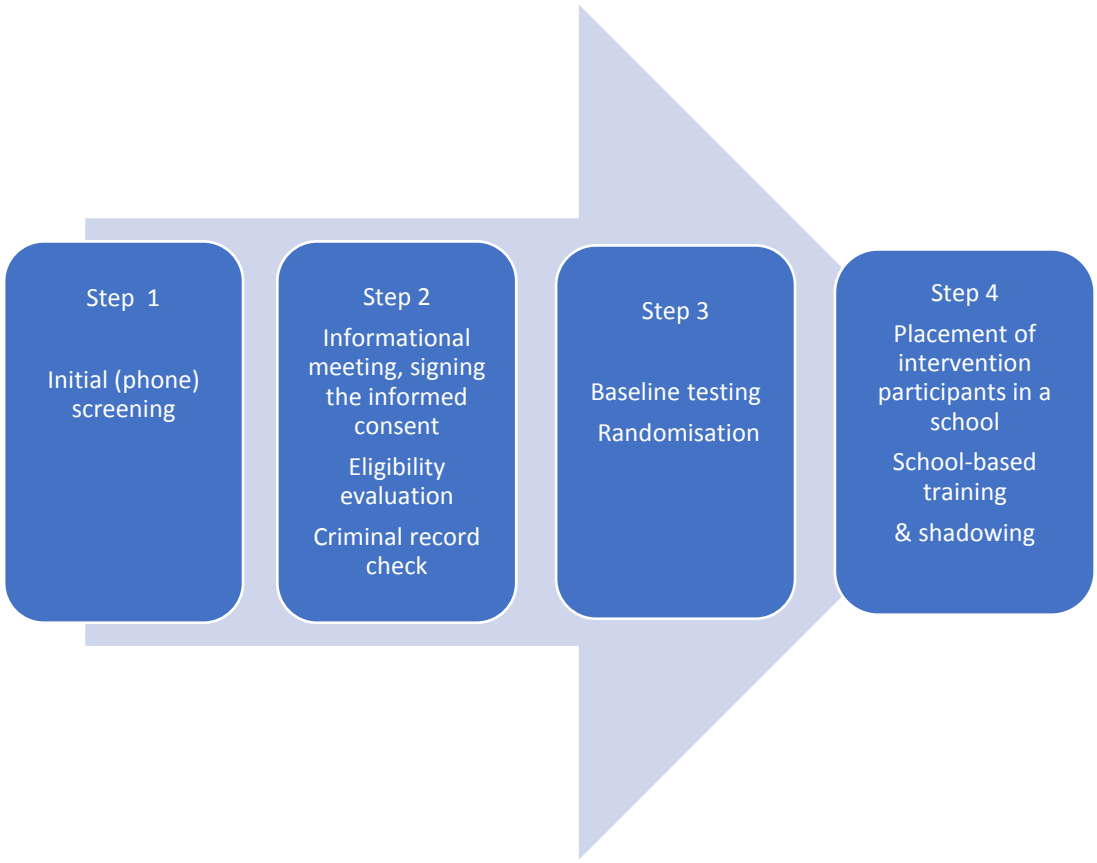
Initially, six primary schools in West Lothian agreed to take part in the programme (all schools that were represented at the initial team meetings). However, given a low recruitment response rate for Cohort 1 (September 2018 - March 2019) only four schools were able to implement the intervention and two were offered to continue participation as control schools during the school year 2018/2019. One of the control schools decided to withdraw from the project, therefore, two other local schools were recruited as control schools prior to when the intervention began. Ultimately, seven primary schools in West Lothian took part in the programme. A description of the role of active and control schools will be provided in the subsequent section (see the Study Setting subsection below).

Participant recruitment and intake process. Participants were recruited through a variety of methods: 1) the schools involved (e.g., school social media, school announcements, and networks); 2) churches in the neighbourhood around the chosen schools (e.g., church newsletter announcements, leaflet distribution to the congregation; Appendix C) older adult community groups and centres; 4) local shops, bowling and golf clubs, health centres; 5) Gen4Gen Twitter and Facebook posts; 6) two short reports broadcasted by the BBC (https://www.bbc.co.uk/news/av/uk-scotland-46664990) and STV (https://news.stv.tv/east-central/1433257-project-encourages-over-60s-to-volunteer-in-schools?top); 7) local newspaper/magazine announcements and advertising (where the media agreed to free listings/articles); 8) local and national voluntary/charity organisations/networks; and 9) West Lothian Council channels (e.g., website announcements, e-bulletin). The University of Strathclyde Media Centre produced press releases in August 2018 (Cohort 1) and November 2018 (Cohort 2). Potential participants were able to learn about the project via posters and leaflets (Appendix C) or through direct contact with the researcher during the visits to the churches, volunteer fairs, and community centres.

All advertising materials included contact details of the researcher and the Chief Investigator. The first contact was initiated by potential participants via email, post, or telephone. Interested older adults were recruited and screened using a pre-defined 4-step protocol (Figure 3.4):

Figure 3.4

Four-Step participant recruitment, screening, and intake process.



1. The first step involved an initial telephone screening interview (Appendix D) to provide basic details of the study (including the potential time commitments involved, and the requirements for a criminal background check) and to obtain core eligibility information (age, time, availability, health status, some basic demographics, exclusion criteria). Verbal consent to receiving and retaining these data was given before requesting any data. Also, to ensure pseudo-anonymity of data, each participant was identified with a unique code. To allow linkage of the longitudinal data, an electronic record of assigned participant numbers, names, and contact details was created and stored at this stage and kept separate from all other data. Participants were also asked to bring photographic ID and address validation documents to the next in-person meeting with the researcher and the Head Teacher (required for the PVG check).

2. The second step involved an in-person meeting with small groups of participants (approx. 2-5 individuals) in the participating schools (ideally near participants' homes, but the schools' availability was also taken into consideration). The aim of this meeting was:
   a) to provide participants with the fuller details about the project;
   b) to provide the participant information sheet and to obtain written consent;
   c) to allow a meeting with the Head Teacher who conducted informal interviews with potential participants, provided information about school policies, compulsory training, and gave a tour around the school.
   d) to complete the PVG applications. All participants in this study were subject to the criminal records check due to the control participants being offered the opportunity to engage with the programme after the formal intervention study (i.e., wait-list);
   d) to conduct baseline screening (see the data collection section 3.4.3 below);
   e) to provide a set of self-administered questionnaires. Baseline questionnaires to be completed during the week before the next session in August 2018 (Cohort 1), November/December 2018 (Cohort 2), or August 2019 (Cohort 3), and to be brought to that meeting.

3. The third step then involved baseline testing, including receiving completed questionnaires, and administering the NIH Toolbox cognitive battery. Also, during this meeting, the self-administered questionnaires were checked, and any missing items followed up where possible, before participants left. After data collection, and before finishing this session, participants were randomised to one of the two experimental conditions (wait-list control group or intervention

group), using a sealed envelope protocol described in the randomisation section below. Participants who were assigned to the intervention group were asked by the researcher on behalf of the Head Teacher to complete a next of kin form (Appendix E) that was then handed out to the school office.

4. The fourth and final intake step comprised compulsory training for all intervention participants (i.e., Child Protection Training, and Health and Safety induction session) delivered by schools prior to starting. After this, a shadowing week (the first week in the programme) took place in the schools, and the intervention began.

Randomisation. Intervention status of all eligible participants was determined by a random list of numbers generated by Sealed Envelope (Sealed Envelope Ltd., 2001). The randomisation was produced for 1:1 allocation of participants to one of two treatment groups (i.e., A-intervention and B- wait-list control) and the sample of 50 (the number was determined based on the response rate to the initial recruitment drive), using the block size of four (e.g., AABB, ABBA, etc.). The block size allowed randomisations to be approximately evenly spread across the two conditions for a small sample size as in the current study. After defining the exact randomisation parameters, a colleague who was independent of this research programme prepared the final randomisation list. The same person deposited the letters including the randomised assignment in consecutively numbered envelopes. The sealed envelopes were then passed to the researcher who was blinded to the randomisation allocation during completion of the baseline tests. The numbers on the envelopes corresponded with the numerical order of the participants' telephone eligibility screening (see above the first step of intake process). The appropriate envelope was given to each participant after their baseline testing session and opened in the presence of the researcher. The meaning of the assignment and following testing visits were explained to the

participant verbally and a Letter of Assignment handed out (Appendix F). The result of the assignment was shared with the Head Teacher and recorded in the study log.

Study Setting. Seven primary schools in West Lothian agreed to take part in the Gen4Gen programme. Four schools (active schools) implemented the intervention, and three matched schools were selected for comparison. In relation to the Scottish Index of Multiple Deprivation (SIMD, 2020), all schools were located in areas designated as the most deprived in Scotland (1-3 quintile of deprivation).

All training and shadowing took place in the school that participants were deployed to. Then, after the induction, participants assisted P1-P4 teachers with their pupils in the classroom or worked in a designated area outside the classroom with a group of children or supported individual children on a one-on-one basis. Volunteers were given freedom of choice in terms of their work mode; they could decide whether they wanted to work in the classroom alongside the teacher or outside the classroom with a group or individual children, in consultation with the teacher.

Training and induction. Volunteering in the programme did not require any previous experience of working in a school environment or with children. However, all eligible candidates were expected to attend the compulsary training and shadowing week organised by the schools

First, all participants (including the control group volunteers) were invited to the Child Protection Training organised for all school staff in August, before the children resumed after the summer break. If they were not able to attend that session or were recruited for Cohort 2 (December 2018-June 2019), the Head Teachers conducted individual/group training sessions with the volunteers. The aim of the training was to introduce different types of abuse that might be experienced by children, how to recognise them and

finally how to respond to them in a sensitive and professional manner. Guidance was provided, detailing the protocol for reporting concerns and specifying whom to report the observations/childrens' accounts to, commensurate with the risk assessment of the research study. The training lasted approximately 1.5 hours.

Further mandatory training preceeding the volunteers' involvement was a 60-minute session on School Health and Safety conducted by the Head Teacher/Principal Teacher. This session covered fire and evacuation (e.g., action to take in the event of fire, location of the assembly point), first aid (e.g., location of the first aid box, identity of first aiders), welfare facilities (e.g., toilets, staff room, breaks), security (e.g., visitor procedures, security codes), personal safety (e.g., lone working procedure), job safety (e.g., information about risk assessment and any prohibitions), incident reporting, and health and safety procedures and policies. Participants were also informed about the requirement of using the Gen4Gen sign-in and -out sheet (Appendix G) and reporting their absence to the school office and the researcher.

After completing all compulsary training, participants agreed with the Head Teacher upon their starting date and the schedules based on their preferences and availability. They were also provided with a copy of school term dates and holidays for a given school year to allow volunteers to plan their time away around those dates. Volunteers were then introduced to the teacher(s) they were assigned to.

The organisational meeting with the Head Teacher also highlighted volunteers' reponsibilities and activities that they could not do in schools. Thus, they were reminded that their main role was to help children who required additional learning support, but not to cover for the teachers or run a class with them. Stating the latter to both volunteers and teachers was important due to the fact that a number of programme participants were former teaching staff. Given their professional experience, volunteers might have been asked to take on additional duties or, on the other hand, they

might have been tempted to overstep their volunteer responsibilities when working with less experienced teachers.

During the first week of the programme, participants had the opportunity to observe the teachers, pupil support workers and/or other volunteers and learn more about the classroom and school routine. Participants were offered an extension to the assigned time for shadowing, if needed. However, none of the volunteers in the current project requested any additional time for induction or training. During the 6 months of involvement, participants were also given the opportunity to attend any training sessions provided for the school staff and invited to participate in the staff meetings.

Study duration and intensity. Participants in the intervention groups were required to commit 8 hours per week for 6 months in the school year. The hours were spread over 2 days (4 hours per day) and the volunteer schedules were established depending on older adults' preferences. The amount of commitment was moderately intensive, but was deemed necessary to allow intergenerational relationships to develop (Glass et al., 2004). The intensity of the programme provided the consistency of support that the pupils and the teachers required and was intended to help volunteers to build a new routine and well-founded position in the school environment. Finally, a reasonably substantial commitment of time was essential to optimise cognitive activity, health benefits and social functioning (Glass et al., 2004).

After the 6-month IE participation, intervention groups could continue the school engagement, in agreement with the Head teachers. Participants assigned to the control/wait-list group were also offered the opportunity to commence a volunteer role after the 6-month programme and all related assessments had been completed. This post-programme stage of participant engagement was not part of the intervention and was supported by the schools only.

Retention of participants. The researcher maintained telephone contact with each participant (including the volunteers from the control/wait-list group) every month to enhance retention. The intervention group was also contacted to monitor participation in school activities and discuss issues, if any were raised for instance in the volunteer reflective journal. Reasons for dropping out or absence were also ascertained by a phone interview every month (e.g., holidays, medical problems, lack of time, loss of interest, family visits). The dropout for each participating group was recorded and used to understand reasons for withdrawal of each individual group; therefore, no reassignment was applied.

Costs of the intervention. Participants were not offered any incentives for volunteering in the programme. However, expenses related to participation, including any necessary transportation, a lunchtime meal, and criminal record applications (i.e., PVG) were covered by the schools. This was meant to eliminate barriers to participation and allow volunteering without cost.

3.4.3 Data Collection

Data collection began with an initial phone screening (described earlier in the Participant recruitment and intake process subsection) to obtain basic demographics and health status information. The following stage of data collection took place during the first face-to-face meeting with the researcher and the Head Teacher; participants completed two questionnaires and two psychometric screening assessments of cognitive functioning:

Baseline screening

Background Demographics Questionnaire (Appendix H) was designed for the purpose of this study and asked participants about their ethnicity, education level, mobility aids requirements, mode of commuting to schools, the need of financial aid to cover the cost of transportation, number of

children/grandchildren, employment status, principal lifetime occupation, marital status, family members in the nearby schools, other voluntary positions, smoking, and alcohol intake.

The Lawton Instrumental Activities of Daily Living Scale (IADL; Lawton & Brody, 1969; Appendix I) addresses meal preparation, shopping, community mobility, money management, medication management, and housekeeping. These activities represent the key life tasks that people need to manage, in order to live at home and be fully independent. Difficulties with IADLs often correspond with how much help and supervision an older person needs. A summary score ranges from 0 (low function, dependent) to 8 (high function, independent). Inter-rater reliability was established at 0.85 and concurrent validity when compared with four other scales of functional status (correlations between 0.36-0.77; Lawton & Brody, 1969).

National Adult Reading Test (NART; Nelson & Willison, 1991; Appendix J) is widely used to estimate a person's premorbid level of intellectual ability. The test requires participants to read out loud a set of 50 words which are irregular in terms of their grapheme–phoneme correspondence. The responses are individually scored as correct or incorrect, according to their pronunciation. This score is then used to derive a premorbid IQ estimate. The NART has a high test-retest reliability of 0.98 and interrater reliability with coefficient above 0.88 (Crawford et al., 1989; Riley & Simmonds, 2003). In terms of construct validity, this measure showed moderate to high correlations (0.40-0.80) with other measures of premorbid intellectual function (e.g., Crawford et al., 1989; Deary et al., 2004).

The Mini-Mental State Examination (MMSE; Folstein et al., 1975; the form is not publicly available) is the most commonly administered psychometric screening assessment of cognitive status. The examination has been validated in a number of populations, including people with dementia, affective disorders, schizophrenia, as well as healthy individuals (Folstein et al., 1975). The MMSE is a 30-point test, with lower scores indicating cognitive impairment. Although different cut-off points were suggested for this

measure, scores of 24-25 are typically considered as the lowest for cognitive intactness (Shega et al., 2008; Tsai et al., 2008), and 17 and lower as indicative of severe cognitive impairment (Tombaugh & McIntyre, 1992; Chopra et al., 2008). Participants in this study were expected to obtain a score of 25 and higher. If they happened to obtain a score of 23 or lower, they would have been excluded from the study and sensitively informed about that as per protocol (see Section 3.5.2). In the current study, scores 24 or less were not obtained.

Baseline and follow-up testing

At both baseline and follow-up testing, participants completed a set of self-administered measures (i.e., social function, health and wellbeing scales) in their own homes prior to their face-to-face assessments. During the face-to-face sessions with a researcher the questionnaires were collected and a battery of cognitive tests administered via an iPad. Most of the testing sessions took place in the schools the participants were assigned to. A designated quiet room was available in three schools to be used by the researcher. One of the active schools was not considered for testing sessions due to lack of available space. Therefore, a private room was booked in the local community centres or the sessions took place in volunteers' homes, as per their request. When the sessions took place in volunteers' homes (twelve participants were assessed at their homes), lone working protocol was applied, and it was ensured there was appropriate space to conduct the assessment.

Cognitive measures

Five cognitive measures were used in the current RCT, including the Flanker Inhibitory Control and Attention Test, the Pattern Comparison Processing Speed Test, the List Sorting Working Memory Test, the Picture Sequence Memory Test, and the Rey Auditory Verbal Learning Test. All tests were valid for the older adult population (i.e., for ages 18+) and administered using the NIH Toolbox for Assessment of Neurological and Behavioural Function

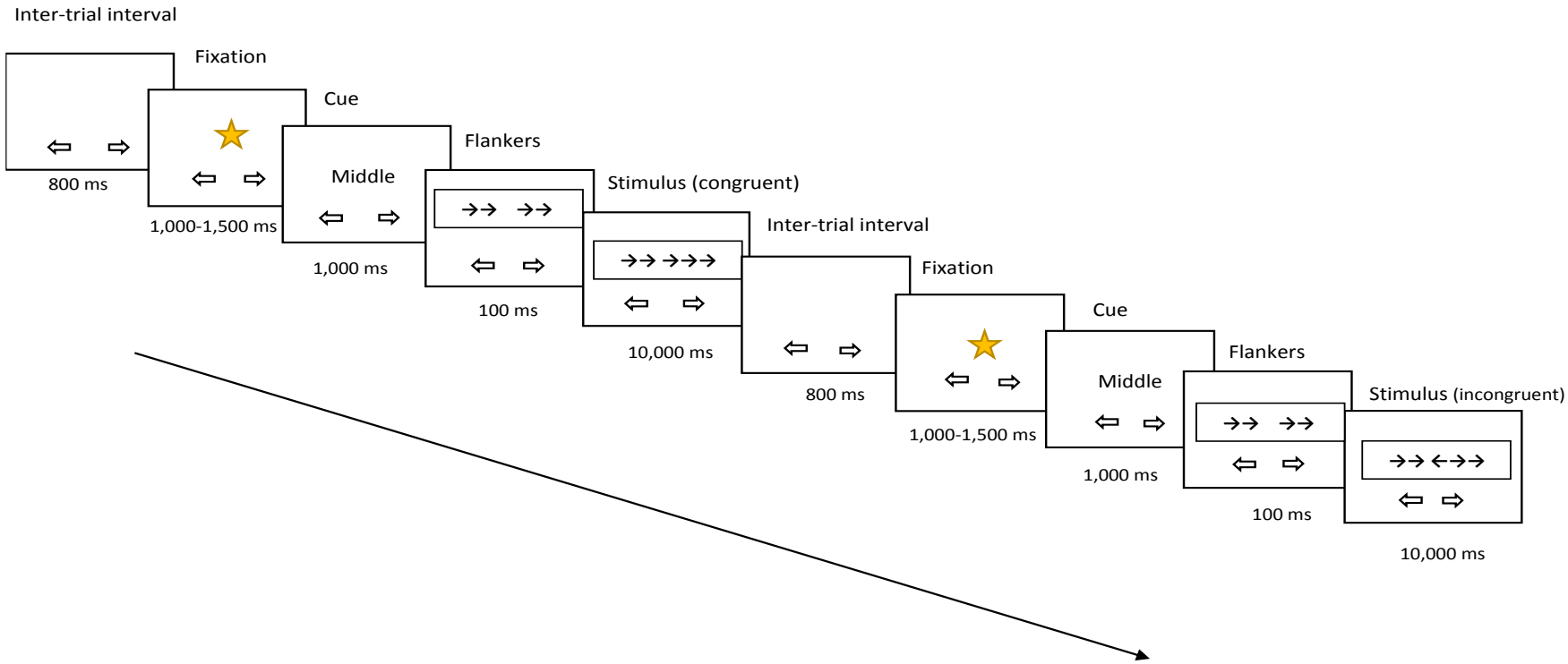
(Gershon et al., 2013; https://www.healthmeasures.net/explore-measurement-systems/nih-toolbox/intro-to-nih-toolbox/cognition). Prior to data collection, the researcher completed the online training provided by the NIH Toolbox Project. Practice testing of the full cognitive battery was also conducted with the Chief Investigator (CI), university students, and individuals from the general public. The tests were administered on an iPad, with some requiring additional equipment and materials [i.e., Bluetooth wireless keyboard, Home Base (a card with a standardised reference point), NIH Toolbox List Sorting Working Memory Examiner Answer Sheet)]. Prior to the testing sessions, the researcher created participants' profiles on the password-protected iPad, including their study number, age, and handedness, as well as set the assessment battery consisting of five cognitive tests. During the session, the iPad was placed in front of the participant at the angle of about 60 degrees from the table; positioning of the iPad could be changed if requested by the participant to ensure their comfort. All instructions were displayed on the iPad screen and were read by the researcher to the participant. In four of the included tests, participants were presented with practice trials to ensure their understanding of the task and familiarity with the equipment used. Tasks included:

The Flanker Inhibitory Control and Attention Test for measuring executive function, requires participants to report the direction of a central arrow while inhibiting distracting arrows (). Twenty trials are conducted for ages 8-85. This test is completed within three minutes. Participants are instructed during the touchscreen tutorial to choose one of two buttons on the screen that corresponds with the direction to which the middle arrow is pointing. On 12 congruent trials, all arrows are pointing in the same direction, and on 8 incongruent trials the arrows point in the opposite direction of the middle arrow. Participants are also asked to place their index finger on a sheet of card with a blue dot sticker on it that is placed on the table in front of them (a Home Base device in addition to the iPad) prior to initiation of each trial. Participants are asked to return their index finger to *Home Base* between each trial to standardise measurement of response time (RT). The actual test

is preceded by four (2 congruent and 2 incongruent) practice trials. Congruent and incongruent trials are presented in a pseudorandom order (i.e., 1-3 congruent trials preceding each incongruent trial), and scoring is based on a combination of the mean accuracy and RT on each of the congruent and incongruent trials, respectively.

Figure 3.5

Trial sequence for the NIH Toolbox® Flanker Inhibitory Control and Attention Test (arrow block).



Note. Used with permission from NIH Toolbox®, © 2020 Northwestern University and the National Institutes of Health.

The computed score ranges from 0-10 (between 0 and 5 for accuracy and RT score, respectively), but if the score is less than 4, it indicates that the participant did not score high enough in accuracy (80 percent correct or less) to receive accuracy and RT score. In this case, the final computed score is equal to the accuracy score. Participants automatically receive 20 accuracy points for the trials of the Flanker. These “free” trials are not reflected in the raw score, which only includes administered items with a correct response. However, they are included in the calculation of the computed score. Given that the accuracy score ranges from 0-5, for each correct response, a participant receives a value of 0.125 (5 points divided by 40 total task trials: 20 “free” and 20 administered trials) and it can be expressed in the following Equation 1:

$$\text{Accuracy Score} = 0.125 \times \text{Number of Correct Responses}$$

Median RT scores are computed using only correct responses with RT ≥ 100 ms. A log (Base 10) transformation is applied to median RT to create more normal distribution of scores. Based on the data from the validation study the minimum median RT for scoring is set to 500 ms and the maximum to 3000 ms (Zelazo et al., 2014). Median scores between 100-500 ms are set equal to 500 ms and those between 3000 ms and 10000 ms set to to 3000 ms. Considering that the RT score ranges from 0-5 and need to be added to the accuracy score, the obtained RT values need to be algebraically rescaled from a log(500) – log(3000) to a 0-5 range using the following Equation 2:

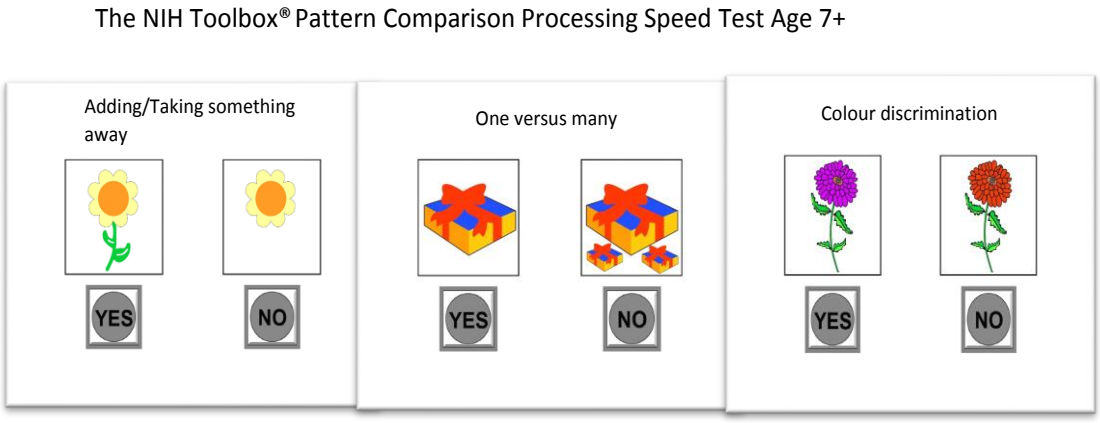
$$\text{RT Score} = 5 - \left[5 * \left(\frac{\log RT - \log(500)}{\log(3000) - \log(500)}\right)\right]$$

Validation of the computerised version of this test has a test-retest reliability of 0.85, and intra-class correlations of 0.83 (95% CI: 0.74–0.89; Zelazo et al., 2014). All scores were calculated automatically by the programme.

The Pattern Comparison Processing Speed Test (Figure 3.6) requires participants to report as quickly as possible whether or not visual patterns exactly match. Participants make this decision by choosing either 'yes' or 'no' buttons on the iPad screen. The test takes approximately three minutes including instruction and six practice trials. The test itself ends after 130 items or 85 seconds. Scoring is based on the number of items answered correctly in 85 seconds, with a range of 0-130. In this study, a raw score (i.e., uncorrected for age or other demographic characteristics) was reported to allow evaluation of simple improvement or decline over time. This test has a test-retest reliability of 0.73 (95% CI: 0.62-0.81), with a small practice effect (scores increased a mean of 0.50 points; standardized effect size 0.24) over 2 weeks (Carlozzi et al., 2014).

Figure 3.6

Practice items from the NIH Toolbox® Pattern Comparison Processing Speed Test Age 7+.



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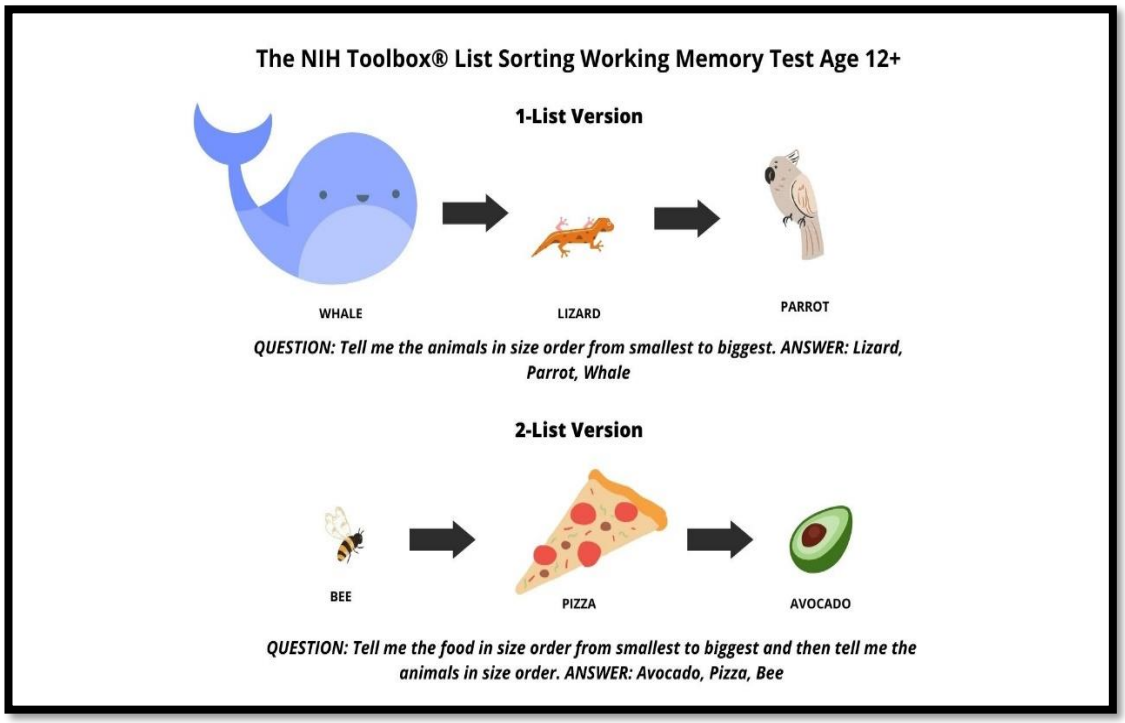
The List Sorting Working Memory Test (Figure 3.7) requires participants to recall a list of objects in size order from smallest to biggest. Participants are presented with pictures of the items, accompanied by audio recording and written names of the items. This test consists of two conditions/lists of items

(i.e., 1-List, 2-List). In the first list, participants are presented with one category of items, either food or animals, and instructed to repeat them in size order (with the image reflecting size differences in the real world). In the second list, they are presented with both food and animals, and are first asked to recall food in size order, and then animals in size order. Each condition is preceded by two practice trials. The test begins with a list of two items that increases by one in each subsequent trial up to seven objects.

Figure 3.7

Trial sequence for the NIH Toolbox® List Sorting Working Memory Test Age 12+.



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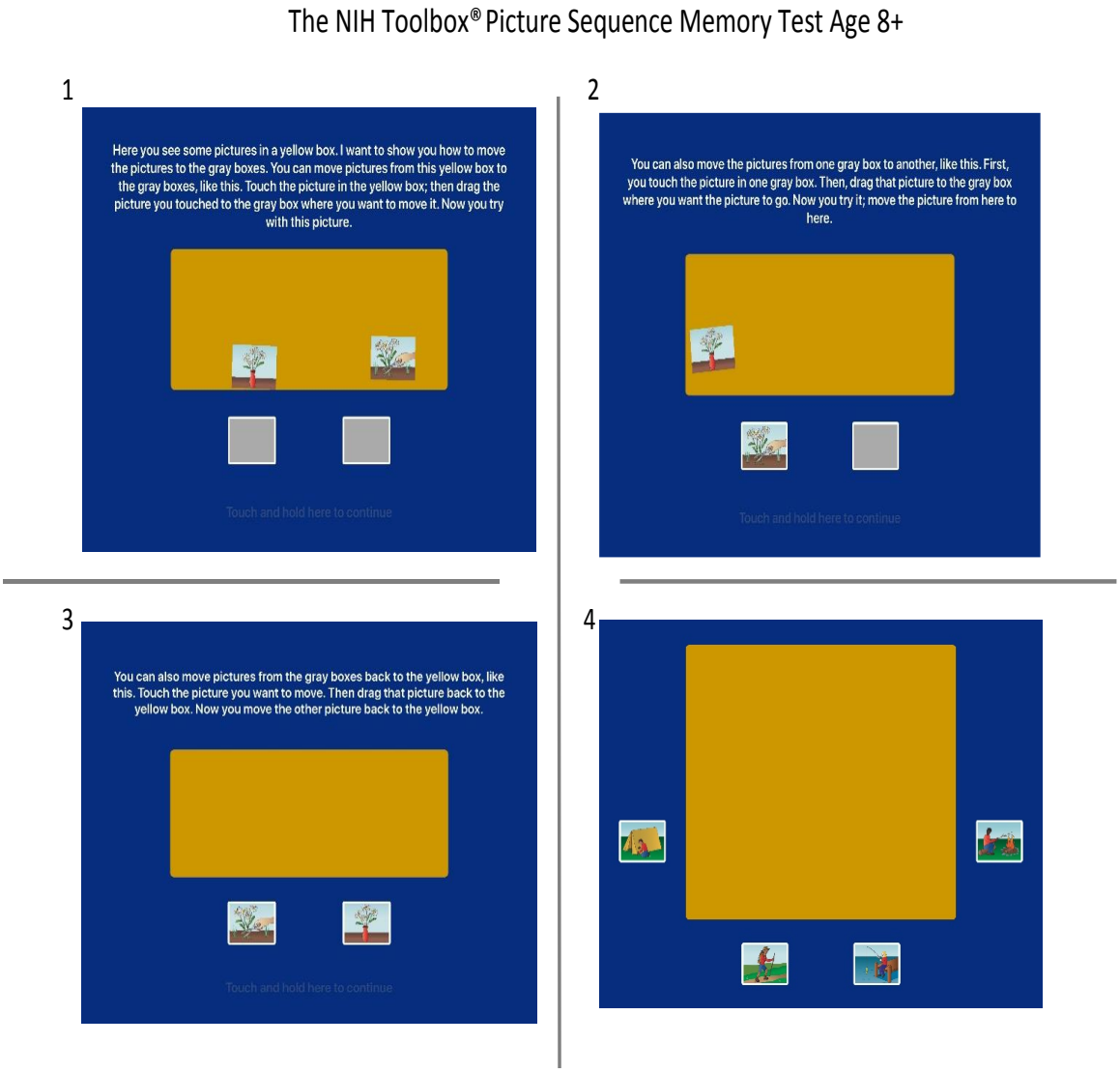
The test takes approximately seven minutes to administer and requires a wireless keyboard paired by Bluetooth with the iPad. The keyboard is used to record the answers and move on to the next list of items. The examiner types

1 if the answer is correct or 0 if incorrect. If participants are unable to recall all items or sequence the string of items correctly, they are provided with a second trial with the same number of items. The task is discontinued when incorrect responses are provided on two trials with the same number of items. Following discontinuation or completion of the List-1 component, participants are redirected to the 2-List. The score is based on the sum of the total number of items correctly recalled and sequenced on the first (one dimension: foods or animals) and second list (two dimensions combined: foods and animals) which can range from 0-26.

The Picture Sequence Memory Test (Figure 3.8) measuring episodic memory, requires participants to view a sequence of pictures shown on the screen with an accompanying audio recording, then recall them in the same order. Pictures present objects and activities that are thematically related (e.g., camping), but do not represent an inherent order. Each picture is presented in the centre of the computer screen and then it is moved to its fixed position in a sequence, until the entire sequence is displayed. After 3 seconds during which the complete sequence is presented together, the pictures are mixed in the centre of the screen. Participants use the touch screen to move the pictures to the slots in which they believed they had appeared in the earlier sequence.

Figure 3.8

Practice items from the NIH Toolbox® Picture Sequence Memory Test Age 8+.



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The test consists of a practice and two test trials. In the practice participants are presented with a four-item sequence, followed by the two test trials with 15-item and 18-item sequences respectively. Participants receive a point for each adjacent pair of pictures they correctly sequence (i.e., if pictures 2 and 3 are placed in that order anywhere, for example in slots 6 and 7, one credit is given). Three different sets of test sequences are available for a repeated measures design to minimise practice effects, with the three sets being used across the three study points in the current research. The test takes approximately seven minutes to administer, and the score is based on the number of adjacent pairs placed correctly across two trials and can range from 0-31. Test-retest reliability of the NIH Picture Sequence Memory Test was strong (r = 0.78) for the entire sample (3-85 years), and shows significant positive correlations with other standardised measures of the same cognitive construct (r = 0.69; Weintraub et al., 2013).

The Rey Auditory Verbal Learning Test for measuring immediate memory and verbal learning, requires participants to recall as many words as possible from an orally presented list. This list consists of 15 unrelated words presented to the participants via audio recording on the iPad at a rate of one word per second. The same list of words is presented on three trials. The answers are recorded by the examiner on the iPad using the touchscreen. The test takes approximately three minutes to administer, and the score is based on the sum of the number of words recalled across three trials and can range from 0-45. Note, examples of words used in this test cannot be provided as advised by the NIH Toolbox services. However, the words were everyday words or objects.

Health and wellbeing measures

The revised UCLA Loneliness Scale (Russell et al., 1980; the form is not publicly available) is a 20-item scale designed to measure one's subjective feelings of loneliness and includes questions such as "I feel isolated from others" and "I feel left out". Participants rate each item on a 4-point scale

from ‘never’ to ‘often’. A total loneliness score is created by summing all 20 items, where higher scores indicate a higher level of loneliness. The scale has high internal consistency (α = 0.84 to 0.94) and test-retest reliability (*r* = 0.73; Russell, 1996).

International Physical Activity Questionnaire Short Form (IPAQ-SF; Craig et al., 2003; Appendix K) is a 7-item measure that examines physical activities people do as part of their everyday lives and includes questions such as “During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling?” and “During the last 7 days, how much time did you usually spend sitting on a week day?”. Four types of activity are assessed, including sitting, walking, and moderate and vigorous physical activity. In this study, data collected with the IPAQ-SF are reported as a continuous measure and as MET (metabolic equivalent; MET= 1 kcal/kg/hour)-minutes/week. The MET-scores are computed for walking (W), moderate-intensity activities (M), vigorous-intensity activities (V), and combined total physical activity. The following MET values are used for the analysis of IPAQ data: Walking = 3.3 METs, Moderate Physical Activity = 4.0 METs and Vigorous Physical Activity = 8.0 METs. Using these values, three continuous scores are defined:

- Walking: MET-minutes/week at work = 3.3 x walking minutes/day x days per week (frequency)
- Moderate-intensity Physical Activity: MET-minutes/week at work= 4.0 x moderate-intensity activity minutes/day x days per week
- Vigorous-intensity Physical Activity: MET-minutes/week at work= 8.0 x vigorous-intensity activity minutes/day x days per week

A sitting score is produced by multiplying the number of hours spent sitting on a weekday by 5. The IPAQ-SF sitting question is an additional indicator variable of time spent in sedentary activity and is not included as part of the total score of physical activity. The IPAQ-SF was found to be a comparable measure to other self-administering scales of physical activity: based on data collected from 12 countries, IPAQ’s test-retest reliability had a median of

about 0.80 (Spearman's ρ = 0.66 - 0.88), concurrent validity (for comparisons between long and short IPAQ forms) = 0.67 (ρ = 0.64 - 0.70), and criterion validity a median of ~ 0.30 (ρ = 0.02 - 0.47; Craig et al., 2003).

The Life Satisfaction Index for the Third Age-Short Version (LSITA-SF; Barrett & Murk, 2009; the form is not publicly available) is a 12-item scale that includes questions such as "My life could be happier that it is now" and "The things are as interesting to me as they ever were". The LSITA-SF employs a six-point Likert-style response scale with choices ranging from 'strongly disagree' to 'strongly agree'. A total score is created by summing all 12 items of the measure. The LSITA-SF has been evaluated as having a high level of reliability of α = 0.90 and good construct and criteria validity (> 0.70; Barrett & Murk, 2009).

The Pittsburgh Sleep Quality Index (PSQI; Buysse et al., 1989; the form is not publicly available) assesses sleep quality using seven different components: (1) subjective sleep quality; (2) sleep latency; (3) sleep duration; (4) habitual sleep efficiency; (5) sleep disturbance; (6) use of sleeping medication; and (7) daytime dysfunction. The measure includes both open-ended questions such as "During the past month, what time have you usually gotten up in the morning?" and Likert-type questions asking to rate frequency of sleep difficulties or overall sleep quality. All answers are then converted to scaled scores according to provided guidelines. Ultimately, each of the seven component scores ranges from 0 to 3 (0 = no difficulty, 3 = severe difficulty). A global PSQI score is created by summing the seven component scores and ranges from 0-21, with a score ≥ 5 indicating poor sleep quality. The scale has high internal consistency, with an overall Cronbach's alpha [α] = 0.83 (for a total of all seven components) and has been validated across different age groups and clinical populations (e.g., Doi et al., 2000; Spira et al., 2012).

The Geriatric Depression Scale Short Form (GDS-SF; Yesavage & Sheikh, 1986; Appendix L) consists of 15 questions, designed for self-administration

and the assessment of depressive symptomatology in older people. Some of the questions include: “Do you feel that your life is empty?” and “Do you feel full of energy?” Answers to the questions are in a “YES/NO” format. Users circle the answer that best describes how they felt over the past week. Of the 15 items, 10 indicate the presence of depressive symptoms and each receive a score point when answered “YES”, while the other 5 are indicative of depressive symptoms and receive a score point when answered ”NO” (Yesavage & Sheikh, 1986). A total score is created by summing the score points from all answers. A score of 5 or more suggests depression. The initial validity study (Yesavage & Sheikh, 1986) on the GDS-SF, conducted among a mixed sample of the older adult population, including patients hospitalised for depression and healthy community-dwelling older adults, reported high internal consistency with $\alpha = 0.84$.

Social function measures

Generativity Scale (Gruenewald et al., 2016; the form is not publicly available) contains 13 items such as “I feel like I make a difference in my community” and “I want to show people younger than me how to do things”. Participants respond to each item on a 6-point scale from “strongly disagree” to “strongly agree”. A total score is created for Generative Desire (i.e., a need to nurture and guide the younger generation) by summing the relevant 7 items and a total score of perceptions of current Generative Achievement (i.e., a sense of contribution to development of the younger generation) by summing 6 items. This scale was found to have high internal reliability of each of the two scales with $\alpha = 0.82$ for generative desire and $\alpha = 0.90$ for generative achievement (Gruenewald et al., 2016).

The Semantic Differential Scale (Osgood et al.,1957; Appendix M) consists of ten pairs of bipolar adjectives (i.e., with opposite meanings) derived from previous studies on intergenerational attitudes (e.g., Caspi, 1984; Pinquart et al., 2000) that could be used to describe children, such as skilful-clumsy, independent-dependent, generous-selfish. Participants are asked to rate

schoolchildren on each bipolar dimension using a 7-point scale (+3; +2; +1; 0; -1; -2; -3), with positive scores indicating more favourable attitudes and a midpoint rating neutrality or uncertainty (Haddock & Huskinson, 2004). The nearer the response is to each adjective the stronger the participant supports it. A total score was created by summing all 10 items. The original semantic differential scale exhibits high test-retest reliability (r = 0.72) and internal consistency (Caspi, 1984); and is a valid measure of prejudicial attitudes, highly predictive of future behaviour (Haddock et al., 1993).

The International Personality Item Pool (IPIP; Goldberg, 1992; Appendix N) is a 50-item questionnaire that assesses personality and includes items such as "Am the life of the party" (Extraversion), "Insult people" (Agreeableness), "Like order" (Conscientiousness), "Get irritated easily" (Emotional Stability) and "Am full of ideas" (Openness to Experience). Participants respond to each item on a 5-point scale from "very inaccurate" to "very accurate". Then, total scores are created for each of the five traits - Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Openness to Experience - by summing 10 items per each factor. The internal consistency (mean r = 0.84; Goldberg, 1992) and concurrent validity of the IPIP factor markers have been demonstrated worldwide (e.g., Gow et al., 2005; Guenole & Chernyshenko, 2005). The IPIP Big-Five factor markers were found to be strongly correlated with the personality scales such as NEO-Personality Inventory (Costa & McCrae, 1985; r = 0.46 to 0.69; Goldberg, 1992), the NEO-FFI (Costa & McCrae, 1992; r = 0.49 - -0.84; Gow et al., 2005), or the Big Five Inventory (John et al., 1992; r = 0.47 to 0.72; Zheng et al., 2008).

Summary

There is a clear overlap between some of the measures used in the present study with those included in other IE studies. Following a recommendation from the systematic review (see Section 2.5.5), the same measures (if accessible and feasible) were used to enhance comparability of the findings across IE programmes. The effect sizes reported on those measures varied

across studies, depending on the size of the intervention (see Table 3.1 below).

Table 3.1

Outcome measures consistent with previous studies and effect sizes identified.

Outcome Measure	Study	Sample size	Design	Effect sizes
The revised UCLA Loneliness Scale (Russell et al., 1980)	Barbosa, M.R., et al. (2020)	12	Pre-and post-controlled study	No significant effect of group, but large effect of time was reported for loneliness (r = – 0.51).
The Life Satisfaction Index for the Third Age-Short Version (LSITA-SF; Barrett & Murk, 2009)	Johnson, W. (2015)	20	Pre- and post-uncontrolled study	*No significant effects* were found for life satisfaction (p-values and effect sizes not specified).
The Geriatric Depression Scale Short Form (GDS-SF; Yesavage & Sheikh, 1986)	Barbosa, M.R., et al. (2020)	12	Pre-and post-controlled study	A significant effect of group and large effect of time was reported for depression (p= .014; r = – 0.714).
	Posada, M.M. (2006)	14	Non-randomised controlled trial	Using t-tests, *no significant main effect* of intervention group was found at time 3 (final follow-up), but medium effect size of time was reported on depression scores for 'cognitively intact' (Cohens' d = .56). When an ANOVA was carried out, including the intervention group and time (baseline vs time 3) variables, the main effect of intervention and the interaction effect were not reported.
	Hernandez, C.R. and Gonzalez, M.Z. (2008)	103	Non-randomised controlled trial	*A significant group x time interaction effect* was found on depression (p < .0001). There was a significant reduction of depressive symptoms in the intervention group (p < .001), whereas an increase was observed in the control group (p < .001). This study did not report effect sizes; therefore, the F statistic was used to determine Cohen's d. A large effect size was found (d = 2.3472).
Generativity Scale (Gruenewald et al., 2016)	Gruenewald, T., et al. (2016)	702	RCT	A significant effect of intervention group was found on: (1) generative desire at the 4-month (p < .05; Cohen's d = .18), 12-month (p < .05; d = .17), and 24-month (p < .001; d = .26) follow-up; (2) perceptions of generative achievement at the 4-month (p < .001; d = .29), 12-month (p < .05; d = .19), and 24-month (p < .05; d = .16) follow-up.
The Semantic Differential Scale (Osgood et al.,1957)	Pinquart, R., et al. (2000)	20	Non-randomised controlled trial	*A significant group x time* (pretest vs posttest vs 7-week follow-up) *interaction effect* was found on: cross-age attitudes towards the children participating in the intervention (p < .01). The effect size was not reported; however, F-value (F = 4.13) was used to calculate Cohen's d, which showed a large effect size (d = .91), due to a substantial increase in positive attitudes in the intervention group.

As per results sections in Chapter 2 (see Sections 2.4.7, 2.4.8, 2.4.9), the most consistent improvements were previously observed in relation to outcomes such as generativity, cross-age attitudes, as well as physical activity. Therefore, this RCT aimed to provide further evidence to support potential positive effects of IE on older adults' self-perceptions of generativity, their attitudes towards the younger generation and the level of their physical activity. This study also included measures of depression, loneliness, and life satisfaction that have been previously looked at (see Section 2.4.8), but that have showed inconsistent effects.

Furthermore, studies included in the systematic review (see Chapter 2) primarily reported on psychosocial and health and wellbeing effects of IE and relatively few investigated impacts on cognition. Therefore, this study aimed to build on the existing, more limited evidence on the impacts of IE on executive function, processing speed, immediate and delayed memory (Carlson et al., 2008, Sakurai et al., 2018) and provide reliable effects on those outcomes in cognitively healthy older adults. To date, IE studies provided limited support for the short-term benefits across those measures, which were mainly identified in samples stratified by baseline impairment (Carlson et al., 2008; see Section 2.4.7). Moreover, the limited evidence on the effects of IE on cognitive function has not comprehensively covered all core areas of cognition (i.e., executive function, processing speed, short-term memory, working memory, long-term memory) that typically display often large age-related impacts (e.g., Bopp & Verhaeghen, 2007; Nyberg et al., 2003; Park et al., 2002; Rönnlund et al., 2005; Salthouse, 1996). Thus, this intervention aimed at exploring impacts of IE on a broader range of cognitive outcomes in order to provide more comprehensive and stronger conclusions about the potential benefits of IE on cognitive performance in older adulthood. In addition, to improve previously applied methods of cognitive assessment that included pen-and-pencil tests, a more sensitive and standardised, but easy to use, computerised battery of tests was used in this study.

In addition, this RCT investigated sleep quality that has not been explored in the previous IE studies. As the frequency of sleep complaints and different sleep disorders (e.g., insomnia) become more apparent with age (Christopher, 2013), it is crucial to identify activities that can potentially improve subjective sleep quality and, by extension, potentially brain health, in older adults (Brewster et al., 2015; Costa et al., 2022; Kent et al., 2021; Liang et al., 2019, Yaffe et al., 2014). According to recent evidence, engaging in helping behaviours (e.g., social service, volunteering) can positively impact sleep duration (Basner et al., 2007) and compensate for some of the physiological declines (e.g., chronic inflammation) associated with lack of sleep (Kim & Yoon, 2020). Extending the existing research of volunteering activities in the school-based environment could provide more evidence to support these findings.

Finally, to date, no IE programmes considered the role of personality in engaging in this type of voluntary activity. The aim for using the personality measure in this pilot study was two-fold. Firstly, the data were collected to describe the sample at the baseline recognising certain levels of personality traits represented by participants. Secondly, the researcher was interested in potential longer-term effects of volunteering on personality, thus we repeated the personality measure after six months of involvement. There is evidence indicating a link between volunteerism, wellbeing, and personality in later life. For example, positive personality traits such as Openness to Experience, Emotional Stability, Agreeableness, and Conscientiousness were positively related with higher likelihood of engaging in volunteer work and higher levels of subjective health (Baek et al., 2016). Moreover, research showed that increases on those positive personality traits over time could be facilitated by the experience of community engagement (Hill et al., 2012). Additionally, although there is a great deal of variability across individuals, it has been demonstrated that personality, or at least responses to personality questionnaire items, could shift as a result of changing demands and experiences, not only over long periods of time, but also day to day (Mroczek et al., 2006). Since those changes in positive personality traits can coincide

with maintaining health and wellbeing, it is important to explore IE as a potential facilitator of that variability, but to consider potential longer-term change.

3.5 Ethical Considerations

This pilot RCT was approved by the School of Psychological Sciences and Health Ethics Committee at the University of Strathclyde and the West Lothian Council Ethics Committee initially in May 2018 (with minor amendments approved on subsequent occasions, for example to extend the study into the following school year). As part of the ethics application process, a risk assessment was also conducted.

3.5.1 Informed Consent

Parent/guardian information sheet and consent. Prior to the commencement of the programme, parents/guardians of P1-P4 pupils in the four participating schools were contacted by the researcher. They received an information letter describing the nature of the project and what was involved in participating in it (see Appendix O). Researchers' contact details were also provided in the letter so that parents could find out more about the study, if required. Additionally, they could opt their children out from engagement with older adults participating in this study. To do so, the reply-slip was to be handed to school staff. To ensure the opportunity to opt-out was not missed, schools sent a blanket communication to parents/guardians of pupils in all classes involved in the study at the beginning of the school year. Only two parents raised initial concerns/queries regarding the intervention. However, after further discussion and clarification provided by the researcher and the Head Teacher, they decided not to opt out their children.

Older adult participant information sheet and consent. The older adult volunteers were provided with detailed information about the study on two ocassions. First, the purpose of the intervention, its procedure and

requirements were explained to them during the initial telephone screening. Potential participants were given the opportunity to ask questions and if necessary the time to consider. Their verbal consent was requested in order to obtain some basic demographic information to verify their eligibility. Next, a Participant Information Sheet (Appendix P) was provided to the volunteers during the first in-person meeting. They were advised to read it carefully in the presence of the reasearcher, encouraged to ask questions, and asked to sign a Consent Form if they wished to continue.

3.5.2 Risk of harm to participants

Potential ethical issues related to cognitive screening. The current study involved recruiting healthy older adults and collecting and retaining pseudo-anonymised data. The main ethical concern that was borne in mind, however, was in relation to the cognitive screening tests and the chance of observing signs of possible cognitive impairment in older adults. Therefore, there was a protocol in place to be used in relation to this. In the event of a score being obtained on the Mini-Mental State Examination (Folstein et al., 1975) which may be indicative of cognitive impairment, the researcher would first sensitively (verbally) inform the participant that they performed lower than expected on this general cognitive task. It would be highlighted, however, that: a) they were not undergoing a clinical assessment by us; and b) that the low score was not necessarily indicative of a problem and might have a variety of causes. This information would also be given in writing, in a Debrief Sheet written specifically for these individuals, who would not progress with the study (Appendix Q). This also stated that, should they have any concerns and especially if they have noticed experiencing problems in everyday life, then their GP could be approached to perform a memory check-up. The Chief Investigator designed and has previously used this protocol for multiple research studies in order to be consistent with the BPS Code of Human Research Ethics guideline ‘Giving Advice’ (BPS, 2014) which states that “a researcher may obtain evidence suggesting the existence of

psychological or physical problems of which a participant may appear to be unaware. In such a case, the investigator has a responsibility to discuss this with the participant if the investigator believes that by not doing so the participant's future wellbeing may be endangered". However, given that all participants in this study obtained scores of ≥ 27, the protocol was not required to be implemented.

Potential ethical issues related to the school engagement. In the event that a participant became upset/distressed as a result of participating in the intervention, they were encouraged to discuss any issues with school staff in the first instance, who would try to resolve the issue. They might also contact the researchers or speak to their GP, if appropriate and depending on the nature of the problem. However, the Participant Information Sheet (Appendix P) clearly stated that participants could withdraw at any time, without explanation or penalty. A Debrief Sheet (Appendix Q) was also given to each participant after the final 6-month testing. Both of these provided the contact details of the researcher, the Chief Investigator, and the Ethics Convenor, who they could contact if they had experienced any distress as a result of their participation.

3.6 Summary

This chapter provided a comprehensive overview of the present pilot RCT protocol and associated quantitative data collection methods. This choice of research methods and applied model of IE were based on previous studies that provided the highest quality available evidence on the topic. Standardised measures used in this study were consistent with instruments used in other intergenerational programmes and were validated for use with older adults. By applying this research protocol and assessment strategy, we aimed to support development and testing of a comparable intergenerational model to the 'gold standard' model used successfully elsewhere, as well as to contribute unique data to the literature. In the next chapter, findings from the pilot RCT are presented.

CHAPTER 4. Cognitive, health and social outcomes of Generation for Generation, an intergenerational engagement intervention, for older adult volunteers

4.1 Chapter overview

The current pilot randomised controlled trial (RCT) was designed to examine the potential cognitive, health and wellbeing, and social benefits of an intergenerational primary school-based programme, Generation for Generation, for older adult volunteers. The first section of this chapter comprises a summary of existing literature relevant to the topic, and the study's aims and hypothesis are outlined. The following section provides a summary of the data analysis plan. The results section begins with descriptive statistics of demographic and health variables for each participant group. Then, the results regarding the potential effects of intergenerational engagement (IE) on cognitive, health and wellbeing, and social outcomes are presented in turn. The feasibility of the programme and associated RCT methods will also be outlined. Finally, the results are discussed in the context of the study's hypothesis and the existing literature. In preview of the results, this pilot study suggests that IE may improve aspects of older adults' cognition, physical functioning, and social outcomes [specifically, their working memory, episodic memory, auditory verbal learning, daytime dysfunction (sleep quality domain), cross-age attitudes, and generative achievement]. Small to large effect sizes were observed across various outcomes. Therefore, it is argued that IE has potential to benefit older adults' health, but that a full-scale trial is required to confirm these effects.

4.2 Introduction

As outlined in the previous three chapters, IE could theoretically contribute to positive functional changes associated with healthy ageing. In line with Erikson's (1998) psychosocial theory of development, engagement in such

generative activities fulfils a developmental goal to prevent self-concern and instils a sense of feeling needed. Furthermore, considering potential benefits of IE on cognitive functioning, the engagement hypothesis supports empirical findings indicating that complex and cognitively stimulating activities could increase the level of the individual's mental flexibility (Schooler et al., 1999). These include improvements in executive function (Carlson et al., 2008), memory (Park et al., 2014), and speed of processing (Stine-Morrow et al., 2008). Mentally challenging tasks are believed to allow the ageing brain to maintain a higher level of cognitive functioning by promoting neural scaffolding (i.e., the scaffolding theory of aging and cognition-revised; STAC-r; Reuter-Lorenz & Park, 2014). According to STAC–r, the brain's effectiveness for building scaffolds (i.e., compensatory neural circuitry) can be enhanced by engaging in beneficial activities including cognitive training, new learning, or physical activity (Reuter-Lorenz & Park, 2014).

Indeed, our systematic review (see Chapter 2) revealed that IE could be an effective multimodal response to the challenges of an ageing society, age-related negative perceptions, and to the need for more intergenerational communities. By engaging in meaningful and productive roles that benefit society, older adults can experience gains in physical activity level (Tan et al., 2006, 2009), cognitive function (Carlson et al., 2008), improved mood and mental health (Murayama et al., 2015; DeMichelis et al., 2015), positive shifts in cross-age attitudes (Gamliel et al., 2014; Meshel & McGynn, 2004), and enhanced social connectedness (de Souza & Grundy, 2007; Fujiwara et al., 2009). Across the available evidence that was outlined in our systematic review (see Chapter 2), outcomes that showed the most consistent patterns of improvement were associated with physical functioning (e.g., Fried et al., 2004; Tan et al., 2006, 2009), anxiety (Halpin et al., 2017; Sng and Jung, 2020; Xu et al., 2016), generative contributions (Ehlman et al., 2014; Gruenewald et al., 2016), and attitudes towards children (Chippendale & Boltz, 2015; Santini et al., 2018). These findings seemed to be linked to older adults' motivations and desire to promote their own wellbeing (Chen &

Morrow-Howell, 2015), as well as to give back and re-connect with younger generations (Erikson, 1950; McAdams & St. Aubin, 1992).

Thus, existing research indicates that older individuals involved in intergenerational programmes can potentially experience a range of biopsychosocial benefits (see Chapter 2). However, stronger conclusions on the impacts of IE cannot yet be drawn considering the limited number of high-quality studies and particularly RCTs. Research studies in this area often use a wide range of models for programme implementation and self-developed outcome measures that limit generalisability and affect the comparability of the findings. Moreover, most of the research has investigated social outcomes (e.g., generativity, cross-age attitudes). Hence, there has been more limited consideration of possible benefits for health and wellbeing; for those outcomes, findings were less consistent and therefore less conclusive. In particular, only eight out of 44 identified studies examined impacts of IE on cognitive functioning and most focused on one specific cognitive domain (e.g., Carlson et al., 2009; Newman et al., 1995; Sakurai et al., 2016) rather than covering a broad range of outcomes. Therefore, more research is needed that uses standardised measures, draws upon gold standard models, and takes a range of potential outcomes into account.

As revealed in the systematic review (see Chapter 2), there is also a lack of studies examining the potential effects of IE intensity and duration on cognitive, health, and social outcomes in older adult volunteers. Only one IE study investigated and demonstrated an intensity-response relationship, suggesting a more positive intervention effect as a function of the greater level of exposure (i.e., number of cumulative hours of participation) to the programme (Gruenewald et al., 2016). This suggests that high-intensity engagement (in this case, 15 hrs/wk) for an extended period of time (i.e., 24 months) may be more beneficial for older adult participants. In addition, other evidence presented in the systematic review showed significant effects of IE programmes involving short-term and less frequent interactions, such as 1h/week over 2-3 weeks or 1.5h/week over 6 weeks (e.g., Ehlman et al., 2014; Hsu et al., 2014; Pinquart et al., 2000). However, to date, little is known

about the impact of intervention intensity and duration on older adults' functioning and where the lower and upper threshold for improvement lies. Therefore, research is needed that uses the gold standard approach (i.e., RCTs), but that involves a more moderate and more easily achievable commitment (e.g., 8 hrs/week).

Over the past 30 years, intergenerational initiatives and activities have been implemented in a variety of settings and across numerous countries. However, a particular research effort has been devoted to understanding the outcomes of engagement between younger and older generations in the school environment, where older adult volunteers are placed as tutors or mentors (Carlson et al., 2008; DeMichelis et al., 2015; Gamliel et al., 2014; Meshel & McGynn, 2004; Murayama et al., 2015). Considering schools' limited resources and the need for promoting health and wellbeing in the older adult population, intergenerational school-based programmes have become a potentially important mechanism for supporting educational, social and personal growth of the pupils, and for providing older adults with access to meaningful roles that can enhance their functioning and social connections (Fried et al., 2004; Fujiwara et al., 2009; Kaplan, 2001; Strand et al., 2014; see Section 1.4 and Chapter 2 for more detail).

A number of school-based IE studies have focused on a range of health and wellbeing outcomes, most notably anxiety, depression, and physical functioning (e.g., Halpin et al., 2017; Hernandez & Gonzalez, 2008; Tan et al., 2006, 2009), but there is still no evidence on the effects of such interventions on specific outcome measures including sleep quality. Most recent evidence indicates that engaging in helping behaviours (e.g., social service, building, clean-up activities, care activities) can positively impact sleep duration (Basner et al., 2007) and compensate for some of the physiological declines (e.g., chronic inflammation) associated with lack of sleep (Kim et al., 2020). Extending the existing research of volunteering activities in the school-based environment could provide more evidence to support these findings. To minimise the need of applying pharmacological therapies to regulate the sleep-wake cycle, it is critical to develop alternative

interventions with potential to resolve that health-related issue. By creating opportunities for older adults to be less sedentary and more physically active, those interventions can contribute to improved cardiorespiratory fitness that, in turn, lowers the risk of poor sleep quality (Sloan et al., 2020).

Furthermore, to date, no intergenerational programmes considered the role of personality in engaging in this type of voluntary activity. However, there is evidence indicating a link between volunteerism, wellbeing, and personality in later life. For example, personality traits such as Extraversion and Openness to Experience were positively related with higher levels of cognition, higher likelihood of engaging in volunteer work, whereas Emotional Stability, Agreeableness, and Conscientiousness additionally contributed to higher levels of activities of daily living and higher levels of subjective health (Baek et al., 2016). Moreover, higher levels of Openness to Experience were associated with greater gains in cognitive function following participation in cognitively stimulating programmes/training (Gratzinger et al., 1990; Stine-Morrow et al., 2014). Previous research also demonstrated that increases on positive personality traits over time can be facilitated by the experience of community engagement, or coincide with increases in social wellbeing (Hill et al., 2012). Thus, considering that the older adult population is at higher risk for health and functional declines, it is important to develop effective interventions that would promote simultaneously functional health, positive personality traits, and social engagement.

Objectives

The main goal of the current intervention was to test the effects of an IE programme by using a pilot RCT in Scottish primary schools. We also aimed to build on the existing literature that has suggested a range of potential biopsychosocial benefits of IE, including some previously observed improvements in health and wellbeing, cognitive performance, and social functioning. In addition, this pilot trial considered whether a moderate exposure and duration IE programme (i.e., 8 hours per week over 6 months)

can provide similar benefits as longer term high-intensity volunteering implemented in existing, gold-standard interventions (i.e., 15 hours per week over 12 months or 3 years; Carlson et al., 2008; Tan et al., 2009). Different parameters of the feasibility were also considered to help inform future research. Finally, to our knowledge, this is the first study that has examined the potential impact of IE on sleep quality and personality.

The hypothesis is that a moderate level of participation (8 hours/week over 6 months) in a primary school-based IE programme will benefit older adults' cognitive, social, and health and wellbeing outcomes, especially after 6 months as compared to 3 months of engagement, due to the greater stimulation experienced.

4.3 Methods

This pilot trial was pre-registered with Open Science Framework (OSF; osf.io/kupbm).

4.3.1 Design

The study took the form of an experimental design and specifically a pilot RCT. The research was a mixed factorial design with two factors: group (control, intervention; between groups) and time (baseline, 3-month, and 6-month follow-up; repeated measures). The dependent variables were all outcome measures involved in the current study, i.e., cognitive, health and wellbeing, and social outcomes. See section 3.4.3 for a full list of measures.

4.3.2 Software

Main analyses in this study were carried out using SPSS 25.0 (IBM Corp., 2017). Bayes Factors were calculated using JASP 0.11.1.0 (JASP Team, 2019; Wagenmakers et al., 2018). The Exploratory Software for Confidence Intervals (ESCI; Cumming, 2012) software (https://theewstatistics.cns/esci/) was used for calculating Cohen's *d.*

4.3.3 Data Analysis

Sociodemographic and health status covariates, and baseline data were first examined by intervention status using between subjects t-tests or chi square (as appropriate), to assess the similarity of the groups at the outset of the study. Two-tailed significance was reported.

Cognitive, social, and health and wellbeing measures taken at baseline, and 3- and 6-month follow-up timepoints were each analysed using a 2 (participant group: intervention versus control) x 3 (time: baseline, and 3- and 6-month follow-up) mixed analysis of variance (ANOVA), with Greenhouse-Geisser correction used where sphericity could not be assumed. The standard $p < .05$ criterion was used for determining if main effects and interactions were significant. The interaction is critical to demonstrating an intervention effect (i.e., effect of time dependent on the intervention group). To follow up any significant interactions, the effect of time within each group was assessed using one-way repeated measures ANOVAs. Any significant effects of time were then followed up using Bonferroni-corrected pairwise comparisons (i.e., baseline vs 3-month, baseline vs 6-month, 3-month vs 6-month follow-up). The *p*-values were automatically adjusted during analyses to account for the number of comparisons. Given the pilot nature of this study, however, the statistical results are to be treated as preliminary and exploratory, and interpreted with caution. Rather, the effect sizes of time within each group (i.e., Cohen's *d* for baseline vs 3-months, and baseline vs 6-months) will therefore be emphasised. Cohen's *d* was calculated as in Equation 3 below, where *M* = mean and *S* = standard deviation of either group.

$$Cohen's\ d = M_{diff} / \sqrt{[(S_1^2 + S_2^2)/2]}$$

We used Cohen's (1962) categorisation of effect size in which a value of .2 is considered small, .5 is medium, and .8 or more is large.

Measures taken at baseline and 6-month follow-up only (i.e., personality) were analysed using a 2 (group: intervention versus control) x 2 (time: baseline and 6-month follow-up) mixed ANOVA. To follow up any significant interactions, the effect of time within each group was assessed using paired t-tests.

Assessment of the strength of evidence. In addition to frequentist analyses, Bayes Factors (*BF*s) were also reported in this study. This allowed us to determine the strength of the evidence for the null versus alternative hypotheses (van den Bergh et al., 2020). Inclusion Bayesian Factors (BF_{incl}) estimating the strength of evidence for the inclusion of the main and interaction effects in the model were calculated for ANOVA effects. The interpretation of *BF*s was based on the classification proposed by Jeffreys (1961) and modified by Lee and Wagenmakers (2013). That is, a *BF* of 1-3 indicates weak or anecdotal evidence for the effect, 3-10 indicates moderate evidence, and *BF* > 10 indicates strong evidence.

Associations between volunteer exposure and study outcomes. Pearson correlation analyses were used to assess the presence of a linear relationship between volunteer exposure (i.e., number of cumulative hours of engagement) and all outcomes under investigation. Raw difference scores were calculated for each outcome for baseline vs 3-month and baseline vs 6-month follow-ups, and then correlated with engagement exposure (volunteer hours).

4.3.4 Data exclusion

Data points were retained for all measures as far as possible. For example, one of the participants withdrew from the school-based programme before completing the full six months of engagement, but agreed to complete all the required assessments, therefore their data were retained. Also, the whole data set was checked for outliers that were identified visually based on graphical analysis using boxplots. However, given the pilot nature of this work and the associated small sample size, outliers and extreme cases were

noted but not removed from the main analyses. To ensure they did not affect the results, the ANOVAs were re-run for the reduced data set where outliers and extreme outliers were identified (see Section 4.4.5).

4.3.5 Missing data

It is important to note that while the majority of the dataset is complete, the cognitive data are missing for the 6-month follow-up for 13 participants (belonging to Cohort 3). This was unavoidable and was a result of the discontinuation of face-to-face testing due to the COVID-19 pandemic (with testing having been due in March-April 2020, and the first UK lockdown starting in March 2020). However, for these participants we were able to collect the social and health and wellbeing data via postal survey.

4.4 Results

4.4.1 Participant baseline characteristics

In total, 36 participants aged between 60 and 80 years (*M* = 66.61; *SD* = 5.12) completed baseline testing and were randomised (using a sealed envelope method; see section 3.4.2) to either the intervention (n = 18) or control/wait-list (n = 18) group (Table 4.1; note, two volunteers who dropped out after the baseline testing are not included in the baseline comparison). The sample consisted of 29 females and 7 males, 52.8% of whom were married. The participants' ethnicity was primarily White British (94.4%). This reflects the 60+ population living in the local authority (98%; Scotland's Census, 2011) and is similar to the ethnic background of the primary school pupils (82% of those pupils are White British; Scottish Government, 2018) and primary school teachers (91%; Teacher Census, 2018). Participants had between 0-5 children (*M* = 1.97; *SD* = 1.08) and 0-7 grandchildren (*M* = 2.58; *SD* = 2.7). All participants completed primary and high school education, and the majority of them reported completing higher/further education (N = 33). Most participants were retired but one was in part-time employment and 11 had other volunteering jobs (not involving intergenerational engagement).

When asked about their previous experience of working in the school environment, 52.8% reported none, 27.8% reported teaching in schools, and 19.4% reported other non-teaching experience (e.g., administrative and catering roles)

Table 4.1

Demographic and Baseline Characteristics by Intervention Status.

Demographic characteristics	Control group (n = 18)	Intervention group (n = 18)	*p* (χ^2 or *t*)	Full sample (n = 36)
Age, *M (SD)*	67.89 (5.18)	65.33 (4.88)	.137 (-1.53)	66.61 (5.12)
Gender n (*%)*:			.206 (1.60)	
female	13 (72.22)	16 (88.89)		29 (80.56)
male	5 (27.78)	2 (11.11)		7 (19.44)
Ethnic Background, n (%):			.446 (2.67)	
White Scottish	14 (77.78)	14 (77.78)		28 (77.78)
White English	4 (22.22)	2 (11.10)		6 (16.66)
White Irish	-	1 (5.56)		1 (2.78)
Indian	-	1 (5.56)		1 (2.78)
Marital status, n (%)			.252 (4.09)	
married	7 (38.89)	12 (66.67)		19 (52.78)
widowed	3 (16.66)	3 (16.67)		6 (16.67)
divorced	7 (38.89)	2 (11.10)		9 (25.00)
single	1 (5.56)	1 (5.56)		2 (5.55)
Years of education, *M (SD*):				
Primary School	6.78 (0.55)	6.94 (0.64)	.407 (0.84)	6.86 (0.59)
High school	4.89 (1.41)	5.44 (1.04)	.188 (1.35)	5.17 (1.25)
Further/Higher	3.39 (2.09)	4.67 (1.85)	.060 (1.94)	4.03 (2.05)
Total	15.06 (3.28)	17.06 (1.98)	.034 (-2.21)	16.06 (2.86)
Employment status, n (*%)*:			.310 (1.03)	
retired	18 (100.00)	17 (94.44)		35 (97.22)
in employment	-	1 (5.56)		1 (2.78)
Age of Retirement, *M (SD)*	62.44 (4.79)	58.78 (5.58)	.042 (-2.12)	60.61 (5.45)
Number of children, *M (SD)*	2.06 (0.94)	1.89 (1.23)	.651 (-0.46)	1.97 (1.08)
Number of grandchildren, *M (SD)*	2.94 (2.13)	2.22 (2.42)	.348 (-0.95)	2.58 (2.27)
Other Volunteering Engagement, n (*%)*	7 (38.9)	4 (22.22)	.278 (1.18)	11 (30.56)
Previous experience of working in the school environment, n (%):			.095 (2.79)	
Teaching Staff	2 (11.11)	8 (44.44)		10 (27.78)
Other	4 (22.2)	3 (16.67)		7 (19.44)
None	12 (66.70)	7 (38.89)		19 (52.78)

Baseline characteristics	Control group (n = 18)	Intervention group (n = 18)	Full sample (n = 36)	*p* (χ^2 or *t*)
Self-rated health, n (%):				.631 (1.73)
Excellent	4 (22.22)	3 (16.67)	7 (19.44)	
Very good	8 (44.44)	11 (61.11)	19 (52.78)	
Good	5 (27.78)	4 (22.22)	9 (25.00)	
Fair	1 (5.56)	-	1 (2.78)	
Alcohol intake (units per week), *M (SD)*	4.22 (4.98)	4.70 (5.22)	4.44 (5.05)	.775 (0.29)
Smoking, *n (%)*	0	0	0	
MMSE score, *M (SD)*	29.72 (0.58)	29.28 (0.83)	29.50 (0.74)	.070 (-1.87)
NART score*, *M (SD)*	118.56 (4.36)	119.22 (4.76)	118.89 (4.51)	.664 (0.44)
IADL score, *M (SD)*	7.94 (0.24)	7.89 (0.47)	7.92 (0.37)	.658 (-0.45)

Note: MMSE - Mini-Mental State Examination; NART - National Adult Reading Test; IADL – Instrumental Activities of Daily Living. * Estimated Full Scale IQ score.

Participants were generally healthy and independent, with the majority of them reporting good health or better. In terms of cognitive status, their MMSE scores ranged between 27 and 30 suggesting no cognitive impairment. The sample had above average intelligence, with estimated full-scale IQ scores ranging between 105 and 127.

No group differences were found on most of the demographic and baseline characteristics, except for total years of education (p = .034), with the intervention group having more years of education compared to the control group; and age of retirement (p = .042), with the intervention group retiring slightly earlier than the controls. Baseline comparisons of the core outcome measures were also conducted to test for any potential group differences at the outset of the study (see Appendix R). No group differences were found for any of the cognitive (all p > .094), health and wellbeing (all p > .052), and social outcomes (all p > .079).

4.4.2 Cognitive outcomes

A total of 21 participants (i.e., Cohort 1 and 2; see section 3.4.1), including 10 from the intervention group and 11 controls, completed all three waves of cognitive assessments (Table 4.2). As specified earlier, the final wave of cognitive data collection for Cohort 3 had to be abandoned due to the COVID-19 pandemic. Therefore, main effects of group and time, and their interaction, for 36 participants (all three cohorts) who completed baseline and 3-month follow-up will additionally be described and graphically presented (Appendix S). Baseline comparisons for the reduced sample were conducted showing a significant group difference in working memory only (p = .023).

Cognitive performance over time– baseline vs 3- and 6-month follow-up

A series of 2 x 3 repeated measures ANOVAs were used to test for main effects of group and time, as well as the crucial group x time interactions, first on the smaller sample that had completed all three waves of testing (Table 4.2).

No significant effects were found for executive function (all p > .087, BF = < 1.24) or speed of processing (all p > .058, BF < 1.56).

Table 4.2

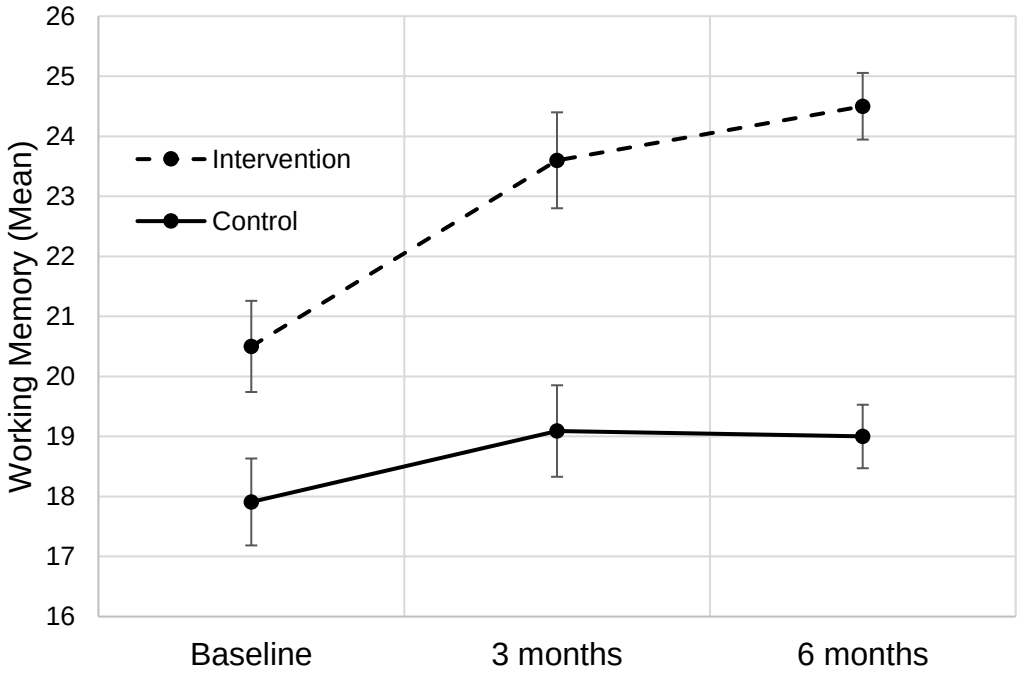
Cognitive function from baseline to 3-month and 6-month follow-up across intervention and control groups.

Outcome	Control (n = 11)			Intervention (n = 10)			Main effect		Interaction
	Baseline	3 months	6 months	Baseline	3 months	6 months	Group	Time	Group x Time
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)		*p (F)*	
Executive function	7.30 (0.80)	7.18 (1.08)	7.22 (1.17)	7.67 (0.79)	7.96 (0.47)	7.75 (0.62)	.087 (3.26)	.883 (0.13)	.556 (0.60)
Processing speed	38.36 (8.38)	37.45 (8.89)	38.18 (7.24)	43.40 (5.91)	44.10 (8.48)	44.70 (6.60)	.058 (4.08)	.862 (0.15)	.792 (0.24)
Working memory	17.91 (2.59)	19.09 (3.18)	19.00 (2.28)	20.50 (2.17)	23.60 (1.51)	24.50 (0.85)	**< .001 (11.37)**	**< .001 (33.31)**	**.047 (3.32)**
Episodic memory	10.27 (4.27)	12.36 (4.57)	10.18 (6.63)	9.40 (5.58)	17.20 (9.31)	18.20 (8.69)	.112 (2.78)	**.003 (6.79)**	**.015 (4.72)**
Auditory Verbal Learning	28.55 (3.96)	28.36 (3.93)	25.82 (3.97)	29.00 (5.56)	34.20 (3.77)	38.90 (3.93)	**< .001 (18.52)**	**.001 (7.91)**	**< .001 (23.43)**

For working memory, significant main effects of time, $F(1, 19) = 33.31$, $p < .001$, $\eta_p^2 = .374$, $BF = 1086$, and group, $F(2, 38) = 11.37$, $p < .001$, $\eta_p^2 = .637$, $BF = 119$, were detected. There was also a significant interaction between group and time, $F(2, 38) = 3.32$, $p = .047$, $\eta_p^2 = .149$, $BF = 1.64$ (Figure 4.1).

Figure 4.1

Mean working memory scores (± SE) for the intervention (n = 10) and control (n = 11) groups at baseline and 3- and 6-month follow-ups.



To follow up the significant difference found between groups for this measure at baseline when n=21 (reduced sample size), independent samples t-tests were conducted to compare the intervention and control groups at the 3- and 6-month time-points. In addition to the baseline difference noted earlier, the significant effect of group was found at both 3-month follow-up, $t(15) = 4.216$, $p<.001$, and 6-month follow-up, $t(13) = 7.450$, $p <.001$.

To follow up this significant interaction, the effect of time within each group was assessed using one-way repeated measures ANOVAs (as detailed in

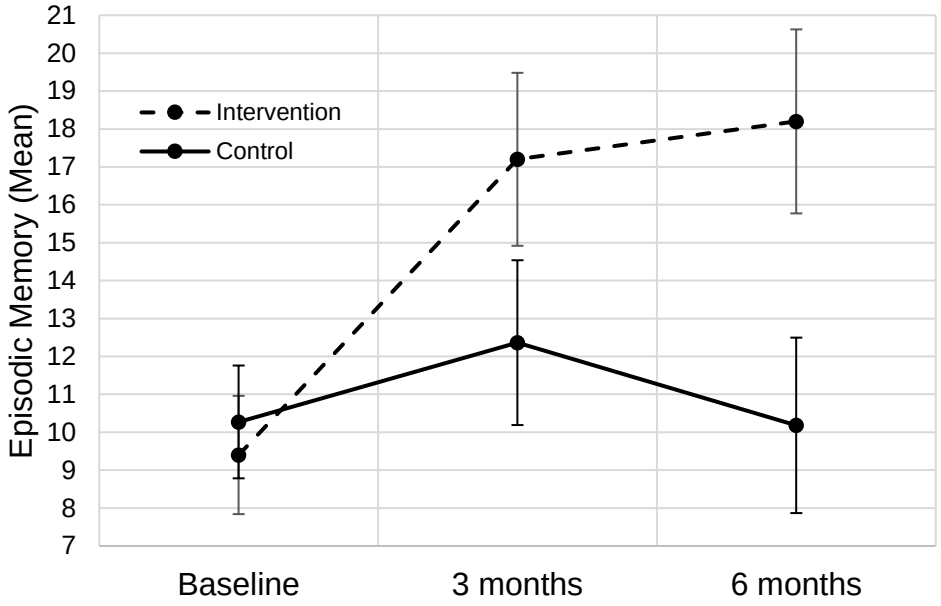
section 4.3.3). The effect of time was found to be significant within the intervention group, $F(2, 18) = 18.04$, $p < .001$, $\eta_p^2 = .667$, $BF = 4915$. Bonferroni-corrected pairwise comparisons confirmed a significant increase between baseline and 3-month follow-up, $t(10) = -3.83$, $p = .012$, $d = 1.66$, and baseline and 6-month follow-up, $t(10) = -5.367$, $p = .001$, $d = 2.42$ (see Figure 4.1), but there was no difference between 3- and 6-month follow-up ($p = .324$). No significant effect of time was found in the control group ($p = .355$). Note, however, with this sample, the Bayesian evidence for the interaction effect in working memory was weak.

Due to the significant baseline difference, secondary analyses were conducted in order to control for baseline score as a covariate. Analyses of Covariance (ANCOVA) was used to examine the difference between the control and intervention groups at 3- and 6-month follow-up. This alternative analytical approach did not affect the findings. The group differences at the 3- and 6-month follow-ups for working memory were consistent with that from the 2x3 repeated measures ANOVAs ($p < .001$). The estimated marginal mean (EEM) for the intervention group was 23.35 ($SD = .87$) at 3 months and 24.22 ($SD = .59$) at 6 months, whereas for the control group EMM = 19.32 ($SD = .83$) and EMM = 19.25 ($SD = .56$) at 3- and 6-month follow-up, respectively.

Regarding episodic memory, a significant main effect of time was detected, $F(2, 38) = 6.79$, $p = .003$, $\eta_p^2 = .263$, $BF = 5.66$, and no main effect of group ($p = .112$, $BF = 1.04$). However, there was a significant interaction between group and time, $F(2, 38) = 4.72$, $p = .015$, $\eta_p^2 = .199$, $BF = 3.75$ (Figure 4.2).

Figure 4.2

Mean episodic memory scores (± SE) for the intervention (n= 10) and control (n = 11) groups between baseline, 3- and 6-month follow-ups.

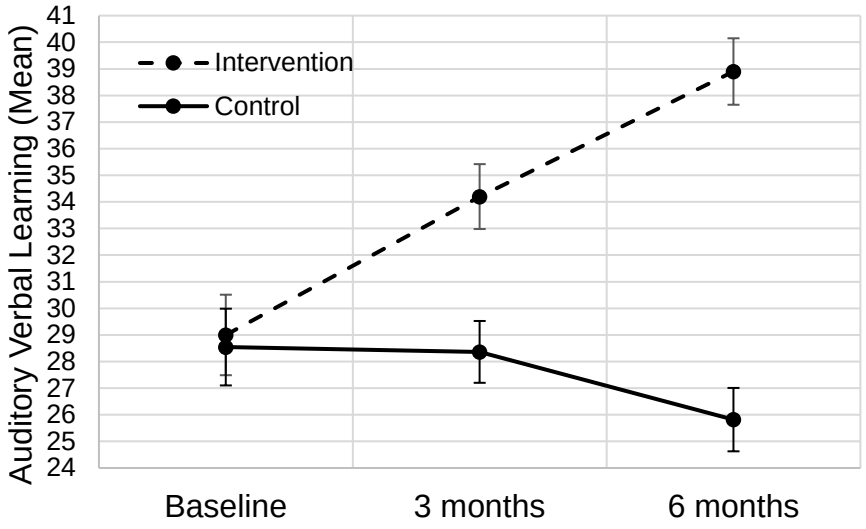


To follow up, the positive effect of time within the intervention group was significant, $F(2, 18) = 11.77$, $p < .001$, $\eta_p^2 = .567$, $BF = 53$. Bonferroni-corrected pairwise comparisons confirmed a significant increase between baseline and 3-month follow-up, $t(10) = -4.33$, $p = .006$, $d = 1.02$, and baseline and 6-month follow-up, $t(10) = -3.72$, $p = .014$, $d = 1.21$, but there was no difference between 3- and 6-month follow-ups ($p = 1.00$). No significant effect of time was found in the control group ($p = .523$; Figure 4.2).

Finally, for auditory verbal learning, significant main effects of time, $F(2, 38) = 7.91$, $p < .001$, $\eta_p^2 = .294$, $BF = 1.45$, and group, $F(1, 19) = 18.52$, $p < .001$, $\eta_p^2 = .494$, $BF = 52$, were detected. There was also a significant interaction between group and time, $F(2, 38) = 23.43$, $p < .001$, $\eta_p^2 = .552$, $BF > 10{,}000$ (Figure 4.3).

Figure 4.3

Mean auditory verbal learning scores (± SE) for the intervention (n= 10) and control (n = 11) groups between baseline, 3- and 6-month follow-ups.



To follow up, a significant positive effect of time was found within the intervention group, $F(2, 18) = 21.07$, $p < .001$, $\eta_p^2 = .701$, $BF = 2983$. Bonferroni-corrected pairwise comparisons confirmed a significant increase between baseline and 3-month follow-up, $t(10) = -3.03$, $p = .043$, $d = 1.01$, and baseline and 6-month follow-up, $t(10) = -5.71$, $p < .001$, $d = 2.06$, as well as between 3- and 6-month follow-up, $t(10) = -4.65$, $p = .004$, $d = 1.22$. A significant negative effect of time was found in the control group, $F(2, 20) = 3.89$, $p = .037$, $\eta p^2 = .280$, $BF = 2.01$. However, in this case, Bonferroni-corrected pairwise comparisons confirmed a significant decrease between baseline and 6-month follow-up, $t(10) = 3.96$, $p = .008$, $d = - .69$. There was no difference between baseline and 3-month follow-up ($p = 1.00$) and between 3- and 6-month follow-up ($p = .205$; Figure 4.3).

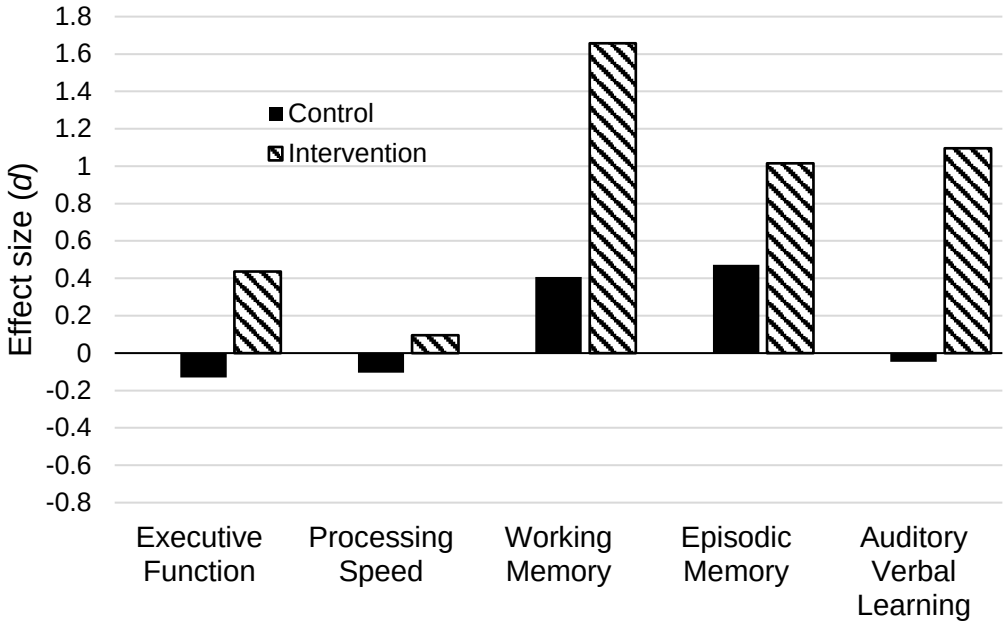
Figure 4.4 presents the effect sizes (Cohen's *d*) of 3 and 6 months relative to baseline for both the control and intervention groups. Note, a positive value reflects improvement over time. Large effect sizes were detected for episodic

memory and auditory verbal learning at both 3 and 6 months, as well as medium effect sizes for executive function, but only at 3 months and a small effect for processing speed, but only at 6 months. Although a large effect size in working memory was detected at both time points and the interaction was statistically significant, bear in mind that the Bayesian evidence for the interaction effect in working memory was weak.

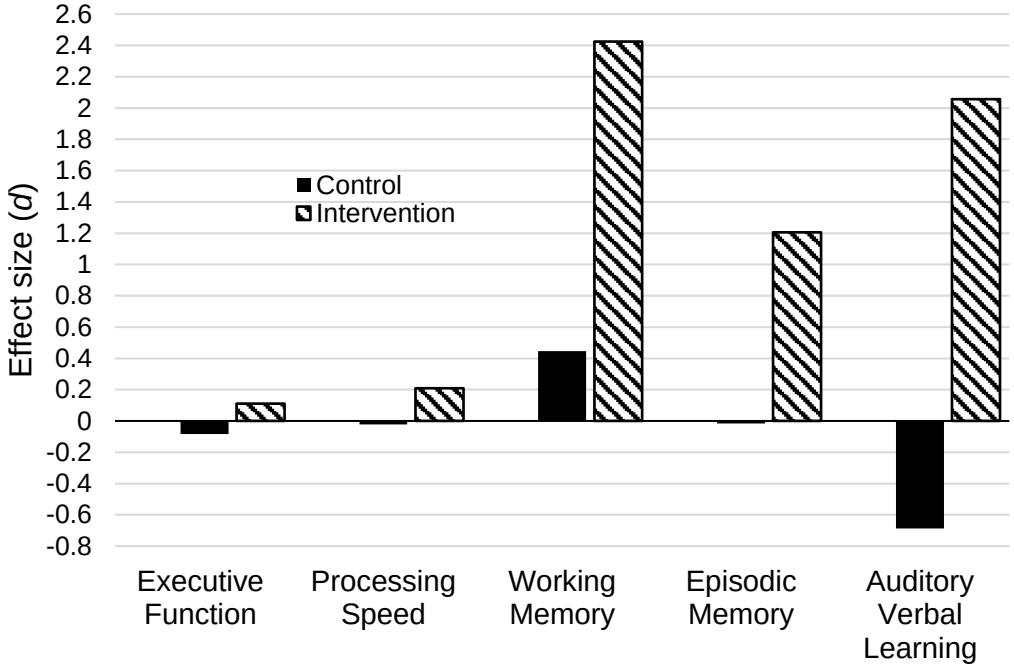
Figure 4.4

Effect sizes of mean differences between baseline and 3-month follow-up (A) and between baseline and 6-month follow-up (B) in cognitive performance for the intervention (n = 10) and control (n = 11) groups for the cognitive tasks.

A



B



Cognitive performance over time – baseline vs 3-month follow-up

A series of 2 x 2 repeated measures ANOVAs were used to assess effects within the entire participant sample that completed the first two waves of cognitive assessment (n = 36, i.e., including Cohort 3; see Appendix S). Overall, the same pattern of effects was found using the full sample (n = 38) and comparing only baseline with 3-month follow-up, as was found for the smaller sample (n = 21) that completed all three waves of cognitive assessment (see Appendix S). However, in this set of analyses an additional interaction was detected for executive function, $F(1, 34) = 5.57$, $p = .024$, $\eta_p^2 = .141$, $BF = 2.71$. However, note that the BF suggests weak evidence for the interaction effect. To follow up the interaction, a significant positive effect of time was found in the intervention group: $t(17) = -2.74$, $p = .014$, $d = .51$, but no significant effect of time was detected for the control group ($p = .325$).

In summary, regarding cognitive outcomes, this pilot RCT highlights the potential for positive cognitive change resulting from engagement in a moderate-exposure school-based programme. Specifically, considering all the analyses above, executive function, working memory, episodic memory, and auditory verbal learning (i.e., immediate recall) all showed benefits. Large effect sizes were detected for working memory, episodic memory, and auditory verbal learning at both 3- and 6-month follow-ups, and a small-medium effect size for executive function at 3 months when considering the entire participant sample. In this sample, these potential benefits of engagement tended to be observed at 3 months and were maintained at 6 months. However, although the large effect size in working memory was detected, the Bayesian evidence for the interaction effect in working memory was weak.

4.4.3 Health and wellbeing outcomes

A total of 34 participants (i.e., Cohort 1, 2 and 3), including 16 from the intervention group and 18 controls, completed all three waves of health and wellbeing assessments (Table 4.3).

Table 4.3

Health and wellbeing from baseline to 3-month and 6-month follow up across intervention and control groups.

Outcome	Control (n=18)			Intervention (n=16)			Main effect		Interaction
	Baseline	3 months	6 months	Baseline	3 months	6 months	Group	Time	Group x Time
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)		*p* (*F*)	
Depression	1.94 (2.98)	2.39 (2.99)	2.11 (2.45)	1.50 (2.83)	1.06 (1.53)	1.19 (1.68)	.229 (1.50)	.976 (.02)	.532 (.64)
Life satisfaction	52.83 (9.79)	51.83 (10.16)	53.44 (11.47)	52.38 (11.80)	56.31 (8.32)	56.31 (8.09)	.461 (.56)	.247 (1.43)	.197 (1.71)
Loneliness	34.89 (11.64)	34.50 (11.40)	35.06 (11.13)	33.44 (12.21)	27.88 (8.30)	27.00 (5.76)	.103 (2.81)	.052 (3.35)	.057 (3.25)
Physical Activity - Total	2420 (1883)	2351 (2667)	2045 (1761)	3235 (3905)	4558 (4969)	4842 (8523)	129 (2.43)	.567 (.42)	.388 (.85)
Vigorous PA	876 (1168)	922 (2066)	680 (1032)	600 (1105)	780 (1274)	542 (979)	.592 (.29)	.605 (.41)	.916 (.04)
Moderate PA	449 (689)	315 (351)	280 (467)	255 (448)	358 (597)	1380 (5011)	.476 (.52)	.411 (.71)	.313 (1.06)
Walking	1095 (817)	1114 (1060)	1085 (851)	2403 (2628)	3420 (3745)	2919 (4175)	**.025 (5.50)**	.317 (1.12)	.338 (1.04)
Sitting	30.97 (11.28)	35.00 (31.03)	37.22 (15.07)	32.66 (18.79)	26.56 (17.10)	30.78 (17.48)	.375 (.81)	.292 (1.26)	**.042 (3.33)**
Sleep Quality - Total	4.83 (3.03)	5.44 (3.11)	5.67 (3.50)	4.56 (2.68)	4.31 (2.44)	4.13 (2.73)	.30 (1.11)	.821 (.20)	.185 (1.73)
Subjective SQ	0.89 (0.68)	1.00 (0.69)	0.94 (0.73)	0.87 (0.81)	1.00 (0.89)	0.87 (0.72)	.907 (.014)	.407 (.91)	.922 (.08)
Sleep latency	1.06 (1.06)	1.06 (0.10)	1.22 (1.06)	0.69 (0.60)	0.50 (0.52)	0.56 (0.51)	**.046 (4.33)**	.607 (.50)	.482 (.74)
Sleep duration	0.67 (0.77)	0.67 (0.69)	0.72 (0.90)	0.56 (0.63)	0.56 (0.73)	0.75 (0.93)	.773 (.08)	.638 (.45)	.875 (.13)
Habitual sleep efficiency	0.44 (0.62)	0.61 (0.92)	0.61 (0.85)	0.69 (1.08)	0.69 (0.70)	0.69 (1.01)	.595 (.29)	.814 (.21)	.814 (.21)
Sleep disturbance	1.06 (0.42)	1.33 (0.59)	1.33 (0.59)	1.13 (0.62)	1.13 (0.62)	0.94 (0.57)	.280 (1.21)	.344 (1.09)	.059 (2.96)
Use of sleep medication	0.11 (0.32)	0.22 (0.65)	0.22 (0.43)	0.00 (0.00)	0.13 (0.34)	0.06 (0.25)	.251 (1.37)	.250 (1.42)	.848 (.10)
Daytime dysfunction	0.61 (0.50)	0.50 (0.51)	0.61 (0.70)	0.63 (0.72)	0.31 (0.48)	0.25 (0.45)	.320 (1.02)	**.010 (4.94)**	**.046 (3.24)**

Health and wellbeing over time - baseline versus 3- and 6-month follow-ups

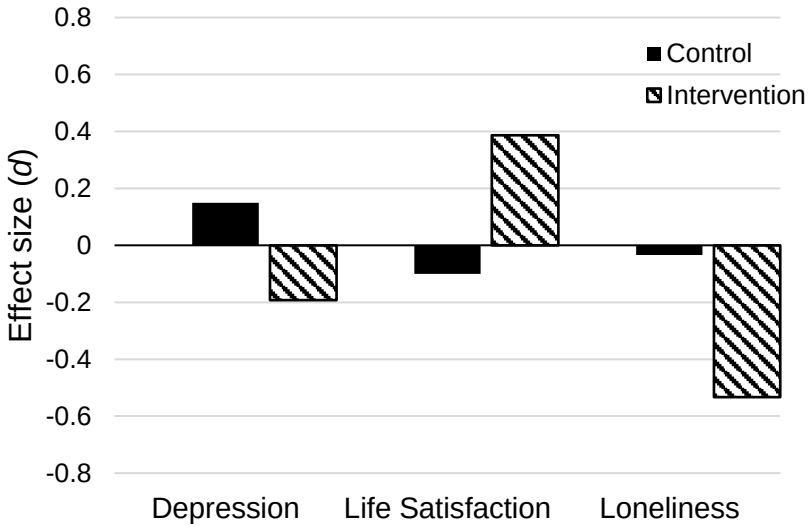
No significant main effects or group x time interactions were found on depression (all $p > .22$; $BF = 0.23$), loneliness (all $p > .05$; $BF = 1.44$), or life satisfaction (all $p > .19$; $BF = 0.51$) (see Table 4.3).

Figure 4.5 presents the effect sizes in these measures, for 3- and 6- months relative to baseline for both groups. Small to medium effect sizes were observed for depression and life satisfaction, where positive change in life satisfaction was indicated by a more positive effect size and in depression by a more negative effect size. Those results are consistent with the evidence regarding the interaction effects presented above. However, although no significant effect was found for loneliness ($p = .057$), this exhibited a medium effect size at both 3 ($d = -.53$) and 6 months ($d = -.67$) for the intervention group.

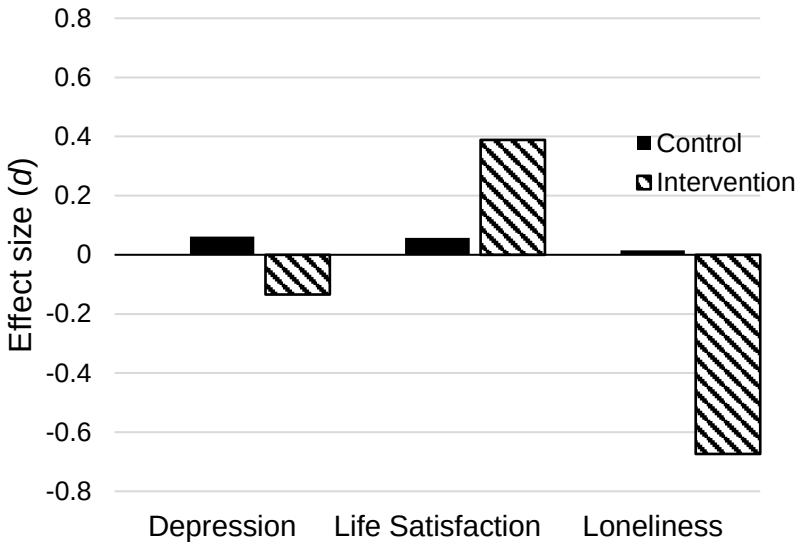
Figure 4.5

Effect sizes of mean differences in depression, life satisfaction, loneliness between baseline and 3-month follow-up (A), and between baseline and 6-month follow-up (B), for the intervention and control groups.

A



B



Regarding physical activity, a significant main effect of group, $F(1, 32) = 5.50$, $p = .025$, $\eta_p^2 = .147$, $BF = 2.59$, was found for walking, in which the mean score for the intervention group ($M = 2914$; $SD = 3178$) was significantly higher than that of the control group ($M = 1098$; $SD = 808$), $t(17) = -2.22$, $p = .040$. More importantly, a significant interaction between group and time was found for hours spent sitting, $F(2, 64) = 3.33$, $p = .042$, $\eta_p^2 = .094$, $BF = 1.67$ (Figure 4.6). However, when following up this interaction, no significant effect of time was detected within either the intervention group, $F(2, 30) = 2.31$, $p = .116$, $\eta_p^2 = .134$, $BF = 0.75$, or the control group, $F(2, 34) = 2.32$, $p = .114$, $\eta_p^2 = .120$, $BF = 0.72$. Note also that the Bayesian evidence for the interaction effect was weak. There were no other significant effects on any of the remaining physical activity measures (all $p > .12$, all $BF < .89$).

Figure 4.6

Mean scores of hours spent sitting (± SE) for the intervention (n =16) and control (n = 18) groups between baseline and 3- and 6-month follow-ups.

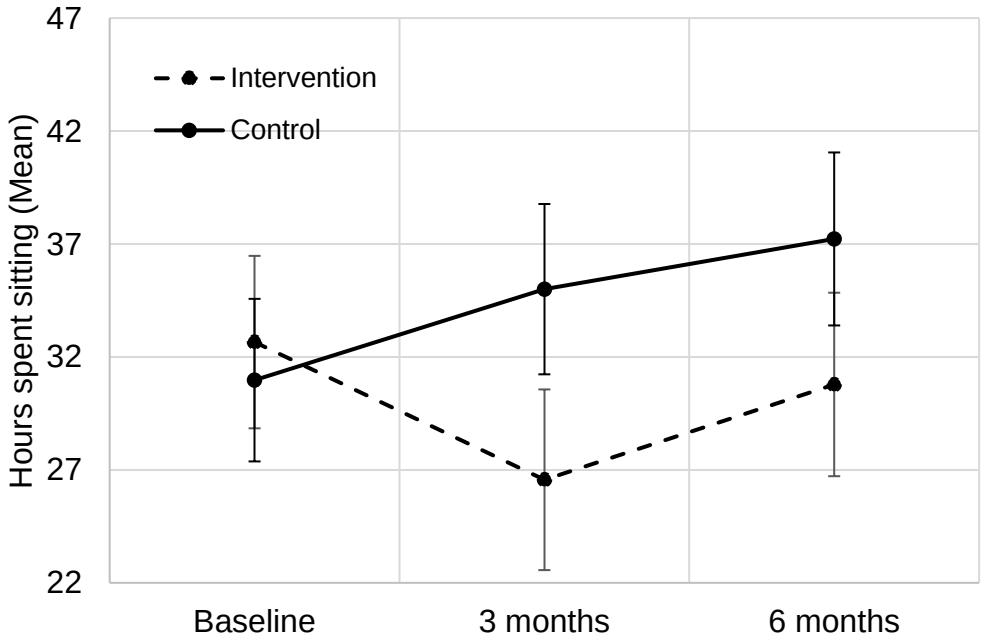
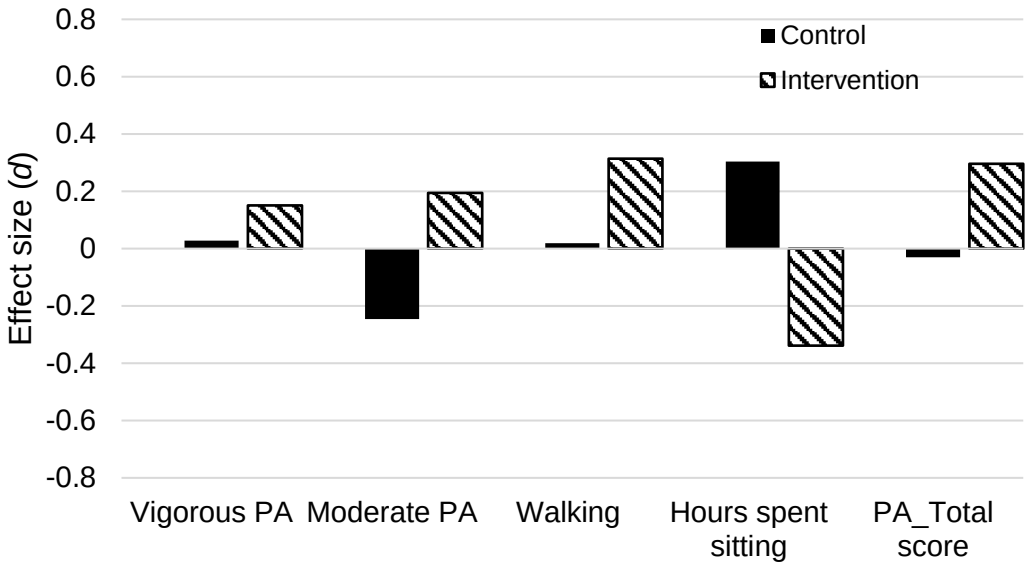


Figure 4.7 presents the effect sizes for physical activity of 3- and 6- months relative to baseline for both groups. Positive values reflect positive changes in all but sitting measure. The small effect sizes were detected for moderate PA, vigorous PA, and walking at both follow-ups, but they appear more consistent at 3 months. However, indeed there are no significant interactions important to point out, consistent with the evidence for the interaction effects presented in Table 4. 3. Also, the significant interaction effect found for hours spent sitting (p = .042) is reflected in a medium effect size at 6 months (d = .47) for the control group.

Figure 4.7

Effect sizes of mean differences in physical activity between baseline and 3-month follow-up (A), and between baseline and 6-month follow-up (B), for the intervention and control groups.

A

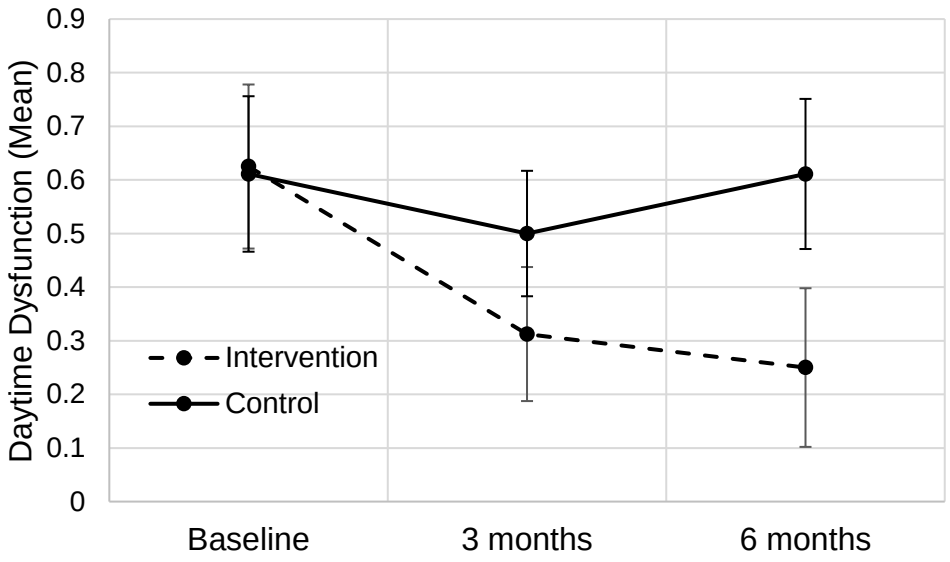


B

Regarding the sleep measures, a significant main effect of group, $F(1, 32) = 4.33$; $p = .046$, $\eta_p^2 = .119$, $BF = 1.75$, was detected for sleep latency (i.e., time taken to fall asleep), in which the mean score for the intervention group ($M = 0.6$; $SD = 0.4$) was significantly lower than that of the control group ($M = 1.1$; $SD = 0.9$), $t(24) = 2.17$, $p = .040$. For daytime dysfunction (i.e., inability to stay alert/awake to carry out daily functions and engage in social activity), a significant main effect of time, $F(2, 64) = 4.94$; $p = .010$, $\eta_p^2 = .134$, $BF = 2.54$, but no effect of group was ($p = .32$, $BF = .064$) found. There was a significant time x group interaction detected, $F(2, 64) = 3.24$; $p = .046$, $\eta_p^2 = .092$, $BF = 1.47$ (Figure 4.8). Note, however, the Bayesian evidence for the interaction effect was weak.

Figure 4.8

Mean daytime dysfunction scores (± SE) for the intervention (n = 16) and control (n = 18) groups between baseline, 3- and 6-month follow-ups.



To follow up the interaction, a significant effect of time was found in the intervention group, $F(2, 30) = 7.15$, $p = .008$, $\eta p^2 = .323$, $BF = 13.07$.

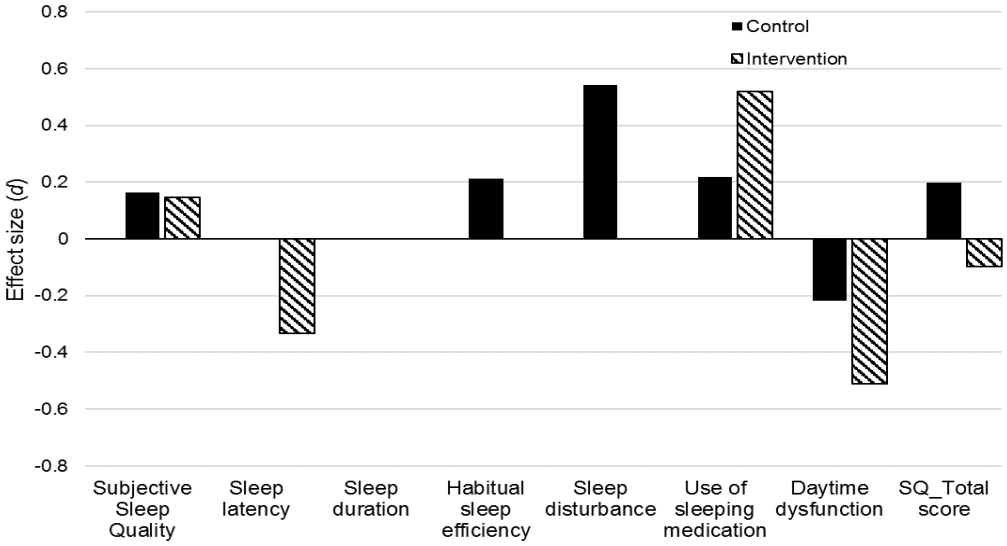
Bonferroni-corrected pairwise comparisons confirmed a significant decrease between baseline and 6-month follow-up in the intervention group, $t(16) = 3.00$, $p = .027$, $d = -.626$, but there were no differences between baseline and 3-month follow-up ($p > .059$), or between the 3- and 6-month follow-ups ($p = 1.00$). No significant effect of time was found in the control group ($p = .462$). There were no significant effects in any of the remaining sleep measures (all $p > .059$, all $BF < .54$).

Figure 4.9 presents the effect sizes in sleep quality measures of 3- and 6-months relative to baseline for each group. Small effect sizes that were detected for most of the sleep quality domains, as well as the general score of sleep quality (all $d < .35$) are consistent with the evidence for the non-significant interaction effects presented in Table 4.3. However, although there are medium effect sizes in sleep disturbance for the control group and daytime dysfunction for the intervention group at the 3- and 6-month follow-ups, the Bayesian evidence for the interaction effect was weak. In addition, although no significant effects were demonstrated in the use of sleeping medication, the domain exhibited a medium effect ($d = .52$) at 3-month follow-up for the intervention.

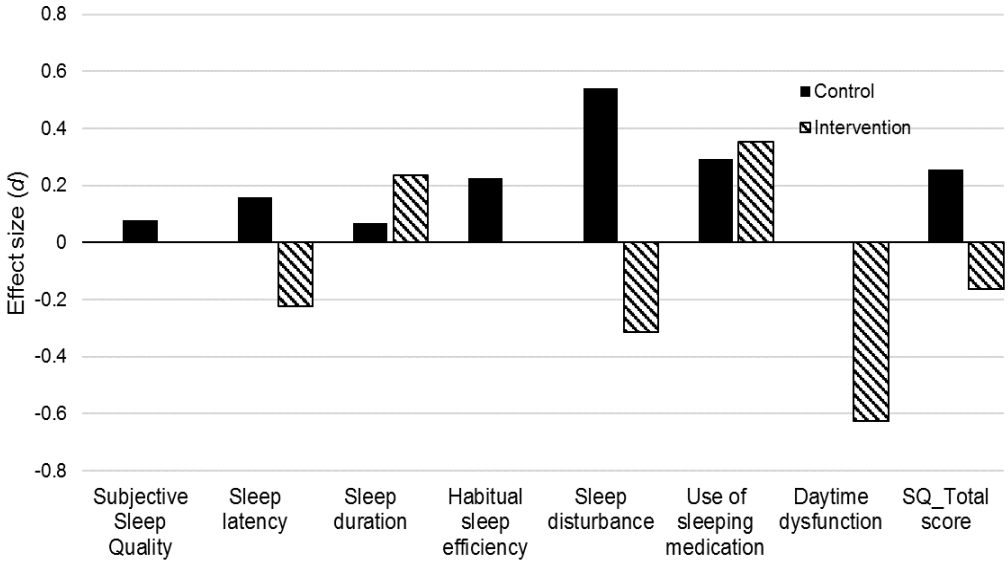
Figure 4.9

Effect sizes of mean differences in sleep quality between baseline and 3-month follow-up (A), and between baseline and 6-month follow-up (B), for the intervention and control groups.

A



B



Note. Effect sizes of a value *d* = .00 for some comparisons are not visible.

In summary, regarding health and wellbeing outcomes, this pilot RCT demonstrated the potential for preventing sedentary behaviour and improving daytime functioning in older adult volunteers. Specifically, significant interaction effects were found in the hours spent sitting and daytime sleep-related dysfunction (i.e., the ability to stay awake, engage in social activities, enthusiasm to get things done). A medium positive effect size (i.e., increase) in the hours spent sitting was detected at 6 months for the control group and a medium negative effect size in daytime dysfunction was detected at both 3- and 6-month follow-ups for the intervention group. For sitting, possible reduction at 3 months and no increase at 6 months were observed for the intervention group, but the pattern was not reliable. The benefits of engagement in daytime functioning were reliably observed at 6 months, but no effect of time was found in the hours spent sitting.

4.4.4 Social function and personality outcomes

A total of 34 participants, including 16 from the intervention group and 18 controls, completed all three waves of social and personality assessments (Table 4.4).

Table 4.4

Social function and personality from baseline to 3-month and 6-month follow up across intervention and control groups.

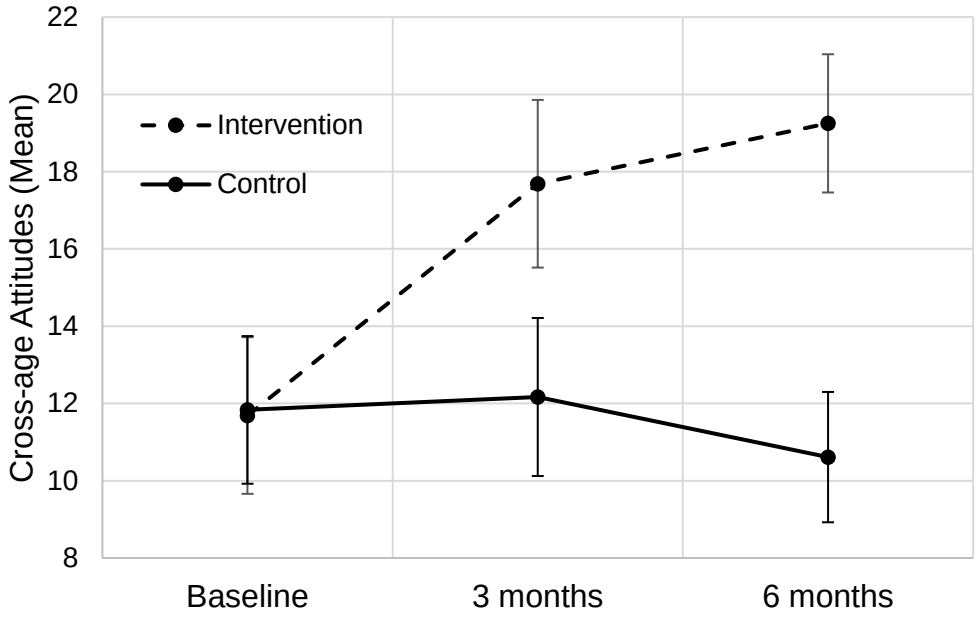
	Control (n = 18)			Intervention (n = 16)			Main effect		Interaction
Outcome	Baseline	3 months	6 months	Baseline	3 months	6 months	Group	Time	Group x Time
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)		*p* (*F*)	
Cross-age attitudes- Total	11.83 (8.72)	12.17 (8.68)	10.61 (8.60)	11.69 (7.36)	17.69 (8.68)	19.25 (5.05)	.051 (4.10)	**.023 (3.99)**	**.004 (5.91)**
skilful - clumsy	1.11 (0.83)	1.06 (0.10)	1.00 (0.91)	0.94 (1.18)	1.19 (1.11)	1.50 (1.16)	.569 (.33)	.495 (.62)	.257 (1.38)
independent -dependent	0.22 (1.35)	0.22 (1.22)	0.50 (1.20)	0.19 (1.52)	1.00 (1.41)	0.81 (1.38)	.319 (1.02)	.177 (1.78)	.309 (1.20)
mentally alert -lazy	1.28 (1.18)	1.33 (0.91)	1.28 (0.90)	1.31 (1.30)	1.25 (1.57)	1.31 (1.25)	.989 (.00)	.999 (.00)	.928 (.05)
helpful-unhelpful	1.06 (1.06)	1.33 (1.14)	1.06 (1.00)	1.56 (0.96)	1.81 (0.91)	2.13 (0.62)	**.019 (6.14)**	.153 (1.93)	.124 (2.16)
active - passive	1.39 (1.34)	1.33 (1.19)	1.06 (1.16)	1.25 (1.39)	2.00 (1.27)	2.31 (0.87)	.071 (3.50)	.224 (1.55)	**.023 (4.49)**
friendly - unfriendly	1.56 (1.15)	1.61 (1.24)	1.22 (1.26)	1.87 (0.89)	2.31 (0.79)	2.62 (0.62)	**.009 (7.85)**	.344 (1.09)	**.013 (4.65)**
happy - sad	1.33 (1.09)	1.33 (1.09)	1.17 (1.04)	1.00 (0.97)	1.75 (1.00)	1.94 (1.00)	.292 (1.15)	.107 (2.32)	**.027 (3.82)**
likeable - unlikeable	1.83 (1.10)	1.78 (1.22)	1.33 (1.14)	1.75 (1.29)	2.56 (0.81)	2.62 (0.62)	**.014 (6.73)**	.251 (1.41)	**.018 (4.77)**
generous - selfish	0.94 (1.21)	0.89 (1.37)	0.89 (0.96)	0.81 (1.17)	1.81 (1.05)	1.75 (0.78)	.079 (3.29)	**.036 (3.50)**	**.016 (4.40)**
kind - mean	1.17 (1.10)	1.33 (1.09)	1.11 (1.02)	1.00 (0.97)	1.94 (0.93)	2.19 (0.54)	.060 (3.79)	**.003 (6.46)**	**.004 (6.10)**
Generativity:									
Generative Desire	34.78 (3.41)	34.00 (4.74)	34.00 (3.57)	34.69 (4.08)	35.88 (4.59)	36.25 (3.36)	.262 (1.30)	.812 (.21)	.125 (2.15)
Generative Achievement	24.33 (5.14)	23.28 (6.09)	22.50 (5.99)	23.63 (5.88)	26.69 (6.12)	27.31 (3.38)	.113 (2.66)	.490 (.72)	**.016 (4.40)**
Personality:									
Extraversion	32.00 (10.28)	-	31.67 (10.04)	32.38 (8.55)	-	34.56 (8.04)	.595 (.29)	.366 (.84)	.222 (1.55)
Conscientiousness	37.50 (7.01)	-	38.39 (5.93)	41.38 (4.70)	-	39.63 (7.42)	.205 (1.68)	.649 (.21)	.169 (1.98)
Emotional Stability	36.11 (10.49)	-	34.17 (9.42)	34.19 (7.22)	-	34.88 (6.04)	.832 (.05)	.432 (.63)	.105 (2.78)
Agreeableness	43.78 (4.49)	-	43.50 (4.63)	44.00 (4.87)	-	45.56 (4.26)	.437 (.62)	.293 (1.14)	.136 (2.34)
Openness to Experience	39.17 (5.26)	-	38.22 (5.11)	39.50 (7.15)	-	38.81 (7.20)	.819 (.05)	.266 (1.28)	.860 (.03)

Social outcomes - baseline versus 3- and 6-month follow-ups

A significant main effect of time, $F(2, 64) = 3.99$, $p = .023$, $\eta_p^2 = .111$, $BF = 1.00$, but no main effect of group ($p = .051$, $BF = 1.61$) were detected for the total score of cross-age attitudes. More importantly, there was a significant interaction between group and time, $F(2, 64) = 5.91$, $p = .004$, $\eta_p^2 = .156$, $BF = 9.83$ (Figure 4.10).

Figure 4.10

Mean cross-age attitudes scores (± SE) for the intervention (n =16) and control (n = 18) groups between baseline, 3- and 6-month follow-ups.



To follow up, a significant positive effect of time was detected within the intervention group, $F(2, 30) = 7.54$, $p = .002$, $\eta p^2 = .335$, $BF = 24$. Bonferroni-corrected pairwise comparisons confirmed the significant differences between baseline and 3-month, $t(16) = -3.02$, $p = .026$, $d = .75$, as well as between baseline and 6-month follow-up, $t(16) = -3.44$, $p = .011$, $d = 1.20$, but there was no change between 3- and 6-month follow-up ($p = 1.00$). No effect of time was found in the control group ($p = .550$).

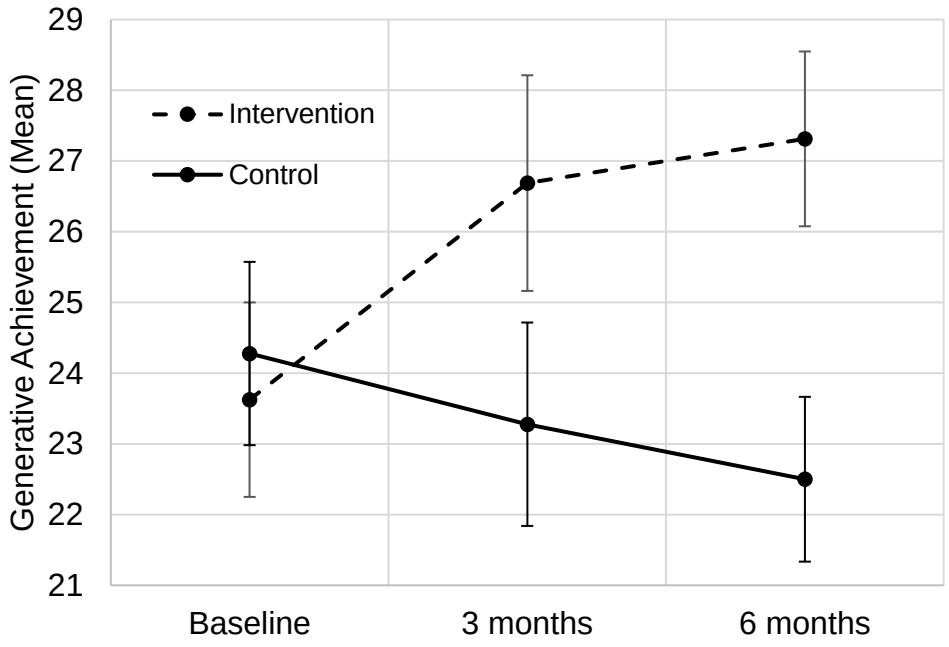
Regarding subscales of the cross-age attitudes measure, that is, attitudes towards children, significant positive interactions between group and time were found on six bipolar adjective pairs, including active-passive, friendly-unfriendly, generous-selfish, happy-sad, kind-mean, and likeable-unlikeable (all $p < .027$, all $BF > 2.48$). No significant group x time interaction effects were found on the remaining subscales (all $p > .12$, all $BF < 0.15$).

To follow up, in the intervention group, a significant effect of time was found on all six subscales showing an interaction (all $p < .02$). Bonferroni-corrected pairwise comparisons confirmed significant effects between baseline and 3-month follow-up for two subscales: generous-selfish ($p < .025$), kind-mean ($p < .032$); and between baseline and 6-month follow-up for three subscales: generous-selfish ($p < .041$), happy-sad ($p < .049$), and kind-mean ($p < .003$). Significant effects of time in the intervention group were not found for three sub-scales: active-passive (all $p > .06$), friendly-unfriendly (all $p > .05$), and likeable-unlikable (all $p > .11$). No effect of time on any of the subscales was found in the control group (all $p > .18$).

Regarding generativity, there were no significant main effects or group x time interaction found on the generative desire subscale (all $p > .12$). However, a significant time x group interaction was found on the generative achievement subscale, $F(2, 64) = 4.40$, $p = .016$, $\eta p^2 = .121$, $BF = 3.52$ (all other $p > .11$, BF < 0.95; Figure 4.11).

Figure 4.11

Mean generative achievement scores (± SE) for the intervention (n =16) and control (n = 18) groups between baseline, 3- and 6-month follow-ups.



To follow up, a significant positive effect of time was found within the intervention group, $F(2, 30) = 3.51$, $p = .043$, $\eta p^2 = .189$, $BF = 1.83$. Bonferroni-corrected pairwise comparisons confirmed a significant difference between baseline and 6-month follow-up, $t(16) = -3.03$, $p = .03$, $d = .77$, but there were no differences between baseline and 3-month follow-up ($p = .312$) and 3- and 6-month follow-ups ($p = 1.00$). No effect of time was found in the control group ($p = .358$, $BF = 0.31$; Figure 4.11).

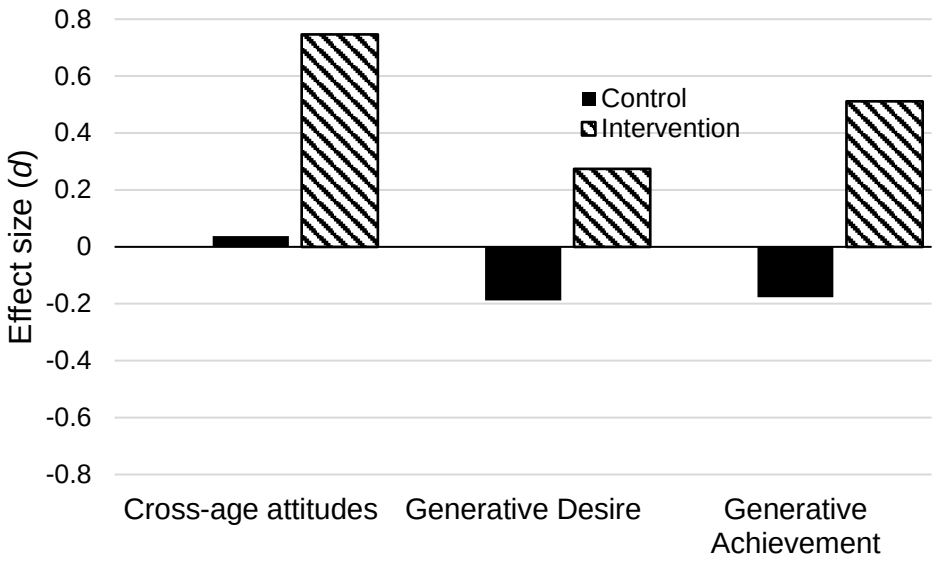
Figure 4.12 presents the effect sizes for attitudes towards schoolchildren and the generativity measures of 3- and 6- months relative to baseline for each group. Medium effect sizes in cross-age attitudes and generative achievement were observed specifically for the intervention group at 3 months, and medium to large effect sizes in both measures at the 6-month follow-ups, which were consistent with the interaction effects demonstrated in

Table 4.4. Small to trivial effects sizes were detected for all the measures in the control group.

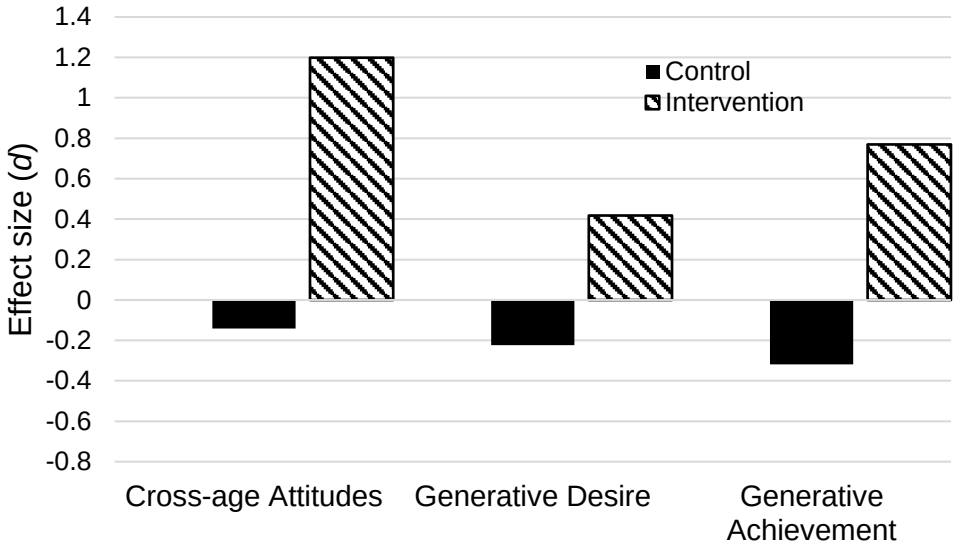
Figure 4.12

Effect sizes of mean differences in social functioning between baseline and 3-month follow-up (A), and between baseline and 6-month follow-up (B), for the intervention and control groups.

A



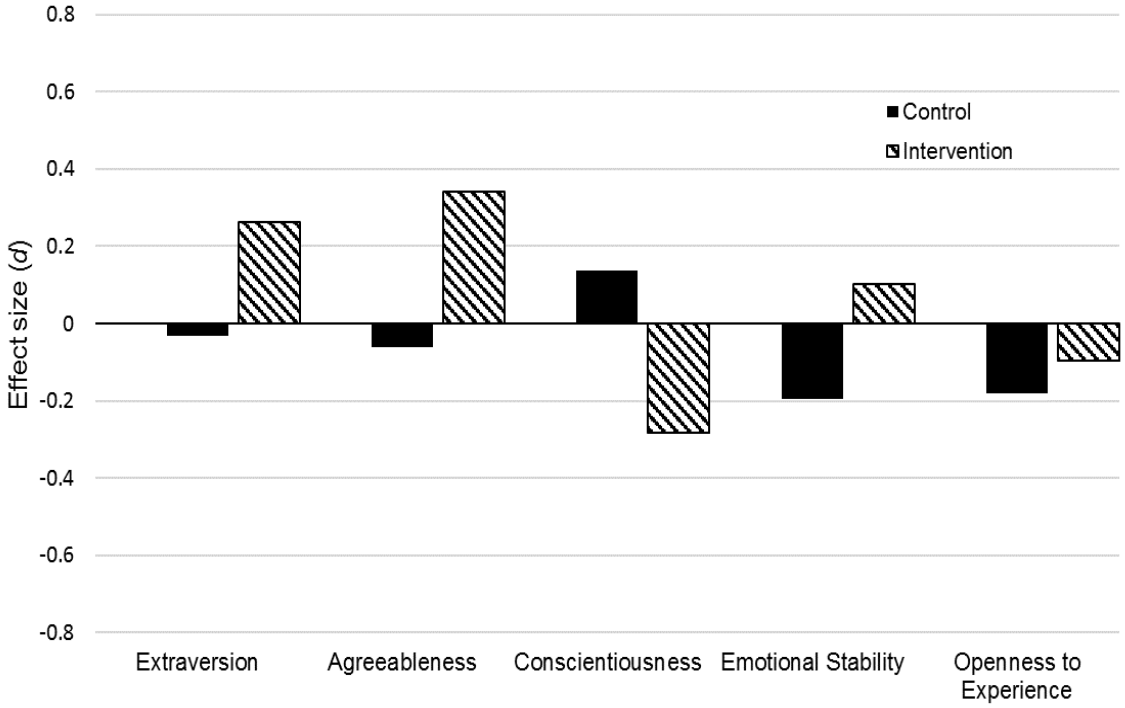
B



No significant main effects or group x time interactions were found on any of the personality traits (all $p > .10$; Figure 4.13). Although some small effect sizes were detected for three of the traits in the intervention group, including extraversion, agreeableness, and conscientiousness.

Figure 4.13

Effect sizes of mean differences in personality for the intervention and control groups between baseline and 6-month follow-up.



In summary, regarding social outcomes, this pilot RCT highlights the potential for positive change resulting from engagement in a moderate-intensity school-based programme. Specifically, attitudes towards schoolchildren and self-perception of generative achievement showed benefits. Medium positive effect sizes were found in both measures at 3-month follow-up and large positive effect sizes at 6-month follow-up. The benefits of engagement in cross-age attitudes were reliably observed at 3 months and maintained at 6

months, and in generative achievement were reliably observed at 6-months. However, note that the Bayesian evidence for the interaction effect for individual items of the cross-age attitudes measure was weak.

Overall, in terms of the strength of the evidence presented across this section, the Bayes Factor for the interaction effect and the effect of time within the intervention group in several outcomes was moderate to strong (see Table 4.5). The strongest evidence tended to be associated with cognitive measures, but was also found for the effect of time for intervention group in one of the sleep quality subscales (daytime dysfunction) and the total score for cross-age attitudes.

Table 4.5

Summary of outcomes with at least moderate Bayesian evidence for a significant group x time interaction and/or a significant effect of time within the intervention group.

	Interaction effect	Effect of time
Outcome	**Group x Time**	**Intervention Group**
Working Memory	weak	**4915**
Episodic Memory	**3.75**	**53**
Auditory Verbal Learning	**> 10,000**	**2983**
Daytime Dysfunction	trivial	**13.7**
Cross-age Attitudes	**9.83**	**24**
Generative Achievement	**3.52**	weak

4.4.5 The effects of outliers and extreme cases

After removing outliers for individual outcomes and subscales, most statistical patterns and conclusions did not differ from those obtained from the complete data set. However, it is important to note that excluding outliers changed results for two outcomes. First, regarding loneliness, after removing two outliers, the 2 x 3 repeated measures ANOVA yielded a significant time x group interaction: $F(2, 60) = 5.28$, $p = .008$, $\eta p^2 = .150$, $BF = 6.52$ (all other $p > .10$). Following this up, a significant effect of time was identified in the

intervention group (p = .014, BF = 4.03), but the significant effect was not confirmed by Bonferroni-corrected pairwise comparisons across timepoints (all p > .05). No significant effect of time was found in the control group (p = .529, BF = 0.25). Furthermore, regarding hours spent sitting (i.e., hrs/week), after removing three outliers, the interaction effect found in the complete data set was no longer evident: $F(2, 58) = 2.36$, p = .104, ηp^2 = .075, BF = .50. In addition, the significant main effect of group was not found on walking after removing two outliers (p = .70, BF = 1.34).

4.4.6 Feasibility

The feasibility of this pilot RCT was also explored by looking at different parameters that would need to be considered in any future intervention study, including effectiveness of the recruitment process, willingness of participants to be randomised, number of eligible participants, characteristics of the proposed outcome measures, response rates to questionnaires/tests, retention, adherence, and costs of the intervention (Arain et al., 2010).

Effectiveness of the recruitment process. A continuous recruitment process (May 2018-July 2019) was implemented in this study due to a small number of participants obtained for Cohort 1 (September 2018 - March 2019) and limited resources for testing large participants numbers simultaneously. Participants were recruited through a variety of methods (see Section 3.4.2)

Recruitment in this study may have been limited due to taking place in small towns, and recruiting from cities where possible, might aid recruitment rates in future. It can also be assumed that the recruitment for Cohort 1 may have been additionally limited by the number of hours originally planned and advertised for this programme (15 hrs/week) as our intention was to include 3 groups: 1) high-intensity intervention group (15 hrs/week), 2) moderate-intensity intervention group (8 hrs/week), and 3) wait-list group. The initial target of 120 participants was not obtained, therefore two groups (a moderate-intensity group and a wait-list control group) were included in this study to ensure its unique scientific contribution to the existing evidence on

IE, while also offering a more attractive voluntary programme that requires less (but still considerable) time commitment.

Although the intervention was constrained to a relatively small geographical area in Scotland (i.e., three small towns in close proximity), the programme also attracted the attention of older adults living in two major Scottish cities, indicating feasibility of recruiting and expanding the initiative to large urban areas if an expanded version of the programme was available. Eight out of 55 people who expressed their interest in participating in the programme did not take part due to the restricted area of implementation and commuting issues. Thus, if the programme was based in the nearest big city, they would have joined it.

Willingness of participants to be randomised. In the current study, randomisation to specific schools was not feasible as only 9 participants had no preference for the location or size of the school. However, all participants agreed to be randomised to either the intervention or the wait-list control group. In general, volunteers were assigned to their nearest school and if they expressed no preferences in terms of location, they were assigned to the school that had a small number of volunteers.

Number of eligible participants. All individuals (N = 55) who expressed initial interest in volunteering in the programme met eligibility criteria, which were evaluated via telephone and baseline screening. This suggests that this type of intervention is able to generally attract generally healthy and independent individuals (see Sections 3.4.1 and 4.4.1 for sample selection and characteristics).

Characteristics of the outcome measures. Most of the self-reported measures used in this study were simple for the volunteers to interpret, which resulted in no missing data and no concerns raised at the follow-up sessions. An exception was the physical activity questionnaire (IPAQ-SF; Craig et al., 2003) which was considered by volunteers as the most difficult to complete. Specifically, they were unsure about the accuracy of the estimates they provided, which could result in over- or under-estimates of their physical

activity levels. The standardised battery of cognitive tests (NIH Toolbox; Gershon et al., 2013) was found to be cost-effective, easily administered and time-efficient, allowing the researcher to collect objective data from a few participants a day within short testing sessions. The short amount of time (i.e., 3-7 minutes) needed for completing each of the individual assessments was also convenient for participants, reducing the burden of doing lengthy evaluations. Future research with more researchers involved may consider using more comprehensive test batteries that allow measuring latent variables for each outcome (i.e., abilities not based on just one measure).

Retention. A high rate of participant retention (89.5% over six months; for more detail see Section 3.4.1) suggests that a moderate-intensity intergenerational programme located in schools in relatively deprived areas is feasible and well-accepted among those who participated. The retention rate in this study is consistent with similar IE studies described in Chapter 2 (e.g., Carlson et al., 2008, 2009; Gruenewald et al., 2016; Kamei et al., 2011).

Adherence. Programme adherence was reported using the number of hours of full participation. As mentioned earlier, only Cohorts 1 and 2 (n = 10; the number doesn't include one of the participants from Cohort 2 who withdrew after 3 months) were able to engage across the full six months. Adherence to the programme varied between individual volunteers and across three cohorts but strong adherence was shown to be possible, particularly with Cohort 1. The low attendance rates reported mainly by Cohort 3 resulted from progressive concern due to the COVID-19 outbreak. Other reasons for a lower intensity of engagement included personal commitments, ill health, care responsibilities (all of which varied by individual) or delays with necessary PVG applications (see Section 3.4.2).

Adherence rates. The standard number of hours for full participation in this programme was 192 hours per volunteer across 6 months, equating to 8 hours per week spread over 2 days. However, as would be expected of a long-term, 'real-world' programme, the intensity of engagement varied substantially between individual volunteers and across the three Cohorts

involved. The total number of hours of engagement (including those who dropped out at some stage) was between 36 and 229 hours (*M* = 129.94; *SD* = 65.77). The highest rates of adherence and the most consistent engagement was observed in Cohort 1 (n = 7 active participants), in which the average individual volunteer exposure was 191 hours (132-229 hours). However, the intensity of engagement decreased substantially in Cohort 2 (n = 4; note, one of the participants withdrew after 3 months of participation) and Cohort 3 (n = 7), to 441 total hours for the group (*M* = 110.25; *SD* = 55.31) and 562 total hours for the group (*M* = 80.29; *SD* = 40.25), respectively.

Association between exposure to engagement (i.e., number of cumulative hours of engagement) and cognitive, social and health outcomes: an exploratory analysis. Descriptive statistics revealed no outliers or extreme values for the hourly volunteer engagement. Pearson correlation analyses were used to examine potential linear relationships between the hours of engagement and all outcomes under investigation. Raw difference scores were calculated for each outcome for baseline vs 3-month and baseline vs 6-month follow-ups, and then correlated with engagement intensity (volunteer hours).

A significant negative association was found between auditory verbal learning and engagement intensity: $r(18) = -.65$, $p = .004$, $r^2 = .421$, specifically at the 3-month follow-up, suggesting potential sporadicity of the finding (see Appendix T). No other associations between volunteer hours and outcomes under investigation were identified in this study (all $p > .09$).

Costs of the intervention. All expenses related to participation, including transportation, a lunchtime meal, and PVG applications were covered by the schools. In total, five volunteers across all three cohorts (n = 18 in the intervention group) accepted the opportunity to receive reimbursement of travel expenses. Importantly, the lack of available compensation in future (i.e., beyond the official programme duration) was indicated by three volunteers as a reason for terminating their post-intervention commitment.

This suggests that reimbursement is crucial to ensure volunteers' retention and continuous engagement, and specifically for those living further away from their school and/or on a low-income.

Feasibility - summary

Evaluation of a pilot study, including appraisal of problems and potential solutions to support the implementation of a full and more robust trial, requires a systematic approach and guidance. Bugge and colleagues (2013) introduced A process for Decision-making after Pilot and feasibility Trials (ADePT) that allows systematic assessment of the main components (e.g., recruitment, blinding procedure, adherence) of feasibility work in order to aid its transition to a full trial. For the benefit of future large-scale implementation of the current research model, the main methodological choices and issues, as well as potential solutions were identified and briefly summarised following Bugge et al.'s (2013) analytical framework. This includes a list of methodological issues drawn from Shanyinde et al. (2011; see Table **4.6** below).

Table 4.6

Evidence and findings of the current pilot study against 14 standard methodological issues for feasibility research.

Methodological issues	**Findings**	**Evidence**
1. Did the feasibility/pilot study allow a sample size calculation for the main trial?	Adequate, albeit small, sample size was recruited for this study.	In total, 36 out of target 50 participants were recruited for this intervention. This is more than suggested minimum for a pilot investigation (Julious, 2005; see Section 3.4.1). However, this small sample size can make estimations of required sample size for the main trial uncertain and possibly inflated.
2. What factors influenced eligibility and what proportion of those approached were eligible?	Ineligibility for randomisation was mainly due to participant withdrawal from the study, before the baseline assessment. For the main reasons for withdrawal please see Section 3.3.1.	In total, 41 out of 55 people who expressed their interest in the study were screened over the phone and were considered eligible. Following the complete eligibility evaluation, telephone screening and baseline testing, 38 participants were randomised to control and intervention groups.

3. Was recruitment successful?	A continuous recruitment process was implemented in this study due to a small number of participants recruited for Cohort 1. Issues existed at the participant and geographical level.	Fourteen out of 55 potential participants withdrew before phone screening and 3 out of 41 eligible participants withdrew pre-randomisation. Recruitment in this study may have been limited due to taking place in small towns in close proximity, as well as the initially advertised maximum hours of engagement (i.e., 15hrs/week for 'high-intensity group' as compared to 8hrs/week for the 'medium-intensity' group). The maximum dosage was reduced to 8 hrs/week only, in response to feedback and only one active group included.
4. Did eligible participants consent?	Yes	All participants gave their consent prior to commencement of the study.
5. Were participants successfully randomised and did randomisation yield equality in groups?	Randomisation process was successful.	Equal sized groups (n=18 each) were obtained at baseline and 3 months. Small differences were observed at baseline for some measures due to the small sample size and the number of comparisons across variables.
6. Were blinding procedures adequate?	Blinding at the randomisation stage was successful.	The researcher and participants were blinded to the randomisation allocation during completion of the baseline tests. However, researcher blinding to the assigned intervention at the outcome assessment stage was not possible as only one researcher was available for conducting and analysing the assessments.
7. Did participants adhere to the intervention?	Overall, good adherence to intervention, particularly in Cohort 1.	The intensity of engagement varied substantially between individual volunteers and across the three Cohorts involved. The total number of hours of engagement was between 36 and 229 hours over 6 months (*M* = 129.94; *SD* = 65.77).
8. Was the intervention acceptable to the participants?	There were some challenges/barriers to engagement indicated during a focus group with the older adult participants (see Chapter 6, Section 6.4.2). Those included, for example, distance to the school they were assigned to and physical challenges.	A number of people (n = 14) who expressed their interest in volunteering decided not to take part in the study once all information was available (see Section 3.4.1 for more detail).
9. Was it possible to calculate intervention costs and duration?	No economic evaluation was included in the study.	All expenses related to participation, including transportation, a lunchtime meal, and PVG applications were met by the schools.
10. Were outcome assessments completed?	All assessments were completed for Cohort 1 and 2. Only the cognitive data are missing for the 6-month follow-up for 13 participants (belonging to Cohort 3), as a result of the discontinuation of face-to-face testing due to the COVID-19 outbreak.	See summary of outcome data in Section 4.4.
11. Were outcomes measured those that were the most appropriate outcomes?	Outcome measures used did assess the areas of interest.	Aside from the limitation associated with COVID-19, participants completed all questionnaires and cognitive tests at baseline and follow-ups, and no missing data were identified. However, physical activity specifically may be better assessed using

		more sensitive techniques (e.g., accelerometers) rather than a self-reported questionnaire that may generate over- or under-estimates and/or be difficult for respondents to interpret.
12. Was retention to the study good?	The retention rate was high.	The retention rate in the programme was high (90%), particularly for a 6-month intervention; 34 out of 38 participants stayed for the duration (aside from the COVID-19 outbreak period in the very final stages of Cohort 3).
13. Were the logistics of running a multicenter trial assessed?	n/a	n/a
14. Did all components of the protocol work together?	All components of the protocol worked well together.	No major difficulties were identified in the process of implementing the intervention and pilot trial. Once the participants were recruited, they all agreed to be randomised to either the intervention or the control group. Further, the researcher was able to collect and analyse the required data (excepting the COVID-19 outbreak which impacted a proportion of the cognitive data only).

4.5 Discussion

This pilot RCT implemented an IE programme, Generation for Generation, in Scottish primary schools and evaluated its impact on cognitive, social, and health outcomes in community-dwelling older adult volunteers. Results from this study offer promising, preliminary evidence suggesting that moderate duration and intensity engagement between younger and older generations can be an effective health promotion initiative, in a variety of ways, for older adults aged 60 and above. However, given the pilot nature of this study, all findings should be treated with caution and assessed in the context of a full-scale, high-powered RCT in future.

This intervention was designed to involve healthy older adult volunteers in 'real-world' activities providing simultaneous cognitive, social and physical engagement. Thus, in addition to their usual daily activities, these community-dwelling volunteers extended their everyday activities to additional indoor/outdoor learning support for primary school children. This additional stimulation was associated with some promising findings showing statistically reliable benefits in many outcomes under investigation at the first follow-up timepoint (i.e., 3 months), supporting the core hypothesis of this

study. Thus, we built on the existing literature that has suggested a range of potential biopsychosocial benefits of engagement built around cognitive stimulation but providing more holistic engagement overall (Reuter-Lorenz & Park, 2014; Schooler et al., 1999; Stine-Morrow et al., 2008). Additionally, the positive impacts of participation in the programme were typically more apparent after 3 months and maintained at 6 months of engagement. This does not support our initial prediction of a great duration resulting in greater benefit. Significantly greater benefits were therefore observed at the first follow-up, which may be due to insufficient power to detect some changes between 3 and 6 months. The current finding may also suggest that the shorter-term change in lifestyle tends to be associated with a boost in outcomes and this is maintained over time. It can also be assumed that with a longer follow-up more benefits may be observed if the control group shows further decline.

4.5.1 Cognitive function

As highlighted in Chapter 2, existing research has demonstrated reliable IE effects in some measures of cognitive performance (Carlson et al, 2008, 2009; Sakurai et al., 2016), specifically global intellectual capacity, verbal memory, and executive function. However, considering the limited evidence on cognition, it was concluded that more research is needed to support the previous observations. The current results therefore build on previous studies investigating the impact of school-based IE on older adults' cognitive abilities (Carlson et al., 2008, 2009; Sakurai et al., 2018). The crucial group x time interaction, along with a large, positive effect of time in the intervention group, were found to be significant for working memory and episodic memory, as well as for auditory verbal learning. This supports findings from the Experience Corps pilot trial (Carlson et al., 2008), which showed a significant intervention effect on both verbal (i.e., word list memory; immediate and delayed) and visuo-spatial memory (i.e., delayed recall). However, previous research reported significant effects on memory for a subgroup of

participants who had impaired executive functioning at baseline and not when considering the whole sample (Carlson et al., 2008; see Section 2.4.7). Thus, this pilot study extends previous evidence on promising effects of IE on cognitive performance in cognitively intact older adults.

Furthermore, in line with two intergenerational studies examining psychomotor skills/processing speed (Carlson et al., 2008; Sakurai et al., 2018), no significant effects were revealed for processing speed in the current study. Although sensitive, computerised tests of executive function were presently used, no significant interaction effect was found at 6-month follow-up (N = 21). However, when the full available sample was considered (N = 36) after 3 months of participation, a significant group x time effect was revealed executive function, as well as a large, positive effect size for the intervention group. Given that both the intervention and control groups obtained high scores at baseline, reduced magnitude of change in executive function at the 6-month follow-up might be the result of limited power of this study to detect changes between the groups. Furthermore, the lack of reliable effects on processing speed and executive function at the 6-month follow-up may indicate that healthy older adult participants need a longer follow-up to improve their scores or that effects may be revealed in a full trial.

Overall, large effect sizes were detected for working memory, episodic memory, and auditory verbal learning at both 3- and 6-month follow-ups, and a medium effect size for executive function at 3 months for the entire participant sample. These benefits of engagement were reliably observed at 3 months and were maintained at 6 months. The overall mean effect of time for all outcome measures of cognition was large, at both 3-month (d = .86) and 6-month (d = 1.20) follow-up. Positive effects of this pilot RCT on older adults' cognitive function suggest that a multimodal real-world intervention can boost cognitive functioning in those at risk for age-related cognitive declines. These findings are in line with the engagement hypothesis (Schooler et al., 1999; Stine-Morrow et al., 2007) and the scaffolding theory of ageing and cognition (STAC; Reuter-Lorenz and Park, 2014), by demonstrating how participation in diverse activities (cognitive, social)

embedded within a complex and stimulating school environment, has potential to improve mental flexibility and enhance compensatory neural effects, resulting in cognitive behavioural benefits. Thus, relatively short-term improvements in higher order cognitive abilities revealed in this study may indicate that the brain has sufficient neurocognitive reserves to maintain and enhance its functioning that in turn could potentially contribute to longer functional independence in later life (Cabeza et al., 2018; Stern, 2009).

4.5.2 Health and wellbeing

Participants in this study were generally healthy, functionally independent, and cognitively intact. These baseline characteristics suggest that this intergenerational programme attracted individuals in good or very good health. Although at the initial phone screening three participants reported some difficulties with walking, none of them requested any additional mobility aids or assistance to be provided during the intervention. The initial assessments of the level of health-related functioning appeared to be reflected in other health and wellbeing outcomes measured at the baseline and two follow-up timepoints. Despite some outliers and extreme values for depression, physical activity, and three sleep quality subscales, there were no significant differences between the groups on any of the health and wellbeing measures at the baseline (Appendix R). Moreover, removing potentially confounding cases from the analysis did not affect substantially the study findings.

As reported in Chapter 2, effects of IE on some psychosocial and health-related measures varied across studies and only a few reported reliable positive changes in depression (e.g., Hernandez and Gonzalez, 2008; Kamei et al., 2011), loneliness (Gaggioli et al., 2014; Lee & Kim, 2019), and life satisfaction (DeMichelis et al., 2015; Meshel & McGlynn, 2004). The inconsistency of findings prevented us from attaining consensus about the effectiveness of IE on those outcome measures and therefore, it was suggested using standardised and comparable instruments in future studies.

Therefore, we included in this study standardised measures that were most frequently applied in previous IE research and were able to support evidence showing no significant effects on depression (e.g., Barbosa et al., 2020; Johnson, 2015; Posada, 2006), loneliness (e.g., Barbosa et al., 2020; Xu et al., 2016), and life satisfaction (Adam, 1992; Carstensen et al., 1982; Johnson, 2015). However, although no interactions were found for any of those three outcomes, moderate negative effect sizes were identified for the intervention group on loneliness (i.e., reduced loneliness scores that would indicate improvement) both at 3-month (d = -.53) and 6-month (d = -.67) follow-up, compared to no effect in controls (d = -0.3 and d = .02, at 3 and 6 months respectively), which may indicate potential for improvement that needs to be tested in a full-scale trial. Those results reveal important potential changes in social wellbeing of older adults after participating in the programme. As it will be demonstrated in Chapter 6, this intervention allowed the older adult volunteers the opportunity to gain a new purpose to their lives, create new relationships and feel a sense of belonging (Chippendale & Boltz, 2015; Lee & Kim, 2019). Involvement in intergenerational interactions may be more likely to have a substantial impact on the level of loneliness in participants who lacked very close relationships in their lives (Gaggioli et al., 2014; Lee & Kim, 2019). Although this study did not monitor social engagement outside the programme, variability in the quality of social networks and existent social/emotional support could potentially explain the extent of benefits in wellbeing, both social and emotional.

Some significant group x time interaction effects were observed on other health and wellbeing outcomes, including one domain of physical activity (i.e., hours spent sitting) and one domain of sleep quality (i.e., daytime dysfunction). Medium effect sizes were detected in number of hours spent sitting per week for the control group (i.e., increased scores) and in daytime sleep dysfunction for the intervention group (i.e., improved daytime functioning). These findings indicate that active participation in IE has the potential to reduce some aspects of sedentary behaviour and improve volunteers' daytime functioning (i.e., ability to stay awake or engage in social

activities, as well as enthusiasm to get things done). These conclusions are in line with previous intergenerational interventions that reported a decrease in hours spent lying down during the day and improved quality of social interactions (Fried et al., 2004; de Souza & Grundy, 2007).

The results of this moderate-term programme did not confirm the findings of Tan et al.'s trial (2009) showing a significant positive effect of intervention group on walking and physical activity (when adjusted for age and frailty) at 3-year follow-up. Given the small sample size of this pilot trial and relatively comparable levels of physical activity at the baseline, these results may suggest that significant overall change in physical activity can only be observed in those with low initial activity levels, as demonstrated in a previous intervention (Tan et al., 2006). Moreover, further studies with a larger sample size are needed to better understand the impact of IE on various physical activity domains. In this study, a commonly-used self-report questionnaire was used to determine the level of participants' physical activity, which could have been a potential source of bias. Volunteers occasionally reported a difficulty in completing or interpreting the measure, which might have generated over- or under-estimates (Johnson-Kozlow et al., 2006; Matsudo et al., 2001). Using a longer-term intervention and objective measures of walking may provide more accurate estimates of participants' physical engagement and prevent potential recall bias. Results from the current study may also suggest that, for more physically active participants, there was a trade-off of their usual activities outside the intervention for those involved in the programme. However, the significant effect of group on walking appears to indicate the initial inactivity of some of the participants was changed through the new commitment to the programme, leading to an increase in usual physical activity.

4.5.3 Social functioning

The findings regarding social functioning are consistent with evidence from a number of studies exploring the impact of IE on cross-age attitudes (e.g., Pinquart et al., 2000; Meshel et al., 2004; Gamliel et al., 2014). A medium positive effect size at the 3 months and a large, positive effect at the 6-month follow-up was found in older adults' general attitudes towards school children for the intervention group. Moreover, active participation in the programme enhanced participants' pre-existing positive views, as demonstrated in previous research (e.g., Belgrave & Keown, 2018; Chapman & Neal, 1990; Chippendale & Boltz, 2015). In particular, participants in the intervention group were more likely than controls to rate the children as happy, generous, and kind. These findings indicate that intergenerational interactions may have potential to improve older adults' views towards, and potentially promote connectedness with, young children.

The effectiveness of this programme was demonstrated not only in terms of age-related attitudes, but also in self-perception of generative achievement (i.e., a sense of contribution to development of the younger generation). A reliable increase in generative achievement observed in this study is consistent with previous research (Gruenewald et al., 2016; Ehlman et al., 2014, Sanders et al., 2013). However, unlike Gruenewald et al.'s (2016) findings, no reliable change was currently found on generative desire (i.e., a need to nurture and guide the younger generation). The lack of effects on this domain may be explained by predominantly high levels of generative desire reported by all participants at the outset of the study, as well as by relatively stable scores amongst the control group that was offered to join the schools after the completion of the 6-month follow-up. Thus, the opportunity of generative engagement might have fuelled continued desire for intergenerational interactions in controls, whereas generative achievement that seems to be enhanced by the direct engagement in generative activities decreased in that group.

The facilitated sense of generative achievement can be linked to a number of health-related benefits, including improvements in cognitive and

physical function, and mental health and wellbeing (Grossman et al., 2020; Gruenewald et al., 2007; Gruenewald et al., 2012). Although causal relationships between generativity and health outcomes were not assessed in the present study, a significant improvement in generative achievement, memory and daytime functioning may suggest a potential link between the outcomes, with brain health underlying these (Brewster et al., 2015; Yaffe et al., 2014). They are also consistent with Erikson's (1950) developmental hypothesis of adult ageing, specifically that older adults need to be generative for their wellbeing. In that sense, a meaningful contribution to future generations can be a means to enhance older adults' perceptions of generativity, as well as to promote health. Further examination, including the correlations between generativity and health and wellbeing outcomes should be an objective in future larger-scale intergenerational interventions.

Although many of the participants in this study reported grandparental roles, this programme seemed to offer them a different opportunity for generative expression through a broader community involvement (Peterson et al., 1995). This extensive pursuit of prosocial expression can be linked to their high scores on prosocial personality traits such as Openness to Experience, Agreeableness, Conscientiousness and Extraversion, identified at the onset of this intervention. According to previous research, these traits are associated with civic engagement and volunteering in later life (Ozer et al., 2006) and positive moderating effects on cognitive performance, psychological wellbeing, and successful ageing in general (Baek et al., 2016; Ihle et al., 2016; Lee, 2019). It is important to note that participants in this study reported high level of Openness to Experience at the outset of IE, which may suggest that those who are less open to new experiences/activities would be also less likely to volunteer in engagement interventions. Therefore, future research needs to consider new recruitment strategies to reach individuals that are less outgoing and pro-active in social situations.

Finally, this study offered evidence that a relatively moderate-duration, moderate-intensity IE programme can potentially provide similar benefits for

older adults' functioning as longer term, high-intensity volunteering implemented in existing, gold-standard interventions (i.e., 15 hours per week over 4, 8 and 12 months; Carlson et al., 2008; Fried et al., 2004). The current evidence is therefore in line with previous intergenerational programmes (see Chapter 2) that implemented short-term (e.g., 1 week – 2 months) and low-intensity (e.g., 1hr/week) programmes and yet were able to report positive changes in participants' health and wellbeing, and social function (Sanders et al., 2013; Wilson et al., 2013; Xu et al., 2016). The effect sizes reported in the current study are also comparable with those obtained in previous research, specifically those for social outcomes such as generativity and cross-age attitudes. Considering the latter, large effect sizes observed in the current pilot RCT were previously reported in a relatively low intensity (1 x 1.5h per week) 6-week non-randomised controlled trial (Pinquart et al., 2000). Further, consistent with the high-dose, long-term intervention (Gruenewald et al., 2016) that reported small effect sizes on both generative desire (d = .18 at the 4-month and d = .26 at 24-month follow-up) and achievement (d = .29 at the 4-month and d = .16 at 24-month follow-up), this study found small effect size on the generative desire at both 3-and 6-month follow-up (d = .27 and d = .42 respectively). In addition, medium effect sizes were found for the generative achievement subscale at 3- and 6-month follow-up (d = .51 and d = .77, respectively). Although the adherence rates varied across participants and cohorts, which is common in real-world interventions (Gruenewald et al., 2016), levels of time commitment were not associated with changes in outcomes under investigation, at least in this sample. However, variation in the intensity and duration of engagement needs to be considered in future studies in the context of exploring a potential 'threshold' effect of participation on health and wellbeing (Luoh et al., 2002; Musick et al., 1999; Van Willigen, 2000).

4.5.4 Implications

In terms of theoretical implications, the positive, promising results of this study, especially regarding cognitive function, provide tentative support for the engagement hypothesis (Schooler et al., 1999; Stine-Morrow et al., 2007), a theoretical model of cognitive and brain ageing (STAC-r; Reuter-Lorenz & Park, 2014), as well as the generativity construct of Erikson's (1998) psychosocial theory of development. There are also some relevant implications from this pilot study for future research and practice. This study indicates feasibility of recruiting and expanding the IE initiative to large urban areas if the programme was available. Moreover, initiatives like the current project, implemented at purely voluntary basis, seem to be an effective strategy to produce health and wellbeing benefits. Considering that this intervention involved a relatively high proportion of volunteers with previous school-based experience (47.4%) and yet was able to provide novel cognitive and social stimulation, can indicate the potential for this programme to deliver beneficial effects regardless of participants' occupational background. The particular interest in the programme amongst former teachers (26.3%) suggests an important opportunity to design interventions involving more structured and professional support for measuring impact on children and schools, and for keeping many teaching staff engaged beyond retirement.

4.5.5 Strengths and limitations

In terms of specific strengths of this study, to our knowledge, this is the first pilot RCT investigating intergenerational school-based engagement in the UK. In addition, this pilot trial demonstrated that a low-cost, moderate intensity and duration IE programme (i.e., 8 hours per week over 6 months) can provide similar, and potentially even more, benefits as longer term high-intensity volunteering implemented in existing, gold-standard interventions (i.e., 15 hours per week over 12 months or 3 years; Carlson et al., 2008; Tan et al., 2009). Moreover, no research to date has assessed the impact of IE on

sleep quality and personality traits. This study also addressed one of the main methodological issues identified in the systematic review (see Chapter 2) by incorporating social and health outcome measures consistent with previous intergenerational interventions. Finally, to avoid recall bias and ensure accuracy of weekly attendance data, volunteer hours and total weeks of participation were recorded using sign-in sheets placed in schools, as well as in the diaries completed and submitted by the participants on a weekly basis.

There are also some limitations of the current pilot study, however. First, the sample size was small, limiting the power to detect intervention effects. Although our sample size was within the bounds of what is required for a pilot study (a minimum of 12 participants per condition; Julious, 2005), a full trial would allow us to determine more precise estimates of the intervention effect sizes and examine whether reliable, positive intervention effects on cognitive, social and health functioning are observable and sustained over time. Second, although the participants in this study represented a wide age range of the target older adult population, the sample consisted predominantly of well-educated, high-functioning and ethnically homogenous individuals. Third, although the adherence rates in this study varied substantially amongst participants, given the small sample size, no data were excluded from the main statistical analyses based on a low attendance rate, but we have highlighted the importance of such analyses in future, larger-scale research. Finally, the cognitive data for the 6-month follow-up for thirteen participants were missing, as a result of the discontinuation of face-to-face testing due to the COVID-19 outbreak, however we have analysed the available data taking into account both the 3- and 6-month timepoints.

4.6 Summary

This chapter presented the findings of the intervention for older adults' cognitive, social and health outcomes. Overall, this RCT has revealed a variety of promising results regarding older adults' potential to gain cognitive,

health, and social benefits of intergenerational engagement. The findings were discussed relative to the underlying theories, along with some potential implications in terms of future research and practice. Given the small number of participants limited by the pilot nature of, and resources available for, the study, results should be treated with caution. Therefore, in order to be able to make firm conclusions about the effects of this intergenerational programme, longer term, larger scale trials, ideally with post-intervention follow-ups are recommended for future research. A follow-up discussion about the recommendations for policy, research, and practical application of this trial will be presented in Chapter 8.

CHAPTER 5. Perceptions and experiences of participating in Generation for Generation: qualitative methods for investigating older adult volunteer and school perspectives.

5.1 Chapter overview

This chapter provides an overview of the qualitative methods used for two evaluative studies, conducted to complement the pilot randomised controlled trial (RCT) described previously (see Chapters 3 and 4). Qualitative data were collected via older adult volunteer diaries, completed over the course of the pilot study associated with the Generation for Generation (Gen4Gen) intergenerational engagement (IE) programme. Focus groups were additionally conducted with older adult volunteers, teachers and pupils, after Cohort 1 completed the programme. A broad discussion on rationale for selecting these data collection methods, as well as for applying thematic analysis as an approach, will be provided in this chapter. A general description of sampling, procedure, data collection and analysis will follow along with validity considerations. Finally, ethical issues will be discussed.

5.2 Rationale for qualitative research

There are many different methods of qualitative data collection and analysis that can be employed within the social sciences. Overall, a study topic and associated research questions determine suitable types of data collection and the analytical approach in qualitative research (Braun & Clarke, 2013). For example, studies exploring personal experiences of an individual (i.e., an idiographic approach) will choose interviews or diaries as the most suitable methods for collecting sensitive data and will use an experiential approach to analysis (e.g., interpretative phenomenological analysis, thematic analysis).

Conversely, experiences of IE that are the subject of the current studies can be examined using a wide range of qualitative data collection methods, including interviews, focus groups, diaries, or surveys. This is particularly the case since no sensitive topics were expected to be discussed. Thematic analysis was also considered an appropriate method for interpreting applied research driven by existing theory and findings (Braun & Clarke, 2013)

This variety of qualitative methods has been used in previous research evaluating perceptions of IE programmes (see Chapter 2). In the studies that focused on reporting qualitative findings only, the most common forms of data collection were in-depth interviews and focus groups (Alcock et al., 2011; Santini et al., 2018; Wilson et al., 2013). Those two types of interactive data collection methods allowed the authors to generate information-rich data that substantiated further analyses on experiences of the IE and cross-age perceptions. In addition, two studies used a multi-method qualitative approach (i.e., focus groups and interviews; focus groups and field notes) to allow cross-validation of the research findings and to strengthen the evidence (Alcock et al., 2011; Wilson et al., 2013).

Conversely, IE studies that used qualitative methods as part of a mixed-method design were less consistent in terms of the methods used and often less rigorous in considering the quality of findings reported. The qualitative data were collected in those studies using post-intervention surveys (open-ended questions; Lin et al., 2017), post-intervention written description of the programme (Chippendale & Boltz, 2015), focus groups (Barbosa et al., 2020; Perry & Wheatherby, 2011), interviews (Kamei et al., 2011), reflective journals (Belgrave & Keown, 2018), or post-intervention evaluation (Chapman & Neal, 1990). The main purpose of using some of these methods was to provide a concise programme evaluation, which was often not substantiated by data included and insufficiently interpreted (e.g., Lin et al., 2017; Belgrave & Keown, 2018). On the contrary, studies that employed reflective (i.e., interviews, focus groups) or more descriptive (i.e., written assignments) methods of data collection provided evidence that was well-

supported with data and well-integrated with the quantitative component of those studies (e.g., Chippendale & Boltz, 2015; DeMichelis et al., 2015).

Using interviews and focus groups allowed the authors to explore participants' in-depth understanding and experiences of IE (e.g., Chippendale & Boltz, 2015). However, their application also required a more methodical approach to data collection and analysis (i.e., using stepwise and pre-defined procedures). Not all studies that implemented those methods were able to use them rigorously and present their findings coherently (e.g., Barbosa et al., 2020; Perry & Wheatherby, 2011). Those that used interactive data collection methods appropriately, demonstrated additional efforts to establish validity and reliability of the research by incorporating supplementary qualitative approaches (i.e., observations, field notes), using triangulation and inter-rater reliability (Gamliel & Gabay, 2014; Kamei et al., 2011).

To date, the number of well-designed qualitative research or complementary qualitative studies on IE programmes is very limited. Further, of those studies that explored the experiential aspect of participating in IE programmes, few provided comprehensive reports of the methods used and complete study findings (e.g., Alcock et al., 2011; Barnard, 2014; Varma et al., 2015; Wilson et al., 2013). Moreover, much of the existing qualitative research was focused on reporting the experiences of the older adult population, and the study settings chosen for those studies were predominantly nursing homes or day care centres (e.g., Briggs & Knox, 2014; Heyman, & Gutheil, 2008; Santini et al., 2018; Schwalbach, & Kiernan, 2002; Seefeld, 1987).

Learning about experiences of all groups participating in the programme is crucial to understanding the multilevel impact of IE and its feasibility from different participatory perspectives. Most importantly, a comprehensive overview of both pupils' and teachers' experiences have been overlooked, which limits the understanding of potential mechanisms underlying the IE programme's functionality and effectiveness. The current qualitative studies were therefore intended to extend previous research on the experiences of volunteering in IE projects by addressing gaps in our knowledge about the

possible benefits as well as challenges of community-based engagement, and its perceived potential impacts for generally healthy and independently living older people (Varma et al., 2015), primary school children (Chapman & Neal, 1990), and teachers involved in the intervention. To our knowledge, these are the first qualitative studies to provide comprehensive qualitative evidence on the perceived effects of a school-based IE programming from these three different perspectives. Moreover, findings obtained in these qualitative studies are complementary to the evidence from the quantitative component (i.e., pilot RCT), of the current research (see Chapter 4). The subsequent sections will outline in more detail the sampling, procedure, data analysis and collection methods employed in the current studies. Note, this chapter concentrates on the general methodological approach, while the methods specific to each of the two qualitative studies will be provided as appropriate in Chapters 6 and 7.

5.3 Sampling

In accordance with the typical approach to sampling in qualitative research, participants were chosen using a purposive sampling strategy. The purposeful selection of participants allows us to develop an extensive understanding of the topic under consideration on the basis of "information-rich" data (Patton, 2002, p. 273). These data can only be provided by individuals who can offer insight into particular experiences or phenomena in a particular context (Smith et al., 2009). Therefore, the sample recruited for these two qualitative research studies consisted of people directly involved in the Generation for Generation programme who could grant the researcher access to in-depth perspectives on IE.

5.3.1 Sample size

In qualitative research there are no clear indicators of appropriate sample size (Patton, 2002). Overall, the sample should be able to provide an adequate amount of relevant information to facilitate analysis on the topic of

interest (Morse & Field, 1995). According to Braun and Clark (2013), sample size can be determined by the type of research question (e.g., experiences, understandings, and perceptions). Following their guidelines, the current study exploring experiences of participating in a school-based IE programme included a sample size that was large enough to demonstrate patterns across the whole data set and small enough to reveal experiences of each individual participant (Braun & Clark, 2013). The method of data collection and the type of research can also be indicators of sample size in qualitative research. Thus, for example, focus groups conducted in social science research, as in the current study, should typically comprise between 6-10 people (a full focus group) or between 4-6 people (a mini focus group; Litosseliti, 2003).

With this in mind, five focus groups were conducted, including one full focus group with older adult volunteers from Cohort 1 (N = 7), two mini focus groups with teachers (N = 4; N = 5), and two mini focus group with children (N = 4; N = 4). Purposive sampling was also used for volunteer diary data collection. Randomised assignment to the active group in the pilot study determined the number of participants (N = 20) asked to complete weekly reflective entries, 16 of whom complied with the request. Full details about the sample are provided in Chapters 6 and 7.

5.4 Procedure

5.4.1 Recruitment

All participation was voluntary and adult participants were invited by the researcher using a standard Invitation Letter (Appendix U) that was sent via email and post (letters to teachers were sent on the school address) to potential participants. Children's parents/guardians were also provided with an invitation and information letter (Appendix V; for more details see section 5.7.1). All older adult volunteers (N = 7) and teachers (N = 9) agreed to take part in the focus groups, while only 40% of the pupils' parents/guardians

returned the opt-in slips. The reasons for the low response rate amongst parents/guardians are unknown. However, the number of children (N = 8) recruited was sufficient for conducting two mini focus groups, one with very young children (n = 4; P1-2) and one with older children (n = 4; P3-4).

5.4.2 Study settings and procedure

Five focus groups were conducted by the researcher (moderator) who was trained in collecting qualitative data by two experts in qualitative methodology, and had previous experience conducting qualitative psychological research, including with vulnerable adults (Krzeczkowska et al., 2018, 2019). The researcher's competence in implementing a qualitative approach minimised the occurrence of potential bias. However, her direct involvement in both the pilot RCT and the focus groups could lead participants to respond in a particular (e.g., more positive) manner (Sargeant, 2012). Therefore, to address the potential influence the researcher's relationships to the study and participants might have had upon their answers, the focus group schedule included a preamble and questions that referred to various experiences of IE (Appendix X). Specifically, participants were encouraged and prompted to reflect on both potential positive and negative (i.e., 'challenging') aspects of their involvement.

The locations of the focus groups were determined by taking into consideration a number of factors, including the researcher's safety, appropriateness of the venue, participants' comfort and safety, and ease of access for all (Braun & Clarke, 2013). Focus groups with children and teachers were organised in the schools and the focus group with older adults in a local community centre. Prior to the start of each session, the researcher (moderator) discussed informed consent procedures to ensure that participants fully understood the study aims, how data would be used, and privacy, including the use of pseudonyms in all published findings and assurances that responses would not affect anyone mentioned in the discussions. Then, all participants were encouraged to ask questions and

offered the opportunity to withdraw if they so wished. If there were no further questions and participants expressed their willingness to participate, written consent was obtained from the adult participants and verbal consent from children prior to the commencement of the focus group. All focus groups were recorded on a digital voice recorder then transcribed verbatim. At the end of each session, participants were provided with a debrief sheet.

5.5 Data collection

Qualitative research requires rich data that can help the researcher explore the participant's understanding of the phenomenon under investigation. Therefore, the most suitable instrument for data collection in this approach should be pre-defined in its structure to some degree but also flexible. This can be achieved by using open-ended questions and a semi-structured format of interviewing, which enables participants to provide a detailed account of personal experiences of IE. During semi-structured interviews, participants are naturally encouraged to reflect at length on the concerns and issues related to the topic and decide which of the discussed issues should be given primary importance (Bryman, 2012). The researcher can help them develop the narrative by using probes and guide them unobtrusively through the schedule (Smith et al., 2009). In this research, open-ended questions were therefore used in both the diary and focus group schedules. The semi-structured interviewing format was applied during the discussions with all the participating groups.

5.5.1 Focus groups

Focus groups and interviews are the most widely used qualitative research methods for data collection in applied social sciences. The purpose of research interviews is often to explore sensitive topics and gain an in-depth understanding of, to some extent, already known social phenomena from an individual perspective. Focus groups are also frequently organised to

examine participants' experiences and beliefs of phenomena from a new research area and to generate data on collective views (Morgan, 1998; Gill et al., 2008).

Rationale for focus groups. Focus groups were chosen for this study as the most appropriate qualitative method of data collection considering the study aims, project time constraints, and the topic under investigation. The group discussions offered the opportunity to elicit meanings and socially shared opinions as a result of group dynamics and interaction (Marks & Yardley, 2004). They are also suggested as appropriate when multi-method design is applied and data collected from the study group need to be clarified or extended (Bloor, Frankland, Thomas, & Robson, 2001). Given the mixed-method design of the current intervention and limited power to detect effects of a given size on the objective measures, using focus groups as a means for triangulation allowed us to enhance our understanding of the phenomenon of interest (Valentine, 2005), orientate to a relatively new research area, and evaluate the methods used in the project (Longhurst, 2003).

5.5.2 Volunteer diaries

In the social sciences, a diary or other self-reflective practices are considered as unique and valuable research tools. A researcher can use them to record participants' attitudes, their personal, structured responses, and research-related activities (Given, 2008). Those qualitative methods for documenting consecutive events and "the particulars of experience" (Bolger et al., 2003, p. 579) also offer the opportunity to examine the reported information in the natural context and minimise retrospective bias (Coxon, 1999) .

Rationale for volunteer diaries. In experimental designs such as the current pilot RCT, the diary method can be effective in capturing relevant interactions, changes in the process, or participants' feelings at the time of their occurance during the investigation (Alaszewski, 2006). While questionnaires and interview data can be associated with some shortcomings

in terms of retrospective recall, diaries generate less biased data (Stone et al., 2003). Therefore, a diary was employed in the current pilot study for monitoring purposes, and as a record of participants' engagement, observations, and intergenerational activities in a structured format that provided a temporal dimension to the data. Given the relatively long duration of this trial, it was important to implement a method for recording volunteer adherence and experiences, to identify potential variations over time. Furthermore, data analysis of diaries allowed identifying factors (e.g., stressors or rewards experienced during participation) underlying intra- and interpersonal variability (i.e., in generative achievement, cross-age attitudes) recognised in outcomes from objective measures used in this intervention (Bolger et al., 2003).

5.6 Data Analysis

In the current qualitative studies, thematic analysis was used to explore evidence from both diaries and focus groups. Thematic analysis is a method of identifying themes and patterns within data in relation to the research questions (Braun & Clarke, 2006). This approach is not theory-bound, which gives the researcher theoretical freedom of choosing across a range of epistemological or ontological frameworks (Braun & Clarke, 2013). This flexible method can be adjusted to different research questions and needs. Unlike some qualitative approaches, thematic analysis can be used to analyse various types of qualitative data (e.g., interviews, focus groups, diaries) and address a wide range of perspectives and experiences. This is particularly useful in generating findings in applied research that need to be accessible to a wider audience and inform policy development.

Thematic analysis is the most widely used qualitative method in social and health sciences (Guest et al., 2012). Nonetheless, many theorists argue that this qualitative approach should be defined as a process underlying other qualitative methods rather than being considered as a stand-alone method (e.g., Boyatzis, 1998; Holloway & Todres, 2003). The main criticism

is the fact that thematic analysis consists of core stages of the analytical procedure that can be identified in many other qualitative approaches (e.g., interpretative phenomenological analysis, grounded theory). Conversely, this aspect of thematic analysis is claimed by other authors to be an advantage of the method as it provides researchers with no prior experience of using qualitative analysis the opportunity to develop foundational skills for implementing other forms of qualitative approaches to analysis (Braun & Clarke, 2006; Nowell, Norris, White, & Moules, 2017).

5.6.1 Rationale for thematic analysis

Although not always recognised as a method in its own right, thematic analysis was chosen for the current studies to illuminate the meanings the different groups of participants attached to IE and the consequences of such meanings for social practice with those groups (Braun & Clarke, 2006; Joffe, 2012). This qualitative approach also allows us to address various research aims and questions, as well as to generate unanticipated results (Nowell et al., 2017). Considering that this study aims to provide both insightful and novel findings, and to complement outcomes examined in the pilot quantitative study, thematic analysis was deemed the most suitable method for the current analyses.

Raw data-based codes allowed for the emergence of new conceptual ground on IE and then to “move to broader generalisations” (Alhojailan, 2012, p. 41). Although qualitative analysis is always influenced to some extent by the researcher’s standpoint and knowledge, the standard inductive thematic analysis chosen for this study enabled us to ensure the identified themes were strongly linked to the data and not shaped by existing theories or previous research (Braun & Clarke, 2013). Moreover, unlike other qualitative approaches to analysis such as interpretative phenomenological analysis or discourse analysis, thematic analysis is not fundamentally underpinned by any existing philosophical positions or the epistemological and ontological stance. This flexibility offers the researcher a chance to identify a theoretical

construct that is particularly suitable to the project's aims and research question. Thus, this qualitative approach was considered to be well-suited for its ability to capture subtle nuances and latent meaning in the participants' narratives, and for its flexibility of data explanation.

5.6.2 Thematic analysis, epistemology, ontology and social phenomenology

Choosing a qualitative approach in research involves adopting appropriate ontological and epistemological positions that are consistent with the research aims (Smith et al., 2009). As this qualitative study was focused upon experiences and perceptions of IE, the researcher generated the knowledge based on participants' reflections on the reality they created through interactions with others in a specific social context. Therefore, a relativist/constructionist position was identified as the most suitable philosophical stance for this study. In other words, the conceptions that participants create of the world do not exist independently of context, and their attitudes towards the given context and others are not stable constructs (Braun & Clarke, 2013). Those conceptions and constructs can be modified through access to knowledge within certain social realms. How individuals construct these views of reality became the key aim of my exploration of theory and literature on IE, which brought me to social phenomenology.

The current qualitative studies explored various aspects of an IE programme in a real-world context. Given that volunteering in the school-based programme constituted an opportunity to learn and establish meanings through social interactions, understanding of the phenomenon required examining shared understandings of a subjective experience. Social phenomenology that approaches individual experiences of phenomena as socially constructed and attached to the outside world (Schütz, 1967), was considered as appropriate theoretical framework for these qualitative studies.

At its core, social phenomenology is a phenomenological approach that endeavours to examine and describe the content of conscious experience by

establishing its essence (Smith et al., 2009). The essence of phenomena is manifested by invariant characteristics that can be uncovered through an examination of meanings that individuals derive from their lived experience (Wojnar & Swanson, 2007). Exploring these meanings cannot occur without understanding the intentionality of the experience. In other words, people's understanding of a phenomenon is always considered in association with their emotions, thoughts, and expectations they direct at an object, something that means something to them (Hein & Austin, 2001).

Phenomenological inquiry is focused on the personal experience that occurs in the individual's consciousness and is not influenced by their actual relationship with the world (Smith et al., 2009). Thus, preconceptions and personal beliefs are set aside to illuminate the subjective experience of given phenomena. However, as individuals cannot separate themselves from the world they live in, this impacts their decisions and provides knowledge to understand their experiences (Wojnar & Swanson, 2007). Therefore, social processes and contexts lying underneath the subjective perceptions should be considered as their constituents.

Schütz's (1967) social phenomenology emphasises the impact of the social world on how meanings are structured and identifies these meanings beyond a purely individual process. The invariant properties of a social phenomenon can be explored by examining subjective experiences of more than one person due to the commonalities found in subjective views and understandings of the external world (Ajiboye, 2012). Therefore, social phenomenology was chosen as a theoretical framework for the current qualitative studies to capture the collective meaning-making of IE. It was important to explore the essential features of the phenomenon (IE) that grasped the consciousness of all active research participants.

A social phenomenological approach lends itself well to the thematic analyses employed within the current research studies. Codes and themes as the commonalities among participants' experiences were identified across the entire data set and allowed a description and interpretation of the essence of IE. Participants' experiences and knowledge of the social world

were also acknowledged as foundations of their current subjective experience of the programme. Since experiences cannot be separated from people's beliefs, prior knowledge or contexts (Miles et al., 2013), it was intended to unravel the unique patterns of IE embedded in a more complex participant's view of the world.

5.6.3 The process of analysis

The process of analysis involved six key stages as suggested by Braun and Clarke (2006). These included the following: (1) reading and familiarising with the data; (2) generating initial codes; (3) searching for themes; (4) reviewing themes; (5) defining and naming themes; and (6) producing the report. The extracts presented in the analyses have been selected as they represent the most powerful and insightful quotes and capture the very essence of each theme.

Identifying patterns and themes. In these studies, the data from diaries and focus groups (with three different groups of participants) were approached as four separate data sets and analysed using Braun and Clarke's (2006) guide to conducting thematic analysis. The analytical process for each of the data sets proceeded as follows:

Phase 1. Become familiar with the data.

Verbatim transcriptions of the recorded focus groups and written diary entries were produced by the researcher and constituted a beginning of the process of analysis (Braun & Clarke, 2006; Ryan & Bernard, 2003). Transcribing enabled the researcher to immerse herself in the data and familiarise "with the depth and breadth of the content" (Braun & Clarke, 2006, p. 87; Patton, 2015). Then, the process of careful reading and re-reading of the transcripts began, when the initial patterns of meanings were uncovered across the

entire data set (Rice & Ezzy, 1999). During this stage, initial notes were made that were then used in the subsequent stages of the analysis.

Phase 2: Generating initial codes

This phase involved organising the data into short basic segments that were of particular interest to the researcher and relevance in terms of the research questions. Given that an inductive approach to analysis was chosen for this study, each data item was given “full and equal attention” (Braun & Clarke, 2006, p. 89). The researcher worked systematically through the transcript, using an electronic copy of the document. Each data extract was highlighted and coded, indicating potential patterns of meaning. The extracts were then copied to a separate file and collated with an appropriate code(s) (see Table 5.1).

Table 5.1

An example data extract collated with codes.

Data extract	**Code**
Well, I’ve been retired for eight years; I haven’t done a lot, and I thought, ‘Why not, get out of my comfort zone, go and do something different’.	1. Seeking something new 2. Pushing comfort zone/being set up for a challenge

The credibility of this phase was enhanced by the involvement of two researchers in the process of analysis. The author of this thesis worked through the entire focus group and diary data, whereas a senior colleague, expert in qualitative research, acted as a secondary reviewer and independently coded 25% of each data set. Due to the use of inductive thematic analysis, no codebook was created for the current research. Therefore, it was not possible to quantify intercoder agreement (ICA; Guest et al., 2012) given that two people cannot employ the same standpoint to the

transcript (Joffe & Yardley, 2004). Intercoder consistency was, however, established through comparisons and discussions between the researcher and the secondary reviewer on overlaps and discrepancies in data interpretation (Thomas & Harden, 2008). The researcher and the secondary reviewer met fortnightly throughout the whole process of analysis to allow time for revising the findings and to examine any changes in their approaches to data as they engaged more deeply with them. Detailed notes were taken during each of the meetings and the progress communicated to the Chief Investigator (CI) to ensure transparency and timely progress.

Phase 3: Searching for themes.

This phase began once the researcher had coded and collated all relevant data extracts. The codes were analysed and combined to generate overarching themes and sub-themes (Braun & Clarke, 2006). The process of theme development was not always dependent on quantifiable measures (e.g., number of codes collated or data extracts), but on whether they captured important details related to the research questions (Braun & Clarke, 2006). No codes or data were discarded at this stage to allow more thorough examination of the extracts in the subsequent stage.

Once the researcher defined candidate themes and subthemes, she presented her list and visual representations to the external reviewer. Through discussion, it became apparent that some themes were too broad or overlapped with other themes. Inadequacies of candidate themes and initial coding were also identified at that stage, requiring several amendments.

Phase 4: Reviewing themes

During this phase, candidate themes identified at the previous stage were reviewed in relation to the coded extracts and the entire data set. Some of the separate themes formed in Phase 3 clustered together or were categorised as sub-themes within a main theme. In this process, internal homogeneity and external homogeneity were taken into consideration,

allowing the researcher to recognise meaningful coherence of the data within themes and apparent differences between themes (Patton, 2015; Braun & Clarke, 2006). First, the coded extracts for each theme were read and evaluated regarding whether or not they represented coherent patterns. The same process was then applied to the entire data set to ensure the identified codes and themes reflected the meanings apparent in the whole text. A thematic map was used to organise the collated data and examine the coherence of and distinctions between generated themes.

Finally, the external reviewer examined the coded data extracts and verified the consistency of patterns identified within each theme. Following the credibility check, two themes were collated due to insufficient data to support one of them. Consequently, some of the sub-themes were renamed to capture the meanings of both the previously assigned data extracts and the rearranged codes.

Phase 5: Defining and naming themes

At this stage, the researcher and the secondary reviewer revisited the names of the themes and sub-themes identified in Phase 4 to ensure they captured the sections of data they referred to and were sufficiently clear in relation to the research aim. The order of the themes was also discussed and organised chronologically to reflect consecutive stages of IE. Once the themes were considered final, the researcher wrote a detailed analysis of each theme to determine whether they needed further refinement and whether they provided a logical and coherent narrative of all participants' accounts.

Phase 6: Producing the report

In this final phase, the researcher wrote a final analysis of the selected data extracts. Both short and long quotations were incorporated into the text to illustrate the interpretation and highlight prevalence of the theme (King, 2004). The researcher engaged in the analytical process by progressing from

description of the data to interpretation in the context of the intergenerational intervention.

Although the analysis aimed to identify specific patterns of meaning that participants attached to intergenerational volunteering, individual comments were valued to the same degree as those which were repeated by the participants (Fereday & Muir-Cochrane, 2006). However, the analysis clearly separated the views which were shared by the majority of focus group interviewees from the individual accounts which provide meaningful explanations. In other words, the reader will be presented with “the predominant and important themes” (Blacker, 2009, p. 83) identified in the entire data set that reflect a full, collective account of experiences of IE.

5.6.4 Validity

A range of criteria have been developed to evaluate the quality of qualitative research (Lincoln & Guba, 1995; Yardley, 2000; Elliot, Fisher, & Rennie, 1999). In the current studies, Yardley’s (2000) four validity principles were applied due to their flexibity in terms of theoretical assumptions and methods used, as described below.

Sensitivity to context. The researcher demonstrated her sensitivity to context by identifying and describing the relevant empirical literature in the systematic review (see Chapter 2). Following the literature searches and their evaluation, the gaps in evidence were identified and aims of the current research formulated. This first quality principle was also applied in the process of data collection and analysis. Ethical issues in relation to participation of vulnerable groups (i.e., children) were considered prior to the commencement of the focus groups. Furthermore, during group discussions, participants were asked open-ended questions that encouraged them to reflect at length on programme-related issues that were of particular relevance to them. Collected data were then analysed using an inductive approach which enabled the researcher to identify boader and unanticipated patterns of participants’ perceptions and experiences of the IE programme,

without imposing the researcher's personal interest or theoretical assumptions to the data.

Commitment and rigour. This principle can be demonstrated by thorough data collection, data analysis, methodological competence and skills, and in-depth engagement with the topic (Yardley, 2008). The researcher's commitment to and in-depth engagement with the study began two years prior to the data collection for the current study, when she gained several months of experience of working with children in a primary school setting in Scotland as a pupil support assistant. This experience helped her design the study, as well as to identify and address potential issues related to its implementation. It also allowed her to obtain unique insights of a supporting role within the school environment and hence, an in-depth understanding of the various participants' perspectives.This study was also sound and rigorous in terms of data collection and analysis. A purposive and homogeneous sample selected for this study represented a sufficient range of individuals that enabled us to capture different perspectives on IE. The analysis was validated by the secondary reviewer, who carried out credibility checks on coding, themes, and interpretation. In relation to methodological competence and skills, the researcher had previous experience of conducting qualitative interviewing and the external collaborator was an expert in qualitative research.

The credibility of this research was additionally enhanced by triangulating data sources. The researcher and the secondary reviewer cross-checked the consistency of evidence obtained through the older adults' focus group and diary. Further, analyses of children's and teachers' focus groups were combined with the analysis of data from the school climate survey (see Chapter 7).

Coherence and transparency. The coherence of a qualitative study refers to the extent to which its methods and analysis are justified and consistently adapted (Yardley, 2008). As described in the previous sections of this chapter (see Section 5.2), the researcher carefully selected appropriate

methods of data collection and analysis that fit the study procedure and research aims. A consistent argument built upon an adequate research method and qualitative interpretations contributed to transparency in the current study. To enhance the efforts to deliver a transparent account of participants' experiences, the researcher provided the reader with a detailed description of the methods used and supported her analytic interpretations with text excerpts and quotations.

Impact and importance. The meaning of research can be evidenced by its impact (Yardley, 2008). The current study aimed to contribute to health promotion amongst community-dwelling older adults, as well as to inform about IE and its implications for policy makers, local councils, and general audiences. The importance of understanding older adults', teachers' and pupils' perceptions and experiences of IE needs also to be emphasised, considering potential intervention modifications, as well as the successful collaboration and retention of participants in future full-scale IE programmes.

5.7 Ethical Considerations

This qualitative research was reviewed by two independent ethics committees. Approval was first granted by the School of Psychological Science and Health Ethics Committee at the University of Strathclyde (Ref: 03/06/03/19/A), followed by the West Lothian Council Ethics Committee (Ref: A9949458; both approvals received March 2019). Following ethical approval, the Head Teachers of both schools chosen for the focus groups received a formal invitation letter (Appendix U) from the Chief Investigator (CI) and provided in-principle agreement to participate in the research.

5.7.1 Informed Consent

Parent/guardian information letter and consent. Parents/guardians of the pupils involved in the IE with the programme volunteers were contacted in

March 2019. They were asked for their permission to involve their children in a focus group with other children from the school. They were provided with an information letter that was handed out to them by their children (see Appendix V). The letter explained to them what was involved in participation, and what would happen with the information collected during the focus groups. The researcher's and the CI's contact details were also provided in the letter so that parents could find out more about the study, if required. Additionally, they were required to opt their children in to participating in this qualitative study by returning a reply-slip that was attached to the information letter. The reply-slip was required to be handed in to the school staff to be passed to the researcher. Only children whose parents returned the reply-slip took part in the group discussion.

Child participant information and consent. The focus groups with pupils involved children under the age of 12 years, therefore the parents/guardians' written and minors' verbal consent was sought prior to the group discussion, as per recommended best practice guidelines (World Health Association Declaration of Helsinki, 2000; The National Children's Bureau, 2011). At the beginning of the focus groups the researcher informed the children about the purpose of the meeting, what was involved in participation, allowed them to ask questions, and gave them the opportunity to withdraw. All the information about the study was provided in clear language that the participating children could comprehend.

Adult participant informed consent. The teachers and older adult volunteers were provided with an overview of the qualitative study in the invitation letter (Appendice V) and an email sent to them by the researcher (older adult volunteers) or on the researcher's behalf by the Head Teacher (the teaching staff). The purpose of the focus groups, their procedure, and requirements were explained to them. The potential participants were then given the opportunity to contact the researcher and ask questions. Next, Participant Information Sheets (Appendix P) were provided to the volunteers and the teachers prior to the commencement of the focus groups. They were advised

to read it carefully in the presence of the reasearcher, encouraged to ask questions, and after any questions were addressed, were asked to sign a Consent Form if they wished to proceed.

5.7.2 Potential ethical issues related to taking part in the focus groups

Potential distress related to taking part in a focus group. There were no anticipated risks to taking part in the focus groups, particularly as no sensitive topics were planned to be discussed. However, if participants felt uncomfortable at any time during the study, the plan would be for the discussion to be halted, and the researcher (and school staff in the case of pupils) would be available to provide support. A detailed evaluation of these and other associated risks was prepared prior to the commencement of the focus groups and approved by the Ethics Committee.

In the current focus groups with all three groups of participants were conducted with no concerns raised that would require session to be paused or participants to withdraw. Also, participants were informed that they could withdraw from participation at any time without giving a reason and without any consequences. Participants were also clearly informed via the information sheet, and verbally at the start of the session, that, although the discussions were audio-recorded, their personal details and personal details of any other people mentioned during the discussion would be removed from the transcripts.

Potential disclosure of negative experiences within the school-based programme. Although there were no sensitive topics to be discussed during the focus groups, a procedure was in place for any participant who disclosed negative experiences of participating in the school-based intervention, either during or immediately after the group discussion. No concerning issues were disclosed during the focus groups.

Coercion. All study participants were provided with an invitation letter Appendix V), in which they were informed that their participation was on a

voluntary basis. They were not coerced into participation. In addition, the older adult participants were offered offsite venues (at the local Partnership Community Centre) to ensure a sense of coercion was minimised and freedom to speak openly about the programme was maximised. Participants were approached by the researcher only if they expressed their willingness to participate via email, letter, phone or via a reply-slip (the children only).

5.8 Summary

This chapter provided an overview of qualitative methods chosen for and applied in the current studies. The rationale for using a qualitative approach to data collection, and specifically the use of thematic analysis, were described relative to existing literature including relevant theories. Focus groups and diaries were identified as being the most appropriate qualitative research tools for the research purposes and questions. Finally, the researcher's efforts to establish validity in this qualitative study were outlined, and ethical considerations described. A follow-up discussion about the qualitative methods used, including a detailed description of the sampling, procedure, data analysis and collection methods used in each specific study, along with the findings from the qualitative data, will be presented in Chapters 6 and 7.

CHAPTER 6. Older adults' perceptions and experiences of voluntary participation in Generation for Generation.

6.1 Chapter overview

In this chapter, qualitative data will be presented on older adults' experiences of voluntary participation in the primary school-based intergenerational engagement (IE) programme Generation for Generation (Gen4Gen). Data were gathered from all volunteers' diaries completed during their six months of participation, as well as a focus group conducted with Cohort 1 after they completed the 6-month programme. The chapter will begin with an introduction on the background research on the perceived impacts on and experiences of older adults participating in IE. Then, the study aims, methods, and analysis will be described, and results will be reported. The diaries and focus group data were treated as two separate data sets and presented in the form of a narrative for each theme identified. Finally, the results will be followed by a discussion of the obtained findings. In preview, the results showed that IE can contribute to a number of personal and interpersonal benefits including regaining a sense of purpose, sense of belonging and appreciation, and building new social connections. Notably, this programme was also associated with some challenges such as physical demands, financial issues, and fear of overstepping.

6.2 Introduction

As outlined in the preceding chapters, in order to help maintain or even improve health, wellbeing and social functioning in the ageing population, opportunities could usefully be created to encourage more older people to actively participate in and contribute more to their communities (WHO, 2015). Community engagement enables older adults to be more active within their environment and to retain their ability to make their own decisions about everyday functioning (i.e., maintaining autonomy) that in turn, can provide a

sense of integrity and independence (Stephens et al., 2015). Furthermore, meaningful social roles and reciprocal relationships are important for maintaining an older adult's self-esteem and can serve as a motivator/facilitator for continued social involvement (Heaven et al., 2013). Therefore, it is essential to develop interventions for effective engagement that facilitate transition to healthy retirement by offering a sense of purpose and self-growth through community participation (Reichstadt et al., 2010).

The typical changes in lifestyle associated with retirement (e.g., a decrease in physical activity and in the number of social network ties; Kauppi et al., 2021; Zantinge et al., 2014) require gradual adaptation and can be balanced by engaging in past social roles, in familiar environments, using professional or personal skills, and maintaining social relationships (Atchley, 1999). For example, passing on knowledge, values, or traditions to younger generations via mentoring or teaching enables continued active involvement based on lifetime experiences and does not involve dramatic changes in behaviours and work-related strategies (Chan & Nakamura, 2016). Knowledge exchange activities can also contribute to fulfilling older adults' inherent generative desire to promote the next generation, create a legacy, and 'give back' to society (Erikson, 1950; McAdams et al., 1993). Thus, their generative actions are not only important in terms of continuing development towards autonomy and independence in later life, but they are also an opportunity to support individuals and promote integrated communities.

The existing qualitative evidence (see Chapter 2) indicates that older adults participating in IE have potential to experience a range of benefits, including enhanced self-esteem or sense of self-worth (Wilson et al., 2013; Santini et al., 2018); a sense of achievement and pride (Alcock et al., 2011); positive attitudinal changes towards the younger generation (Barnard, 2014; Belgrave & Keown, 2018; Chapman & Neal, 1990; Santini et al., 2018) as well as towards their own age group (Johnson, 2015). Moreover, the knowledge and skills learned from the younger generation were found to serve as a means for older adults to connect with family, friends, and wider social networks, as well as enhance their sense of independent living and

provide practical support in everyday life (Lee and Kim, 2019). The potential effect of IE was also reported on purpose of life, but the findings were not substantiated with sufficient evidence (Barbosa et al., 2020). Overall, the qualitative findings consistently contributed to quantitative evidence demonstrating benefits of IE on older adults' social functioning. Specifically, the positive effects of IE on self-perceived generativity (Wilson et al., 2013; Chippendale and Boltz, 2015; Mahoney et al., 2020) and improved/reinforced positive perceptions of the younger generation were shown (Barnard, 2014; Belgrave & Keown, 2018; Chapman & Neal, 1990).

Overall, as outlined in Chapter 5 (see Section 5.2), there is a limited number of qualitative studies on this topic that have generated information-rich data and provided in-depth interpretations of the findings (Alcock et al., 2011; Santini et al., 2018; Wilson et al., 2013). Moreover, only one study to date explicitly explored both challenging and rewarding aspects of participating in a school-based engagement that may be unique for this type of voluntary interactions (Varma et al., 2014). However, participants in the Experience Corps programme (Fried et al., 2004; Varma et al., 2014) were receiving a stipend, which eliminated financial challenges/barriers that could potentially occur if the programme was on a completely voluntary basis. In addition, Varma et al. (2014) examined volunteers perceptions of a high-intensity (15hrs/wk) intervention implemented in large urban schools in the US that may not be generalisable to other settings and sociodemographic contexts. Further to this, to our knowledge, there is no high-quality, in-depth qualitative evidence examining the motivators for joining a school-based programmes that could inform future research in terms of design and recruitment strategies. To date, exclusively survey data have been used to identify main categories of motives and their impact on the subsequent volunteer experience, with limited detail available (Chen & Morrow-Howell, 2015).

The primary aim of this study is therefore to explore older adult volunteers' perceptions and experiences of participating in a school-based intergenerational programme. This qualitative multi-method study will also

seek understanding of motivations for joining the programme, perceived gains and challenges associated with participation, as well as the personal and interpersonal meanings of the engagement. Two methods of qualitative data collection (i.e., focus group, diaries) were used to provide a comprehensive qualitative analysis of school-based IE by exploring volunteers' experiences and perceptions of the programme (for more details see Sections 5.5.1 & 5.5.2). In addition, the current qualitative analyses will offer a complementary and explanatory account of the quantitative findings obtained in the RCT (see Chapter 4), and this broader context will be discussed in Chapter 8. Finally, applying a qualitative approach will provide an opportunity to receive feedback on the systemic and organisational issues related to the continued development and implementation of the intervention, such as pre-programme induction, training, and volunteers' schedules.

6.3 Design

A multi-method qualitative approach was used to allow cross-validation of the results (see Chapter 5 for methods details). Data source triangulation (Patton, 1999) involved analysing the diary and focus group data sets separately, followed by synthesising and comparing the findings. This approach allows cross-checking the consistency of evidence obtained from different data sources.

6.4 The diary study

6.4.1 Methods

Sampling. The core inclusion criterion for participating in this qualitative component was active engagement with the programme. Volunteers from all three cohorts (n = 18) were asked to record weekly diary entries over the course of their involvement, 16 of whom complied with the request. The demographic characteristics of this cohort are described in section 4.4.1.

Data Collection. The diary for this study was prepared prior to the commencement of the school-based intervention (September 2018) and included open-ended questions such as '*What did you like the most/the least about this week?*' and '*What activities were you involved in?*' (Appendix W) Although these semi-structured entries were mainly used for monitoring purposes as mentioned previously, including hours of participation in a given week, they were also used as an effective, regular channel of communication between the researcher and participants. Thus, the records provided valuable feedback on the programme and allowed the researcher to address any organisational problems that could have compromised participants' adherence.

Procedure. The diary was submitted each week over the six-month participation period via a locked deposit box located in the school offices. To ensure pseudo-anonymity, participants used their participant numbers and were asked not to identify individuals in any reflections.

Data Analysis. The older adults' diaries were approached and analysed as a separate data set to enhance trustworthiness of findings (Morse, 2009). The data recorded by 16 volunteers was considered in this analysis, to reveal a broader spectrum of perspectives and better understanding of the nature of intergenerational engagement. Since the diary in this research was predominantly used for monitoring purposes, it contained very short reflective entries summarising a limited group of categories (e.g., school activities, activity settings, positive and negative aspects of engagement). This structured format enabled patterns to be identified easily and facilitated quantitative coding (Alaszewski, 2006). Thus, we were able to identify different activities, settings and pupil year groups involved in the programme, and assign the number of participants that reported those characteristics in their diary entries. Therefore, these data will be presented both quantitatively (where possible) and qualitatively, in the form of a narrative using thematic analysis (Braun & Clarke, 2006). The researcher worked through the entire diary data and the expert secondary reviewer analysed 25% of the records.

Volunteers' names are replaced by a V (volunteer) or a VT (volunteers with teaching background) throughout to preserve participant anonymity.

6.4.2 Results

Given that the diary was completed regularly (weekly) and used in this study primarily for monitoring purposes, it required only concise reflective entries to pre-set questions. The obtained data were therefore firstly approached to capture the contexts of IE. According to participants' records, the majority of them (n = 15) assisted at least two age groups involved in the project (P1-P4; children aged 4.5-8 years of age), although five volunteers supported all four age groups (P1-P4). Participants were involved in a variety of school activities, including literacy and numeracy support, as required by the programme (n = 16), as well as arts and crafts (n = 6), outdoor learning (n = 3), computer tasks (n = 4), singing/dancing (n = 12), nurturing activities (e.g., assemble for feelings dice; n = 5), and physical activity (PE; n = 4). All volunteers reported working with pupils on a one-to-one basis, in both smaller and larger groups, and within the whole class along with the teacher, showing that a variety of interactions took place.

Thematic analysis of participants' responses regarding experiences of participating in IE resulted in two main themes: programme benefits and programme challenges. In addition, each of the themes revealed interpersonal and personal dimensions of reported experiences.

Theme 1. Programme benefits

A number of positive experiences associated with IE were reported on a weekly basis. They ranged from volunteers' enjoyment of in-school interactions with pupils, teachers, and other helpers, to their personal satisfaction and a sense of achievement.

Interpersonal. The most frequently reported interpersonal reward of participating in the project, was the opportunity of 'watching and interacting

with young pupils as they engaged with their learning' (VT7). The more time volunteers spent assisting the same individual or groups of children, the more chance they had to get to know them, 'the different personalities of each child' (V8), 'different characters among the children' (V2), and their specific needs. Regular interactions allowed them also to see children 'improve in their understanding of the topic being taught' (VT6), their 'steady progress in learning outcomes' (VT4), and increased confidence when approaching new tasks. A sense of achievement accompanied each 'small breakthrough' (VT14) in communicating or each relationship built with pupils, especially with those with additional needs.

Although volunteers were primarily motivated to help pupils and provide meaningful assistance to the teachers, they also recognised in the programme 'potential for mutual benefits' (V15). Volunteers mentioned enjoyment of learning from both teachers and pupils, and personal satisfaction when they were able to share their own experiences. Those with a teaching background reported particular satisfaction when they realised that their expertise and skills 'could be still of use to someone' (VT4). Overall, volunteers were open to 'learning about using new technologies in the classroom' (V16) and teaching approaches that varied across teachers they worked with.

Personal. Volunteers viewed participating in the programme as an opportunity to establish a new weekly routine, 'two days of structure' (VT7) that allowed them 'to be back in a work environment with other adults' (V11) and that for some 'seemed like a real job' (V13). They 'enjoyed having more responsibility and a variety of work' (V2), 'feeling useful' (V14), and 'learning about new aspects of modern teaching' (V2). The staff's and pupils' welcoming approach to volunteers expressed consistently from the beginning of the programme, allowed them to perceive themselves as part of 'a team' (VT7) as well as, made them feel 'trusted' (V8), 'included and valued' (V15). Further, the school's enthusiastic and accepting attitudes enhanced their confidence in the role and made them realise the usefulness of their contribution.

Theme 2. Programme challenges

Programme challenges were mainly related to assigned activities, work settings (e.g., group work, one-to-one support), and interactions with pupils. Within this theme the most frequently reported issues were the difficulty of making children focus on tasks, a challenge of managing disruptive behaviour, and working with children with additional needs. Other challenges that were infrequently mentioned over the 6-month engagement included physical (e.g., mobility, noise level), organisational (e.g., travel, volunteering hours, lack of a pre-programme meeting with the teachers), and external issues (e.g., concerns about pupil's future, poor parenting).

Interpersonal. Most of the volunteers reflected on the need for identifying strategies to encourage pupils to concentrate and perceived their efforts as 'a Herculean task to keep some of the children on task' (V12). They reported that pupils, especially those with additional needs, had difficulty focusing and 'follow adult instructions-even when they had to do something they liked' (VT7). An additional challenge constituted 'the language barrier with a couple of children who don't have English as a first language' (V14), which interfered with the process of working with pupils and made volunteers feel that they 'didn't achieve very much' (VT4). They also witnessed 'how one child's behaviour impacts on the class' (V8) and often had to address behavioural problems themselves when working with larger groups. Dealing with pupils' misbehaviour made them feel that they were either going 'to lose control – knife edge feeling' (V6) or that they had to be 'in charge' (V6) of the situation as part of their role requirement.

Volunteers were also asked to report any concerning issues to the teachers such as potential signs of neglect. Some of them expressed their concerns seeing children withdrawn, with a lack of energy or distressed. It made them wonder 'how difficult life is for some children' and worried of 'what will happen to some of these children in the future despite the great efforts made by the school at this time in their lives' (V12). They witnessed how 'some children struggled while other children thrived' (V7), how they were

‘not getting reinforcement from home’ (V12), indicating that ‘more additional support should be available, especially at the early stages – P1, P2’ (VT6).

Occasionally, volunteers were concerned whether they had the right approach to teaching and did not know ‘how much help to offer to the children when they were struggling’ (V12). Partly this issue was about not helping too much and letting pupils work the tasks out by themselves, but it was also about not having the appropriate strategy. A challenge of establishing the extent of the support provided to pupils was often co-reported with uncertainty regarding the extent of communication and collaboration with the teachers that they were supposed to maintain. They often reported ‘the lack of time to liaise with staff with regard to strategies’ (VT7) or ‘no time to go into long explanations’ (V12) about the tasks they were asked to do, ‘when faced with challenging behaviours’ (V7).

Personal. Personal difficulties were reported fairly infrequently and were mainly related to physical challenges of participating in the programme. The first weeks of engagement appeared to be the most trying: ‘I feel it was more physically and mentally tiring than I thought it would be’ (V13). Some of the physical challenges reoccurred in volunteers’ diaries, including ‘a lack of adult height chairs in P1 classrooms causing hip pain’ (VT14); sore knees as they ‘”clamber” up and down the floor’ (VT7); or ‘the noise level being quite distracting’ (V12). Some of the volunteers reported that part of their duties was to assist pupils in outdoor learning. Although they enjoyed the experience that usually was in line with their physically active lifestyle, they also recognised the downside of this type of engagement: ‘I think the outdoor activity will not suit everyone in my age group. I am used to the outdoors, walking my dog up to 35 miles per week. Other ‘Generation for Generation’ volunteers may not be so inclined’ (V1). Conversely, volunteers did not like ‘periods of inactivity’ (VT14) when they were not able to work with pupils or contribute in any other meaningful way. They often reported feeling like ‘a bystander in music or PE/dancing’ (VT6) or ‘not useful when supporting lower classes’ (VT10).

6.4.3 Summary

In summary, the diary entries revealed a number of personal and interpersonal benefits and challenges associated with volunteering in Generation for Generation. The interpersonal positive aspects of the programme were mainly associated with the enjoyment of working with children, developing special relationships/connections with them, and satisfaction of seeing them improve. The interpersonal benefits included a sense of belonging, being valued and respected, as well as regaining confidence, and establishing new weekly routine. The interpersonal challenges were mainly related to uncertainties regarding boundaries of volunteer roles, activities settings (i.e., one-to-one, group work), and children behaviour and their external stressors (e.g., poor parenting). The personal challenges included physical challenges of engaging and organisational issues with scheduling volunteers' activities. More in-depth reflections on experiences of volunteering in Gen4Gen will be outlined in the subsequent section.

6.5 The focus group study

6.5.1 Methods

Sampling. The core inclusion criterion for participating in the focus group was active engagement with the programme between September 2018 and March 2019. All older adult volunteers from Cohort 1 (n = 7) were therefore invited. The sample consisted of one male and six female participants aged 63-80 years (*M* = 67.9; *SD* = 6.18), all were White British, and four were married. Participants had between 0-3 children (*M* = 2.00; *SD* = 1.00) and 0-7 grandchildren (*M* = 2.57; *SD* = 2.57). All participants completed primary and high school education, and had between 2-7 years (*M* = 5.00; *SD* = 2.00) of higher/further education. All participants were retired but one had another volunteering role (not involving IE). When asked about their previous experience of working in the school environment, three reported teaching in

schools, two reported none, and two reported other non-teaching experience (e.g., administrative and catering roles). Participants were generally healthy and independent, with all of them reporting good (n = 1) or very good health (n = 6).

Data collection. A semi-structured focus group schedule was developed prior to the commencement of the focus group. Scheduled content reflected different aspects of the programme and different areas of potential perceived impact. Older adult volunteers were asked to reflect on the reasons they joined the programme, what activities they engaged in during the intervention, as well as whether they perceived any changes in their cognitive skills, social function, and physical/mental health. The focus group schedule (Appendix X) included questions such as: '*Can you share some of the reasons why you decided to become a Generation for Generation volunteer?';* '*What were some of the positive aspects (if there were any) in working with the children?'; and 'What were (if at all) some of the challenging aspects of working with schoolteachers?'*

The lists of questions were not followed in a rigid way, and instead, a process of reflecting (e.g., 'you said there that …') and probing (e.g., 'tell me more about that') was adopted (Smith et al., 2009). This allowed the participants to direct the content of the focus group and prioritise issues which they felt were central to the topic under investigation.

Procedure. The focus group, as an additional study to the pilot RCT (see Chapter 4), involved providing volunteers with a dedicated participant information sheet (see Section 5.7; see also Appendix P) and consent form, and took place in a private room at a local community centre (offsite) to ensure a sense of coercion was minimised and freedom to speak openly about the programme was maximised. On arrival, older adult volunteers were also given the opportunity to introduce themselves, engage in small-talk, and offered refreshments to enhance conversation and a sense of comfort (Krueger & Casey, 2009). The researcher introduced the study by outlining the purpose of the focus group, the procedure, and ethical considerations

(e.g., the right to withdraw from the study, the potential risks, data handling), and then initiated the discussion by asking the first question on volunteers' motivations for volunteering. The session lasted two hours and was concluded with a debrief (Appendix Q) including the information about the study they just participated, the right to withdraw, and contact details of a mental health charity (if they had concerns about their wellbeing), and those of the researcher, Chief Investigator, and an independent contact to whom issues could be raised.

Data analysis. Thematic analysis was used to interpret the focus group data in the current study. The process of analysis involved six key stages as suggested by Braun and Clarke (2006; see Section 5.6). It is noteworthy that in the extracts which follow, (…) represents text that was not included in the excerpts due to its irrelevance to the point being made and/or for conciseness.

6.5.2 Results

Five inter-related main themes were identified: 1) motivators for joining in; 2) reinforcers to engaging; 3) challenges of engaging; 4) barriers to engaging; and 5) importance of engagement. The themes are presented in order, reflecting both the chronology of engagement in the programme and frequency of information provided. First, this section commences with an exploration of the variety of reasons for joining in the intergenerational programme. Then, the school engagement period, and the different aspects that reinforced participants' commitment, are described. In two subsequent themes, challenges of and barriers to involvement are highlighted. Finally, the focus is directed on the particular experiences acquired by the volunteers and importance of the programme in terms of children's support. Themes and subthemes are listed in Table 6.1.

Table 6.1

Focus group themes and subthemes.

Themes	**Subthemes**
Motivators for joining in	Seeking something new A need to share/Sense of educational mission
Reinforcers of engagement	Sense of purpose Building new relationships Sense of belonging and appreciation Satisfaction of seeing children grow
Challenges of engaging	Physical challenge/Physical ability and disability Not in charge Fear of overstepping Seeing children's struggles Using technology
Barriers to engaging	Distance and financial issues Systemic issues
Importance of the engagement	Sharing Supporting Empowering Expectations versus reality

Theme 1: Motivators for joining in

Participants mentioned a number of reasons for entering the programme that reflected both their generative desire and intrapersonal motives. Generative reasons determined within the theme included a need to share

knowledge/experience and sense of educational mission, whereas intrapersonal reasons were related to seeking new experiences.

Seeking something new

Both volunteers who had teaching backgrounds and those who had no previous experience of working in the school environment frequently emphasised that joining the programme was determined by their desire to explore potential differences in the school environment:

> V5: It was completely out of my comfort zone, I've never been in a school since I was at school, so it's been a great experience and again, part of it is just seeing how methods of… Well, school's different!

> VT4: Well, I am a retired teacher. (…) So, my main thing was to see what the difference was in teaching and in schools in the seven years since I had retired.

As reflected in these excerpts, personal interest in teaching practice and professional curiosity about how the education system had evolved emerged in most accounts as the main intra-personal motivators for participation.

Some volunteers also noted that taking part in the programme was a new personal/professional challenge, or an opportunity to experience something novel and to leave what is convenient behind:

> V2: Well, I've been retired for eight years; I haven't done a lot, and I thought, 'Why not, get out of my comfort zone, go and do something different'.

> VT6: I taught (topic) latterly but getting right down to the basics and using… trying to find the language, a simplified language to get the

> children to understand. (…) So, all round, it was quite a challenge for me, you know. A new dimension to my erstwhile career.

Entering a new-old territory meant for many pushing boundaries or overcoming daily routine they had established over years of retirement. That is, the programme allowed them to explore a new path while escaping the well-known one. In further perspectives, embracing this new challenge constituted an opportunity for self-growth and to share with children 'some of the more basic stuff' (V1) such as reading, writing, and numeracy skills.

A need to share/Sense of educational mission

Learning about the programme seemed to allow volunteers to fulfil their latent generative intention of being able to help and work with children. The opportunity to influence and contribute to the next generation was indicated by all seven volunteers as one of the main interpersonal reasons for their participation:

> V3: I thought it looked really interesting as well and I thought, "Yeah, I've got lots of time and I've got a lot to give". And we've got life experiences, and you pass them to the children.

Volunteers often emphasised their availability and willingness to help and share their legacy with children. Having been aware of their intellectual and experiential capital, they wanted to positively influence children's future and enrich their lives through their own skills and knowledge:

> VT7: (…) one of my motivations is to just encourage children's love of books (…) some young children have never seen a book, you know, you give them a book in P1 and they don't even know how to hold it. And for me, that is the most important thing, it's to give them a

> foundation that so many children have and so many don't have, and I thoroughly enjoyed it.

Providing the younger generations with solid 'foundations', or teaching them 'the basics' was perceived as a means of creating opportunities for growth for many children – an opportunity they would perhaps not have had otherwise.

Further, the volunteers' efforts to provide a meaningful contribution could exceed the provisional support and become core and solid underpinnings of the children's education and future:

> V5: I was quite keen on the idea of education because I just think it's a basic, if they [children] can read and write, you've given them the world, and I was looking for a way in, so this is my perfect way in.

Thus, educating children and consequently giving them the 'basic' tools to build their own lives, appeared to be essential and meaningful vehicles for helping the next generation.

Applying knowledge and experience gained through professional work with children can also be perceived as an asset when considering possible solutions for an education-related issue:

> VT6: I thought I could contribute because I had been teaching. So, when I saw the advert in the church bulletin actually, I thought, "Hmm, I could do that maybe." (…) I thought… they keep talking about bridging the attainment gap and I thought, "Well, maybe I could help that way."

Making a difference in children's lives and responding to societal appeal to close the educational gap seemed to facilitate volunteers' determination and took their engagement to a higher level of relevance, transforming into a specific personal and rewarding mission.

Theme 2: Reinforcers of engagement

Participants reported a variety of personal and interpersonal aspects of their involvement that served as positive reinforcers to engage. The subtheme of sense of purpose emerged as an important benefit of participation that had a great effect on volunteers' everyday functioning. Social, interpersonal dimensions of engagement ranged from building new relationships with children and other adults in schools, through a sense of belonging to, and appreciation of, the new environment, to a satisfaction in seeing children grow.

Sense of purpose.

When asked about the most rewarding or positive aspects of participation in the programme, volunteers began with reflections on an intrapersonal dimension of the involvement. They described how the two 'best days of the week' (V2), often awaited with great anticipation, encouraged them to be more active and 'prevented two pyjama days' (V5). One of the strongest reinforcers of volunteers' commitment was related to the re-establishing of work routine and regaining a sense of purpose personally:

> V3: It was great getting back into work again (…) having a purpose for getting up two days a week and getting showered and dressed, which was brilliant.

> VT6: I suppose it gave me meaning to my day. I hate the idea of sitting in your kitchen, looking out the window, you know, "I wonder what I'm going to do today", so it was quite nice to have a structured day.

‘Having two days of structure’ (VT7) was also associated with enjoyment of being with the children, which ‘kept them young’, and being around other people in general:

> VT7: Getting a routine, getting out a couple of days a week where normally I would be sitting about. And stimulation and just going in and listening to all these people, to some of their ideas.

Building new relationships.

Entering a new environment, and working with both children and teachers, consequently led to establishing new relationships. Volunteers who had previous experience of working in schools had to re-define their position and how they interacted with people they used to work with professionally:

> VT7: I think that’s what I find is very different is; having been a teacher and now going in as a volunteer, it is completely different, and you build up a completely different relationship and it’s lovely. I love working with children, I always have done, I always wanted to be a teacher, and I’ve worked with children from four all the way up to 18, but it’s just… I enjoy…this is what this project is showing me; I actually enjoy being with children.

As reflected in this excerpt, being a volunteer as opposed to working as a teacher, means a different but not necessarily uncomfortable experience. Volunteers with teaching backgrounds perceived the individual, meaningful, and joyous time they could spend with children and with the school staff as a luxury that being in the teacher role could not necessarily provide.

The joy of working with children was also accompanied by a sense of responsibility, a realisation that they were perceived as professionals, as a source of skills and resources:

V5: They come asking you things, how to spell a word, how to do things, and I think that's the most important thing, that they start to understand that you're a source of help.

V2: Children are trusting me more, they are coming to me for help.

This shows that children gradually acknowledged the presence of volunteers, other adults in the classroom, who were supportive, approachable, and who could be trusted when help was needed.

This professional relationship between volunteers and pupils seemed to strengthen the relations with other adults in schools. Meeting and working alongside teachers and support workers was for many volunteers, especially those with no teaching background, an opportunity to observe and learn. They were mentored and enjoyed 'getting to know teachers, teaching methods and the children's different abilities' (V5):

V1: I think the teachers are remarkably skilled in a variety of different ways (…) Having observed, I tried it in a reading group, and it worked for me…observation, mentoring and coaching can be very helpful.

V2: Enjoyed the varied approaches to literary work-printed texts, using magnetic boards plus letters. (...) so many different aspects of modern teaching.

Volunteers also emphasised the importance of relationships with other volunteers in schools that prevented a feeling of isolation, but also provided reassurance, support, and a sense of comfort at difficult times:

V5: It was nice for me to meet other volunteers because one of the problems is you thought you were maybe struggling with something and chat and finding, no, it's not you, it's just as it is. And I think it was

> nice being able to say, ‘Look, I can’t cope with this group’, or…I think you felt okay to do that, which is nice. You weren’t kind of…you know, I felt okay to say, ‘I can’t do this’.

Thus, being around people who were also new to the school environment and who often experienced similar difficulties, made some volunteers feel at ease when asking for an advice or help. This supportive and approachable environment validated volunteers’ struggles and strengthened their resilience.

Sense of belonging and appreciation

Participants frequently emphasised the welcoming attitude towards them that began on their first day of involvement and how it gradually developed into mutual trust between them and teachers, and provided a sense of inclusion:

> V3: The headmistress said to us when we met her, the last week we were there, ‘Do you feel part of our family?’ She said, ‘You are part of our family’. I said, ‘Yeah, we do’. (…) And the school…the staff and pupils were absolutely fantastic. They made us welcome from day one.

This excerpt reflects commonly reported accounts of favourable and nurturing attitudes of the school staff towards them. This made them feel valued and accepted.

The strongest positive reactions towards volunteers often came from children who recognised and acknowledged them as part of the school teaching team:

> VT7: One young lad in the P4 class who doesn’t really pay a lot of attention to anybody and I really thought he wasn’t aware of me being in class at all and I was walking in one morning and he stands up and shouts, in the playground, ‘Mrs Y, Mrs Y!’ I’m going, ‘Oh, hello, hello’. And he said, ‘Look, everyone, it’s Mrs Y, she’s coming into class today’.

Volunteers' presence in the school often evoked a lot of excitement in children, which made the volunteers feel noticed and appreciated, and gave them a sense of pride and joy.

> V1: A number of children are coming up to me in the corridor or at break to speak and ask why I am not helping them and when I will help again. (…) I really see a strong positive response from some and note that especially with boys they appreciate the chance to discuss learning matters with me.

Positive reactions from children like this one, signalled to the volunteers that they were needed and valued. They also helped them to recognise the importance of their role in the lives of individual children.

Satisfaction of seeing children grow

Personal satisfaction from observing children learn and progress over time was mentioned by all participants as one of the most rewarding aspects of engagement. Enjoyment and happiness could be simply evoked by children's enthusiastic reactions to the process of learning and its positive outcomes:

> VT6: It's…the input that you put in but the output from it is much more than the input. You get absolutely great satisfaction back from seeing a child understand something that you're telling them about (…); when you see the child's face changing, saying, 'I understand that'. Or, you know, they're moving on from what they've already learned, and they've acquired some more learning, you know. So, it's…that to me is, well, it's really very satisfying, you know, just to see a difference in a child's understanding.

A sense of making a meaningful difference in children's lives can be recognised in this excerpt. The rewarding experience that brings joy and

gratification is associated with witnessing and appreciating pupils' development.

Strong positive feelings are also related to watching children developing more confidence and skills. Volunteers often mentioned great improvements in children they had a chance to assist, especially in those who experienced particular difficulties and needed more time to 'come out of their shell' (V1):

> V1: I saw them [children] develop their confidence and I'm not saying I was the only factor, I'm definitely not, but that was amazing to see that, you know. And one of them went from complete silence to being very verbose and quite complicated in his speech, the lad. And then there's the children who have difficulties who…like, there's one guy who has difficulty with mathematical strategy, but as soon as you say, 'Use that big brain of yours', he's done it. And it just needed somebody one-on-one to do that with him. So, I mean, it's just those little individual interactions that give you a buzz and that kind of thing.

A thrill and excitement were expressed as a reward for individual interactions with children who went through their individual learning 'battles' and gradually overcame the difficulties. Hence, the volunteer seemed to disbelieve that they played a direct role in these dramatic transformations in individual children, but they were aware of their meaningful contribution in children's improvement and growth.

Several reinforcing factors were reported by volunteers when they were asked about the rewarding dimension of engagement. Developing new and special bonds with children, teachers, and other volunteers emerged in all accounts. These new relationships gave the volunteers a sense of belonging and acceptance. They felt noticed and respected in a new environment that turned out to be very supportive and welcoming. These positive attitudes

towards the volunteers, including children's excitement and teachers' trust, seemed to crown their efforts and made them feel proud.

Theme 3: Challenges of engaging

Participants highlighted a number of challenges of working in the school environment that were mainly related to their using technology, physical health/fitness, emotional challenges of observing children struggle, accepting the position of not being in charge, using technology, and finally overcoming the fear of overstepping while performing the new role.

Using technology

One of the main challenges that was anticipated by volunteers when entering the school environment was the use of computers and other information technology. Participants reported that both children and teachers used various pieces of technology that they were not familiar with. However, the access to and use of technological equipment varied across the schools, which determined volunteers' different attitudes. Those who had to use laptops or tablets experienced a discomfort and a feeling of professional inadequacy:

> V2: First time, I had to take one wee boy out, who'd been absent and do a slide-show with him, and I had to say, 'I don't know, I can Google on my own tablet, but I'm not comfortable with this', I had to get someone to show me and then another time, the teacher went out the classroom and she says, 'Just keep on going'. I ended up going back and the kids were all killing themselves laughing. 'I don't know what I'm doing here', they had a wee laugh.

Physical challenge/Physical ability and disability

A new routine that required volunteers working in a specific school setting adapted for children but not for adult helpers, was a new type of physical challenge:

> VT7: The only disadvantage is when you're with the P1s and you're on the floor with them, having to find a table to get back up again! I always get a chair. I can't, you run ahead, crawl over to a table. That's the only disadvantage.

> V1: You know when you sit with a group doing an exercise for an hour maybe; different kids come in and do it. And then you're sitting on one of those little chairs… I can do the standing up bit, but it's your back! My back's gone, you know. Because you're in such an awkward position.

Sore knees or back, or catching a cold a couple of times over a few months 'tested' their fitness and immune system, but did not discourage them from continuing the engagement and carrying on the activities that were a source of their struggle. Pain or physical exhaustion that resulted from volunteering were not perceived as constant obstacles, but rather as indicators 'to exercise more' (VT7), be more active, or as temporary inconveniences that would improve with time:

> VT6: I found it quite hard work being back in school. I was really tired whenever I came out of the school, and I felt like going to my bed when I get home. I felt it in my eyes, you know, I felt really tired. But I think if I kept doing it, I would get better.

Participants noted that low physical ability might constitute a major contraindication to participating in the programme. They highlighted that people their age, who were 'less able, would not cope in the classroom' (V3).

The physical obstacles ranged from physical struggle to ‘get off the floor after playing with young children’ (VT7), understanding children speak, to having ‘to get around’ (V3) children and their clothing lying all over the floor. Finally, volunteers ascertained that these physical limitations might easily go unnoticed by the school staff:

> V1: I do the outdoor learning with them and I’m thankfully quite fit, you know, but it wouldn’t suit everybody (…), because you’re climbing up here and you’re on wood and all of that kind of stuff. But they just made an assumption about me, so that may be an issue is that they made an assumption, ‘Oh she/he can do that, so she/he’ll go and do it’, you know.

Volunteers mentioned that adapting ‘to the children’s voices and the speed at which they speak at, the tone and the level of their speaking’ (VT6) might be an issue, particularly to people with hearing problems. However, they also stated that no disability should be considered a disadvantage, and could be ultimately used in the classroom as an advantage:

> V5: I think children would adapt and you’re teaching something to learn if somebody’s less able in some form. But the big one probably would be if you’re deaf. Because some of the children speak slowly, sometimes it’s a certain language, and sometimes I struggle to put the right facial expression in response to something I didn’t understand. So, you know, it’s a very noisy environment, but I still think (...) you’re teaching some of the children’s skills in terms of disability etc. anyway, so you shouldn’t exclude anybody.

Not in charge

Another important challenge emphasised by the volunteers involved uncertainty of the role requirements and difficulty in recognising its constraints. Participants who had no previous experience of working in schools, experienced a frequent conundrum of responsiveness:

> V5: One of the things I found difficult was being an adult in a classroom seeing things happen and I didn't know what to do. So, I'm an adult, observing things, seeing things that the teacher's not seeing, and I kind of didn't ever know what to do in that situation because I felt very much you mustn't do anything, you know, the teacher's in charge and I would just quietly do nothing.

As reflected in this volunteer's excerpt, uncertainty around volunteers' status within the school hierarchy led to discomfort and doubts.

Over time, many acclimated to their subordinate role in the classroom and overcame discomfort of not carrying overall responsibility for the situation in the classroom:

> VT4: I can't say that I felt uncomfortable, but I always referred the children…if the child came with a moan or a complaint, I always referred them to the teacher. Always. Because I'm the volunteer in this situation, I'm not in charge.

Working in compliance with teachers' classroom rules and their methods constituted a different kind of challenge for former teachers. One of the volunteers was aware of teachers 'being a bit wary' (VT7) of her coming into their classrooms. Therefore, she adjusted to the new teaching approaches, although they differed from teaching techniques she knew and found easier:

> VT7: So, they've got very different ways of working which is challenging for the children as well as for me. I have to adapt to their ways of working.

As reflected in the volunteer's words, the initial period of adaptation was challenging and sometimes required from the volunteers, especially those with teaching backgrounds, an occasional self-reminder that they were 'a volunteer not the teacher' (VT7). However, volunteers gradually settled into the new school reality and learned to define their role within the classroom according to teachers' expectations and classroom rules.

Fear of overstepping

Volunteers' responses also revealed another challenge related to their role - fear of overstepping when assisting children with their learning. Volunteers were overly concerned about pointing out children's mistakes or overhelping:

> V2: And I wasn't sure at first how much I should point it out to the children, you know, if they were doing their threes the other way and fives, or then the letters. But now I'll say, 'Oh, you've done it again! You know how to do that, look, you've done it right up there, you can do it right down here'. And you know, get them to do it again.

Volunteers were afraid to 'hurt their [children's] feelings' (VT6), and do or say something wrong that could discourage children from learning:

> V5: It's funny that, isn't it, because you know that's wrong, but there's something in your head that says, 'Oh, are you allowed to tell them the right thing?' But you feel you have to hold back. Because I asked that question, and I thought, 'This is stupid, asking this question, of course it's wrong', but it's funny how we're so scared to do the wrong thing

> sometimes.(…) you're afraid to correct something because you feel that a child would lose his interest.

Some volunteers called this sensitivity and tentative approach towards children as 'a generational thing' (VT4), an approach that seemed to resonate with their personal life, and a role as a grandparent as opposed to an educator. They were aware that 'it's wrong' (V5) and that they were too 'busy thinking about their feelings instead of getting the education done' (V5), but they also understood that times changed, that the emphasis shifted from practicality to creativity. Thus, as volunteers they needed to adapt to a new generational approach in the schooling system.

Observing children's struggles

Participants often reported observing children who struggled throughout the school day, 'completely withdrawn' (V1) and too tired to participate. They emphasised that poor parenting was most likely the reason for children's problematic school performance and behaviour:

> V1: Some of them come in utterly laden in the morning, you know, and I just sit there in class and look at these kids coming in and I can see, you know, 20-30% of them are coming in having slept on grandad's couch the night before, you know. And if they can't perform, it isn't because they don't have the capacity for it, it's…(...) all sorts of things buzzing in their heads.

Children's poor life circumstances were also recognised by the volunteers in their language, low self-esteem and lack of confidence. Seeing children overwhelmed with difficulties, the volunteers felt inclined to make a positive difference:

> VT4: I've got one wee boy and he's just a joy. He makes me smile whenever I see him because he's always got a smile on his face. But

> he will sit, and he'll say, 'Why am I so stupid? Why am I so thick?' So, I think I'm getting through to him that's he's not… (...) You have to keep on saying to him, 'You're not thick, you're not stupid', as you say, 'Look at what you've done there; you can do it'. (...) he's one of the ones the teacher will say, 'You sit with him', but it's heart-breaking when you hear that, 'Why am I so stupid?' and you think, 'Who's saying that to you? Somebody has told you that'.

Despite their limited capacity to make a substantial difference in children's lives and restraints of what could be done in terms of their home situation, volunteers tried to concentrate on enriching their lives within the time they could spend together in the school. They were focussed on what they could control and offer, rather than on what they could not because of being restricted by professional boundaries.

Theme 4: Barriers to engaging

Participants reported some perceived and potential barriers to volunteering in the programme. Two subthemes emerged under this theme: pragmatic issues of distance and finances, and systemic issues.

Distance and financial issues

All expenses related to participation in this programme, including transportation, meals, and criminal record check applications were covered from the school funds, used at the discretion of the Head Teachers. Three out of the seven volunteers accepted the opportunity to receive reimbursement of travel expenses due to long distance and costs of travel. These volunteers were not offered the same conditions by the school after the programme finished and, therefore, they discontinued their commitment. They reported that lack of reimbursement of travel expenses and distance to the schools might be important barriers to participation:

> V5: I suppose the thing is that we've been limited by the projects and limited by the schools that volunteered. So, the project is to do with just where the places were, so we had to travel. It's actually a real expense in terms of mileage in your car and petrol, so it's a real thing. So, in some ways, it just depends on where you live, and the project was just designed around four schools. I could just go to the school across the road, but I wanted the support and your help, you see.

Although the programme was not able to offer all volunteers an opportunity to participate in their local schools, three of them were in favour of volunteering outwith their communities:

> V5: The other thing is, sometimes you don't want to teach or be involved in your backyard anyway.

Thus, the apparent barrier was counterbalanced by an advantageous dimension. Changing the well-known environment met with a favourable response among many volunteers.

Systemic issues

Another challenge was related to volunteers' worries about potential negative consequences of their engagement in the programme, how it might potentially impact the school dynamic and employment:

> V6: I just wondered about classroom assistants too, because they're also employed and: Are we reducing the number of classroom assistants that come into the classroom because we're there then do they need a classroom assistant? (…) Also, there are people with teaching backgrounds and the people with non-teaching backgrounds, I just wonder whether the unions are actually okay with people who are not qualified coming into the classrooms and how the teachers feel

about people coming in who are not qualified, because they used to go on strike about that.

These concerns could discourage potential participants from volunteering in school-based initiatives. Although volunteers were aware that their role was not a teaching or a paid job, concerns about unintended negative effects on the schooling system arose from their accounts.

Theme 5: Importance of the engagement

Volunteers emphasised the need and relevance of additional support for children and schools in general. Different aspects of their contribution were identified in four subthemes: sharing, supporting, empowering, and expectations versus reality.

Sharing

Participants often referred to the professional skills that they brought to the programme and that they shared not only with children, but also with the teaching staff:

> VT7: I think the school are using my expertise, which I think is great because that's what it's all about, it's about sharing the skills that we have, that we've learned, because we're all old folk and we've got lots to pass on before we forget it all!

Timeliness of the volunteers' contribution seemed to be undeniable. Expertise that was of particular importance to the schools now, found an application and usefulness when the time to share it was perceived by the volunteer as limited.

Sharing also meant teaching the children how to knit, how things were done in the past and finally, telling them about one's own life experiences and how to achieve more:

> V1: I had a brief chat with Head Teacher a couple of days ago, and she said, 'You know, children in this school, maybe 50-60% of them will never leave X [a deprived area of the town] for the whole of their adult life really'. And I think, well, I used to live in X once, in a different part of Britain, but I made it out, you know. And that's where you could be perhaps more helpful, that you can share life experience and raise the bar a bit for kids.

Volunteers identified great potential in inspiring children through shared experiences, and through presenting themselves as role models that children might need to challenge their current life circumstances. They recognised the importance of not to writing children off, but investing in them, with their time and knowledge.

Supporting

When asked about their main contribution to the school, they all agreed that they aimed to provide meaningful assistance to teachers. Often, they were the only support that a teacher had in the classroom, which made them realise how much help was actually needed in the classroom:

> V3: I mean, it's quite obvious that the teachers do need extra help, because some classes have more children that have special needs and certainly, they need more help, classroom assistants or volunteers.

Volunteers also made efforts to respond to children's needs, regardless of whether that involved assisting with learning or emotional support. Their

presence and empathy were of particular importance for children who experienced various social stressors in their lives outside of the school:

> V3: One little girl, she's not got a good home life and the teacher said to me, 'Would you sit with her because her gran died recently, and she thinks you're her granny'. Which was nice. Because she's got so many problems at home, bless her.

Observing children who struggled throughout the school day, volunteers wondered whether they had done enough to support the children, who needed more than "just trying to get them through stages of their education" (V1). Over time, they realised that they played a valuable role in many children's lives, a role that was not only to improve their attainment, but also to compensate for deficits they experienced outside the school.

Empowering

Volunteers observed various manifestations of lack of confidence and low self-esteem in children that were not able to realise their potential and abilities and suggested that 'external factors' (V5), and negative reinforcement determined their low self-perception that, in turn, prevented their attainment. Participants realised that they could change that by facilitating improvement:

> V1: What amazes me is that somehow children develop a reputation for being 'this' or 'that' in class, not so bright (…) One girl in particular, I can think, said, 'I can't do these… I can't generally do these. I can't do maths'. Her self-speaking, speaking to herself, telling herself or somebody else has told her, you know, and not what she's able to do. And one of the joyous things is when you stop them from being like that and show them, 'Hey, look what you've just done', you know, 'You're able to do it. Do you want to do another one?'

Participants often reported that parenting sometimes contributed to children's poor performance and misbehaviour in the school. They felt helpless and frustrated about the disconnect between the school and parents. However, gradually they acknowledged the constraints of the school's and their own position, and focussed on what difference they could make, instead of concentrating on things that were outwith their control:

> V5: I think the important thing is you can't do anything about their home life, but you can do something while they're in the schools. You've got to concentrate on what you can do. And if you've taught them the basics, you've, you know… That's the most important thing, because you can't change their social situation, but you can take them aside and they'll remember you for that.

By providing children with solid educational foundations and consequently a good start in life, volunteers were leaving their legacy that will not be forgotten.

Expectations versus reality

Participants often made reference to various aspects of their involvement that were of particular importance for their own personal development. Over six months, they observed a new environment, learned more about it, and finally, confronted how their expectations of the schooling system met with reality. Some volunteers reported being surprised at how their expectations of the modern school differed from reality, especially in terms of the use of technology:

> VT4: Well, I honestly thought when I went back that they would all be sitting with wee tablets and everything would be on a board. I only saw one tablet, the children only once had computers in the classroom and that was when the teacher was off and it was the IT specialist who

came in to take them, so that was a bit of a shock to me because I really thought everything would be done on computers.

While observing children using the technology, participants also realised that children represent different levels of learning and skill development:

V5: It was interesting to notice…my expectation is they all know their way around computers now, and yet in that skill, you could see the ones that were spending a lot of time on computers and the ones that weren't, so it was interesting, so they're all at different levels, so I think my mind was completely open about that.

The engagement in the programme was a real 'eye-opener' for those who held specific expectations before entering the new role. The experience of working with staff and children made them realise that the school environment should not be perceived through a prism of uniformity or predictability. Both pupils and teachers represented different skills and abilities and these individual differences needed to be embraced with an open mind.

Volunteers also held specific expectations in terms of the structure of their involvement and ' felt at a bit of a loss' (VT4) when they had to assist children for PE or music classes. However, they also understood that they could help children in more than one way:

V5: (…) there was a music session and I thought this was a waste of, well, I suppose my time. So, I think expectations are different from what reality was and I suppose I would have wanted just wall-to-wall reading and writing. But again, coming back, you probably hadn't realised how much you helped that kid with the ball or the board or

something that we wouldn't appreciate, just being there, another adult to ask help from.

VT4: That's one of the things that it's difficult to know how much they're taking in because it's maybe years later that you find that a child will tell you something about an experience and you thought it went nowhere but it's actually been soaked in by then, hasn't it? That they're absorbing all the time what you're doing or talking about. It's sometimes difficult to measure that in an immediate time.

The uncertainty of the impact they had on pupils and their growth often echoed in volunteers' accounts. Their contribution appeared to be impossible to measure at the time of involvement, which left them with a hope that they made a meaningful difference in children's lives and that their help would be eventually appreciated and remembered.

6.5.3 Summary

In summary, different dimensions of importance of the programme reported by volunteers corresponded with their motivators for joining in. Personal/professional curiosity and willingness to explore a modern-school work territory was validated with a reality that was not as they expected. Finally, seeing children struggle and teachers needing extra help, made them realise that their role could take different forms, including sharing, supporting, and empowering that were incorporated in their initial aims and intentions.

6.6 Discussion

This qualitative mixed-method study captured the context of IE and explored perceptions and experiences of older adult volunteers in a school-based programme. The analyses of the diary and focus group data revealed both beneficial and challenging aspects of engaging in the Generation for Generation programme. The main positive experiences identified in the

diaries included interactions with children, satisfaction of seeing their progress, and regaining a sense of belonging and structure; whereas challenges related to disruptive behaviour, working with children with additional needs, and physical challenges of volunteering. The analysis of the focus group data provided more detailed evaluation of the programme, including insights into motivations to join in, reinforcers that facilitated adherence, challenges and barriers associated with engagement, and finally reflections on the relevance of engagement. Overall, a wide spectrum of experiences emerged from the qualitative data, indicating potential for future implementation and further development of the current programme.

The independent analysis of both the focus group and the diaries revealed consistent views of the programme across different data sources. For example, a sense of satisfaction of supporting children's learning, watching them grow and gain confidence were frequently mentioned by volunteers and seem to be unique aspects of volunteering in schools (Varma et al., 2014; Gamliel & Gabay, 2014). Through regular interactions during in-class activities, one-to-one tutoring or outdoor learning, volunteers were able to develop special bonds with both pupils and teachers that, in turn, created a sense of belonging and appreciation (Gamliel & Gabay, 2014). Feeling welcomed, valued and respected seemed to reinforce volunteers' generative desire and balanced the interpersonal and personal challenges of the role, preventing potential drop-out or burnout (Maslach et al., 2001). These findings suggest that engaging in a meaningful role and receiving social recognition enabled volunteers with control over the challenging school environment as well as overcoming their physical abilities/disabilities.

In addition to overlapping reflections from different data sources, the focus group data revealed a number of motivators for entering the programme that reflected volunteers' interpersonal (i.e., sharing knowledge/experience) and personal motives (i.e., seeking new experiences). These reasons appear to be in line with previous research suggesting two primary factors that motivate volunteering, altruism, and self-oriented rationale/ self-benefits (Chen & Morrow-Howell, 2015; Hwang et al.,

2005). Altruistic motives in the current study seem to resonate with generative intentions to contribute to the next generation and leave a legacy to society (Erikson, 1950; McAdams et al., 1993), whereas self-oriented motives can be situated within the need for maintaining familiar lifestyle patterns involving engaging in meaningful social roles, using professional skills, and maintaining social relationships during retirement (Atchley, 1999).

Regardless of professional background and level of familiarity with the school environment, most of the volunteers in this study were in pursuit of new/more structure in their daily life or aimed to enhance a sense of purpose, which is often challenged by retirement (Bradley, 1999). Weekly schedules and assignment to the same teachers and pupils helped volunteers establish new routine, social connections and become part of 'a school team'. Volunteers' accounts revealed that they had settled into the new school reality easily and learned to define their role within the classroom according to teachers' expectations. However, the transition to the new social role was also associated with personal and organisational challenges including fear of overstepping and uncertainties regarding the constraints of volunteer responsibilities. The latter issues may be related to the induction process and the lack of detailed task-specific guidelines in the current intervention.

However, none of the volunteers indicated a need for additional comprehensive training to improve their tutoring skills or to learn about the school resources, as suggested elsewhere (Experience Corps; Glass et al., 2004). Considering that the age range of children involved in this study was consistent with the age of children participating in the programme with the pre-intervention training, may suggest contextual differences in school requirements in terms of volunteers' preparation to the role or researchers' attempt to enhance intervention fidelity (Glass et al., 2004). However, organisational meetings with teachers and administrations could enhance the team approach within the classroom and minimise discomfort and doubts as reported in this study.

6.6.1 Strengths and limitations

This study was a complementary and explanatory component conducted in addition to the pilot RCT that investigated the potential impacts of IE on older adults' health and social functioning. Specifically, this research provided an in-depth exploratory account of volunteers' experiences of participating in an intergenerational programme, including their motivations for participating, and reinforcers of and barriers to intergenerational engagement, which can inform the continued development of the Generation for Generation programme and future research more generally. The qualitative data also revealed some organisational challenges that helped us to improve the programme in its subsequent stages (i.e., Cohort 2 and 3 involvement). Specifically, pre-programme induction meetings that were organised for all three cohorts were extended to include a detailed discussion among volunteers and teachers regarding the volunteer roles (i.e., potential issues/uncertainties) and physical challenges (e.g., provision of adult-size chairs; limited involvement in outdoor learning/PE).

Limitations of this study include potential bias towards reporting more favourable views of the project by the older adult volunteers considering the researcher's direct involvement in managing the programme and collecting the data. In addition, due to the time and resource constraints, the post-intervention focus group was conducted with Cohort 1 only, which may limit the generalisability of the findings to the whole active sample. The generalisability may also be reduced due to the small sample size of the whole study, as well as the involvement of schools located in relatively deprived areas in Scotland.

6.6.2 Implications for future research and practice

Unprecedented numbers of older individuals may need to be better accommodated in the coming decades by being more actively engaged in community-based partnerships. As demonstrated in this study, an intergenerational school-based intervention can constitute one of the possible

solutions for new social requirements and does not have to be costly to put in place. Unlike the gold-standard Experience Corps project in the USA (Fried et al., 2004), in which participants receive a considerable stipend covering their time and expenses, participation in the Generation for Generation programme was on an entirely voluntary basis. However, to minimise barriers to participation all volunteer expenses, including transportation, lunch, and criminal records check applications were covered from the school funds. This allowed volunteering without cost and constituted a symbolic gesture to show older adults appreciation for their contribution (Glass et al., 2004).

Although only five volunteers across all three cohorts accepted the opportunity to receive reimbursement of travel expenses, the lack of compensation was indicated as an important potential barrier in terms of their future commitment, particularly for those living further away from their school and/or on a low-income. Thus, to ensure volunteers' retention and continuous commitment after the initial programme finished, it is crucial to secure funds to be made available to volunteers. However, the predominantly altruistic motivation to joining the programme and a range of rewarding aspects of participating in the programme that were reported by volunteers, may suggest that receiving stipends as indicated previously (Glass et al., 2004) may be a helpful buffer of potential withdrawals, but not a factor that impacts their generally positive experiences of IE.

In terms of recommendations for future practice, pre-intervention meetings between volunteers and school staff should be organised to discuss the roles and any constraints to avoid role-related uncertainties and fear of overstepping. These meetings would also allow to discuss mutual expectations and agree upon a list of the most suitable classroom activities. This would be particularly beneficial for the programme as allows taking advantage of specific experience and skills that volunteers bring with. It would also be useful to clearly establish the key school-based point of contact that would clarify the study requirements and resolve any potential issues. Finally, some volunteers' reflections suggested that the roles should

be tailored more carefully to individual abilities and preferences in future interventions.

6.7 Summary

This study explored benefits and challenges associated with IE volunteering from the older adults' perspective. Volunteers' weekly diaries completed during the programme, as well as data from a focus group were analysed using thematic analysis. A number of personal and interpersonal benefits and challenges of IE were reported by the volunteers, enhancing our understanding of how IE may contribute to positive changes in older adults' lives and for wider society, and how the intervention could possibly be modified to maximise its effectiveness and the positive experience of participation. The main benefits reported by volunteers included regaining a sense of purpose, sense of belonging and appreciation, and building new social connections. By supporting the young generation and contributing to their growth, they were able to contribute to their own growth and leave a positive legacy (Erikson, 1950). Their generative desire to share their experiences and knowledge through tutoring gave them an opportunity to escape stagnation and contribute to the wider community. This generative involvement appeared to be intertwined with the need to regain the continuity and coherence of their roles and activities from before retirement. In line with the continuity theory (Atchley, 1999), volunteers sought engagement opportunities pro-actively to re-establish a sense of control and goals that were put on hold or lost after the transition into retirement. This programme was also associated with some challenges such as physical demands, financial issues, and fear of overstepping. However, those challenges did not stop the volunteers from engaging, but taught them how to adapt to the new context and accept barriers as part of an otherwise positive experience. In terms of recommendations for future research, potential financial barriers to participation should be eliminated and a more comprehensive pre-programme induction for both volunteers and school staff organised. Complementing the present study, the next chapter will present quantitative

and qualitative findings from the school climate survey completed by the participating school staff and from focus groups conducted with pupils and teachers, giving a comprehensive overview from the perspective of all participants.

CHAPTER 7. The impact of Generation for Generation on the participating schools.

7.1 Chapter overview

In this chapter, a qualitative study will be reported which investigated the perceptions and experiences of the teachers and pupils of primary schools participating in Generation for Generation (Gen4Gen), a 6-month intergenerational engagement (IE) programme. Additionally, a quantitative study of school climate will be presented. This investigated the wider potential impacts of the programme on schools from the start to the end of the school year in which the programme was conducted. The chapter will begin with an overview of the background research on the impacts of school-based IE on participating children and schools. The subsequent subsections will present the qualitative study based on focus groups with teachers and pupils. First, the methods will be described, followed by interpretation of themes and subthemes identified using thematic analyses. Data will be presented in the form of a tabular summary of the findings and a narrative for each theme. Teachers' and pupils' focus groups will be treated as two separate data sets. Then, the school climate survey will be outlined, including methods and results. The analyses will be followed by a discussion of both quantitative and qualitative findings. It will be concluded that IE has potential to benefit pupils' attainment and behaviour, teaching efficiency, as well as that five out of eight sub-domains of school climate (i.e., school satisfaction, parental involvement, creativity and the arts, learning climate, and school resources) and overall school climate, can be maintained amongst staff in interventions schools as compared to declines in staff in comparison schools. However, more research is needed to address the effects of IE on these outcomes, particularly relative to longer-term interventions.

7.2 Introduction

One of the key priorities of the Scottish Government is to close the poverty-related attainment gap by introducing a broad range of attainment-focused initiatives and supporting pupils living in the areas with highest concentration of deprivation (Scottish Government, 2019a). Despite efforts to improve children's literacy and numeracy in the most disadvantaged areas of Scotland, the attainment gap seems to be resistant to change (Scottish Government, 2017). According to the Scottish Survey of Literacy and Numeracy (Scottish Government, 2016, 2017), there was a 15 and 21 percentage point difference in reading, writing and numeracy performance between pupils at a P4 (age 8-9) stage (corresponding to pupils' age involved in the present study) in the least and the most deprived areas, respectively. The "National Improvement Framework (NIF) and Improvement Plan: 2020" was therefore introduced by the Government to develop "a culture of empowerment and collaboration" facilitating teaching practice and efficacy, that, in turn, are crucial to ensure academic progress in school children (Scottish Government, 2019b, p. 6).

This collaborative approach should primarily happen locally, between schools and local authorities that can identify and implement the most appropriate and sustainable interventions to tackle challenges related to both learning and teaching (Scottish Government, 2018). The collaboration should also involve Government agencies and researchers that have access to the appropriate data and research-informed knowledge necessary to design, implement, monitor, and evaluate the impact of those interventions (Sosu & Ellis, 2014). Development and implementation of an effective school-based engagement intervention may not only contribute to closing the gap in attainment, but also support teachers' practice. It may also improve 'school climate', which reflects the overall quality of school functioning (e.g., school goals, social relationships, organisational structures; The National School Climate Council, 2007). Improved school climate can diminish negative effects of socioeconomic factors, community safety and social support, on educational achievement (Astor et al., 2009).

Interventions positively impacting school climate can be of particular importance considering its key role in promoting pupils' academic achievement and teacher retention (Cohen et al., 2009). Existing literature suggests that a safe and supportive school environment, a sense of school cohesion, and high-quality teacher-pupil relationships are associated with pupils' increased engagement in school activities, which in turn leads to improvements in learning outcomes (Lawson & Masyn, 2015; Wang & Degol, 2016). Regarding the impact of school climate on staff, perceptions of pupils' greater motivation and better behaviour were related to experiencing high teaching efficacy, less stress, improved wellbeing, and greater job satisfaction (Collie et al., 2012; Grayson & Alvarez, 2008). However, evidence on staff's perceptions of school climate and their implications is still very limited, with school climate reports typically relying on pupils' perspective only (Berkowitz et al., 2017; Wang & Degol, 2016). Moreover, to date, only one study explored the effects of a school-based IE intervention on school climate, by comparing active versus control schools (Parisi et al., 2015). Furthermore, no research on IE has examined pre- and -post intervention data on the measure, to investigate the potential interaction between intervention status and time. Therefore, more research on staff's perceptions of school climate is needed to identify areas for reform, as well as specific climate dimensions likely to be changed by intervention implementation (Ramsey et al., 2016).

Several theoretical explanations were identified to explain the processes underlying the relationship between school climate, teachers' outcomes, and pupils' achievement. From a socio-ecological perspective, school staff and pupils' development and behaviours, as well as reciprocal interactions are influenced by multiple socio-contextual factors of the school environment in which they are embedded (Bronfenbrenner, 1997; Wang, 2009). For example, poor teacher-pupil relations or low pupil academic orientation are predictive of educators' negative attitudes towards pupils (Grayson & Alvarez, 2008). Lack of teacher/peer support and inconsistency of the school rules are also associated with declines in pupils' wellbeing and increased

behaviour problems (Way et al., 2007). Social cognitive theory, another theoretical approach frequently cited in the school climate research, addresses learners' motivation and achievement in the social context (Bandura, 1997). The theory posits that teachers' high expectations, high self-efficacy, and supportive attitudes can activate the positive influence of school climate on pupils' academic performance (Goddard et al., 2000). The social identity approach (Maxwell et al., 2017) extends the socio-contextual explanation of school climate and group dynamics by incorporating a concept of pupils' and teachers' school identification (i.e., sense of belonging/connection) that can be facilitated by positive school climate to predict pupils' achievement and behaviour (Reynolds et al., 2017). To understand better the implications of these theoretical approaches, it is important to apply them in the context of school-based interventions that may impact educational and behavioural improvements.

IE interventions could be an example of collaborative efforts to facilitate learning and teaching practices. To date, many of the IE programmes were implemented in an academic environment, where older adult volunteers provided educational support to younger generations as tutors or mentors (Fried et al., 2004; Strand et al., 2014; Yasunaga et al., 2016). Several studies also offered young people the role of a helper or a tutor to motivate both age groups to benefit by learning from each other (e.g., Chapman & Neal, 1990; Gamliel & Gabay, 2014). The mutual knowledge exchange or teaching activities typically involved classroom-based tasks (e.g., reading, writing, maths) as well as, computer/Internet learning, skills facilitation (e.g., tutoring, gardening), reminiscence, or creative arts (Chapman & Neal, 1990; de Souza, 2003; Fujiwara et al., 2009; Gamliel & Gabay, 2014; Poole & Gooding, 1993).

As outlined throughout, there is evidence supporting a range of potential benefits of school-based IE on older adults, but we know little about the impacts on young people and the schools involved. IE programmes were often primarily designed for health promotion in older adult volunteers and for improving cross-age connections and attitudes in both older adults and

children (e.g., Carlson et al., 2008; Fujiwara et al., 2009; Gamliel & Gabay, 2014). Therefore, most effects reported for the younger participants included perceptions of older people or attitudes towards ageing (Lin et al., 2017; Pinquart et al., 2000; Sun et al., 2019). For example, results showed significant improvements in younger people's views of ageing (Lin et al., 2017), their sense of comfort with the older generation (Sun et al., 2019), and intergenerational attitudes (Bales et al., 2000; Piquart et al., 2000; Sun et al., 2017). Intergenerational interactions also contributed to a reduction in stereotyped perceptions of older adults (Alcock et al., 2011; Hernandez & Gonzalez, 2008) and increased understanding, respect and appreciation for older people (de Souza, 2003, 2011). Thus, gains for the young participants were predominantly reported in terms of attitudinal dimensions of the social outcomes.

However, there has also been some, albeit limited, examination of potential changes in psycho-social outcomes, academic performance and classroom behaviours in participating pupils. Both experimental and observational studies demonstrated a decrease in interpersonal anxiety (Marcia et al., 2004; Sng et al., 2020), better adjustment to stress (Yasunaga et al., 2016), and an improvement in sense of self-worth (Poole & Gooding, 1993). The positive changes also involved improvements in overall school performance (e.g., reading achievement) and in classroom behaviour (Rebok et al., 2014). Specifically, pupils in IE schools obtained fewer referrals for classroom misbehaviour, and higher scores in verbal ability and 'reading readiness' outcomes, compared to pupils in control schools (Rebok et al., 2014). The effects were reported for children who received one-to-one tutoring, mentoring, or other forms of school-based support and are believed to have occurred through three pathways including academic stimulation, behavioural management, and readiness for learning (Glass et al., 2014). However, more evidence, both quantitative and qualitative, is needed to support the link between IE and children's academic and behavioural outcomes.

Additionally, in the Experience Corps programme (see section 3.2.1) indirect impacts of having older adult volunteers in the classroom were also found for wider school outcomes (Parisi et al., 2015; Ramsey et al., 2016). Their presence improved perceived access to resources, and fostered social support and collaboration with the school staff (Rebok et al., 2011). Consequently, the volunteers contributed to significantly higher ratings of school climate among staff and pupils in the intervention as compared with control schools, as well as teacher retention and morale (Parisi et al., 2015; Rebok et al., 2004). Perceptions of staff in the intervention schools were more favourable on several subdimensions of school climate (i.e., teaching, parental involvement, satisfaction with the school, and educational values) and the overall school climate compared to staff in the control schools, during the first year of participation in the EC programme (Parisi et al., 2015). In the second year, a significant difference between schools was only found for teaching subdomain (i.e., perceptions of the quality of the teaching practice). Regarding pupils, perceptions of overall school climate and learning environment differed significantly between intervention and control schools during the the first year of participation (no significant differences were found during the second year), and their perceptions of educational values during the second year only.

Differences in staff and pupil ratings of school climate suggested that more favourable ratings might have been associated with dimensions that were of personal importance for each of the two groups (e.g., teaching for staff and learning environment for children; Mitchell et al., 2010). Given that the results came from one community-based programme and no pre- and -post intervention data were collected (the surveys were administered annually and compared across schools in each year separately), more evidence is needed to gain better understanding of how the whole school environment can benefit from IE. Further, more information-rich (qualitative) data on participating schools are needed to support, explain and validate quantitative findings. To our knowledge, there is no comprehensive qualitative evidence on the perceived effects of a school-based IE

programme from teachers' perspective and qualitative data on pupils' experiences of IE are still limited (Chapman & Neal, 1990).

The primary aim was therefore to explore effects and experiences of participating in Gen4Gen in pupils, teachers, and the wider school. To our knowledge, this is the first mixed-method study to provide comprehensive evidence on the perceived impact of a school-based IE programme from various perspectives. Qualitative analyses from focus groups with pupils and teachers offer complementary and explanatory accounts of the results obtained from the administered school climate survey. Furthermore, applying a qualitative approach provided an opportunity to receive feedback on the systemic and organisational issues related to the development and implementation of the Gen4Gen intervention in Scotland. The hypothesis is that the presence of older adult volunteers will have a positive impact on perceptions of school climate among the school staff, as investigated by both qualitative and quantitative methods. The subsequent sections will outline in more detail the design, sampling, and data collection and analysis methods employed in the current studies.

7.3 Study design

A concurrent triangulation design was applied in this study (Creswell et al., 2003). Two different research methods (qualitative and quantitative) were integrated within a single study, with each of the two methods playing an equally important role in addressing the research question (Creswell et al., 2006). Specifically, pupils' and teachers' focus groups (the qualitative component) and the school climate survey (the quantitative component) were used to corroborate and cross-validate findings on the impact of IE on participating schools. This research design enabled the researcher to perform the quantitative and qualitative data collection and analysis separately, and then integrate the results in the overall interpretation (Teddlie & Tashakkori, 2009). Below, the methods and results for the teachers' and

pupils' focus groups are each covered in turn, followed by that for the quantitative study on school climate.

7.4 Teachers' perceptions and experiences of participating in Gen4Gen

7.4.1 Methods

Sampling. Two active schools were chosen for conducting focus groups with the teaching staff and children. These schools had the highest number of volunteers from Cohort 1 (n = 7; September 2018 start). This gave the researcher a chance to recruit more teachers and pupils who worked with the programme volunteers.

In this study, the core inclusion criterion for participating in the focus groups was active engagement with Gen4Gen between September 2018 and March 2019, and being a teacher from one of two selected participating schools that worked with the volunteers (i.e., P1-P4 in each school). In total, 9 teachers took part in this qualitative research - one male and eight females. Two mini focus groups (Litosseliti, 2003) were organised in the teachers' schools to ensure their attendance, convenience, and comfort. The first focus group comprised four participants while the second comprised five.

Data Collection. A semi-structured focus group schedule (Appendix X) was developed prior to the focus groups and outlined the areas of interest to be discussed. The questions reflected different aspects of the programme and different areas of its potential positive or negative impact. Teachers were asked to describe their involvement in the programme implementation (e.g., 'Could you please share with us your experiences of the process of setting the school up for hosting volunteers?'), as well as how, if at all, the programme impacted the school/classroom climate (e.g., 'What impact (if any) have volunteers had on your classroom climate and your school satisfaction?'), and what they got out of the programme (e.g., 'How was the

support you were provided by volunteers enough or not enough considering school needs?').

The list of questions were not followed in a rigid way, and instead, a process of reflecting (e.g., 'you said there that …') and probing (e.g., 'tell me more about that') was adopted (Smith et al., 2009). This allowed the participants to direct the content of the focus group and prioritise issues which they felt were central to the topic under investigation.

Procedure. Focus groups with teachers were conducted by the researcher in April 2019, after completion of Cohort 1 engagement (i.e., 6 months of intervention, which was completed at the end of March 2019). Teachers met the researcher in a quiet private room, after their classes had finished or on a school in-service day. Prior to the start of each session, the researcher (moderator) discussed informed consent procedures as described previously (see Section 5.7.1). The teachers' focus groups lasted between 45-60 minutes. At the end of each session, participants were provided with a debrief sheet.

Data Analysis. Thematic analysis was used to interpret the focus group data in the current study. The process of analysis was described in more detail in Chapter 5 (see Section 5.6.3). It is noteworthy that in the extracts which follow, '(…)' represents missing text. Participants' names are replaced by a 'T' (teacher), 'V' (volunteer) or '[volunteers]' throughout, to preserve their anonymity. In addition, considering that only one male volunteer participated in Cohort 1 and was discussed in this study, gender revealing pronouns were replaced by 'she/he' or her/him'.

7.4.2 Results

This section will present three inter-related themes that emerged from the data: 1) perceptions of the programme; 2) perceptions of the volunteers; and

3) volunteers' contributions. First, a summary of the main themes and subthemes will be outlined in tabular form (see Table 7.1). Then, the analysis will begin by presenting teachers' initial reactions to the programme, as well as some systemic issues associated with programme implementation and management. In the second theme, the volunteers' role and skills will be discussed in the context of responsibilities and tasks to which they were deployed. Finally, the wider context of volunteers' involvement will be considered, including its perceived impact on children's attainment and behaviours, classroom climate, and teachers' practice.

Table 7.1

Themes and subthemes identified in the teachers' focus group data.

Themes	**Subthemes**
Perceptions of the programme	Reluctance versus excitement Managing engagement Timetabling issues Lessons learned
Perceptions of the volunteers	Self-conscious concerns Volunteers' roles Different skills to use All-embracing support
Volunteers' contribution	Impact on children's academic skills Impact on children's behaviour Positive relationships Impact on teaching efficiency

Theme 1: Perceptions of the programme

When asked to share their perceptions of the programme, teachers reflected on initial concerns and excitement about launching the Gen4Gen programme

in their classrooms. They also mentioned various aspects of the IE that required additional effort, planning, and improvement. Finally, to summarise the reflections on the programme, intra-personal relevance of their participation in the programme was highlighted.

Reluctance versus excitement

The implementation of the intergenerational programme evoked two opposing reactions, including reluctance as well as excitement. Those who initially expressed reservations about the project anticipated ‘an extra burden’ (T8), that is, an additional responsibility imposed on them:

> T3: I’ll be completely honest with you, we were told in a meeting that this Gen4Gen project was happening and a flavour of what was happening, and I immediately said, “I don’t want to take part. I don’t want to have to organise someone else’s time.”

Having volunteers in the classroom implied more work, having to become ‘a people organiser’ (T3) who needs to manage others’ time and ‘train them up’ (T8). However, despite those anticipated negative implications of involvement in the programme, many teachers reacted enthusiastically to the idea, perceived the volunteers’ arrival as an opportunity to receive ‘a bit of extra support’ (T7) and experience something new:

> T1: When the Head Teacher mentioned it, I was actually quite excited about it because I thought, “Good, I wonder what this will be like?” I had never heard of it before. I thought, “They’re actually giving up their own time to do this in the school.” I just thought, “This is a brilliant idea.” (…) It was a novelty that everybody just threw themselves into.

The situation was new to everyone involved, including volunteers, teachers and pupils. They entered the programme either not knowing what to expect or expecting potential workload ramifications. For many of the teachers,

participating in the project constituted the potential of winning extra teaching time, while for some of them a risk of losing this time.

Managing engagement

Teachers' initial concerns regarding organising volunteers' time were addressed by the Head Teachers who assigned the new helpers to the classes and planned their weekly schedules. However, all teachers reported that there was no clear guidance regarding specific activities the volunteers might be involved in. They were instructed by management to use the volunteers 'like a resource, like a pupil support worker', or 'an extra pair of hands' (T3) and engage them in activities with pupils who needed the extra support, but it was not specified what exactly was expected from them and volunteers:

> T7: I think it would help as a teacher knowing what was expected. I think initially, we were kind of asking each other, "Oh what are you asking them to do?" because we were worried that we were asking them to do too much "Were they supposed to be doing that? Are we meant to get them to do something different?" So, I think a meeting beforehand just to kind of cover those questions would help with us planning to have them in the class as well.

Many teachers mentioned that they would benefit from a list of 'a typical kind of activity that volunteers might be involved in' (T3) or from a conversation with volunteers themselves about their expectations and interests. Due to the lack of clear guidance and limited knowledge about volunteers' skills, most teachers adopted an approach to engage them in activities that were not 'too complicated', but usually 'time consuming' (T3):

> T7: I would ask V to do reading groups with my class because I actually felt that pupils asked loads of questions and it's questions I would love to have time to answer every time I read with them but just with the time constraints it wasn't always possible. So, the kids got a

> lot out of reading with her/him. I think that V didn't have the pressure that a teacher sometimes is under to get things done so, you know, she/he could really get things out of the children.

This opportunity to effectively use 'the extra pair of hands' allowed the teachers to provide additional support for children's learning and include activities that are often overlooked for the lack of time. Teachers also reported asking volunteers to do one-on-one work with children with additional needs, which they found 'very tricky to do when you have the whole class' (T5), but with volunteers' help this type of support was made possible. However, before the teachers felt confident enough to ask volunteers to fulfil more complex or specific tasks, they needed time to learn more about them:

> T2: I think, at the start, you were not wary but you were very conscious of the role that they were playing within the learning, and if you did give them something to do it was maybe slightly less until you got to know them, until they got used to what you required from them and things. That is through talking about what your expectations are and how this will go with the children. Then it built up until you're quite happy, "You can just take that groupwork," or, "Can you go over these ones with them?" and they knew exactly what they were doing.

The process of establishing a well-functioning teacher-helper relationship and in-class routine required time and mutual understanding. However, not all teachers were in favour of adherence to routine and tried to diversify the tasks for volunteers, find something that they would find interesting:

> T3: I just thought, "If it was me coming in to volunteer in a school I wouldn't want to be doing the same thing week in and week out, I'd want to do a different flavour." So, I did spend a bit of time thinking, "What will I have these volunteers doing?" Of course, it depends on when I met them and got a flavour of what they wanted to do.

The emphasis on taking into consideration volunteers' expectations and preferences in terms of classroom activities was recognised in many teachers' accounts. This flexible approach contrasted with a perception of some teachers that a consistency of engagement and activities was important for both volunteers and pupils:

> T6: I think V was brilliant with the kids and she/he picked it up really quickly, but I just think like coming into this situation she/he needed a little bit more kind of guidance to begin with. (…) And after that, like for weeks on end she/he would just do the same, like similar kinds of activities every week, and sort of kept a routine for the children and they knew that when they saw V either they were going to do some reading with her/him or she/he was going to do this or other game.

Timetabling issues

During the six months of volunteers' involvement, when the initial reservation and unease resolved, it gradually became evident that the volunteers' timetable could be organised more efficiently, considering 'different ways of how to make it purposeful for them (volunteers) as well, and for the children' (T2):

> T1: The only one thing that stands out for me is that it was the timetabling of it, because sometimes you were in the throws of it and really everybody was working, and then the timeslot was up. Then the volunteers would have to move onto the next class that was timetabled. We were all given a wee timetable, so you were desperate to come back to your timeslot, but I just felt sometimes they were halfway through a job and they had to leave.

Most teachers reported that volunteers expressed regret when they needed to move to another classroom according to their schedule, or when the time of daily engagement was finished. The limited timeslots that were assigned to

them and an inability to complete the work with children, caused them some distress. Therefore, according to some teachers, they ‘would take that extra time and that was something that they really enjoyed, and they felt that that was their purpose’ (T4).

However, many teachers mentioned that volunteers’ engagement was not always considered or planned purposefully. There were times when volunteers were scheduled for music or PE classes that required no extra assistance. Therefore, teachers sometimes applied a more flexible approach to what was suggested in the timetables and tried to manage the engagement more efficiently:

> T1: Personally, I think we should be ironing that out and nobody else, because we know our timetable. I know that I had a bit that just didn’t work well, my PE slot got changed, so it meant when I had one of the three volunteers in it was PE time (…), but then there’s a way to work around it. What we did was V still came down to the hall with me for PE, and she/he would then take groups out and do checks or reading or something (…), which then made a more purposeful use of the time.

Moreover, most teachers perceived morning timeslots as more useful and beneficial in terms of their teaching efficiency. Although the afternoon sessions were considered as mainly beneficial for pupils due to volunteers ‘having the conversations’ teachers ‘wouldn’t sometimes have with the children’ (T7), the morning slots were perceived as a more productive use of volunteers’ time.

Many teachers also reported that some modes of engagement were more efficient than others. They highlighted that especially the reading sessions were hard to run when the whole class was in and sending volunteers with a small group of pupils outside the classroom made it work for everyone and it

didn't feel as though they 'had extra work to do' (T9) and the volunteers didn't need to be 'firm the way a teacher is' (T3):

> T3: Generally, I would have them out in a quiet area with a group, rather than in the classroom. I just felt the noise level got a bit much if they were in the class. In fact, I tried it with a reading group in a class once, but the noise just got out of hand because they weren't as firm with the children as I would be.

Lessons learned

In the end, the programme was not only perceived as a chance to receive additional support in the classroom, but also an opportunity to learn and build upon volunteers' professional expertise and their approach to children:

> T9: I learnt a few things from V about, you know, in certain situations where I've tried to calm children down and she/he's given me some helpful advice, you know, on how I should approach them, when I should just leave them or what specifically I should say, and just things like that, you know, some hints and tips.

> T6: I think I'd say like I've kind of learnt to remember the importance of having a conversation with the children that isn't necessarily related to the lesson you're teaching but to remember how beneficial it is to have a one to one conversation. (…) And how it helps with like relationships that are then going to help you with the actual teaching because they'll be more kind of receptive.

In summary, teachers' experiences of the programme evolved over six months, from uncertainty of how to use 'the extra pair of hands' into a relatively clear vision of what could be the most efficient way to organise volunteers' time. The initial reluctance or reservation reported by some of the

teachers transformed into determination to facilitate the engagement and ‘make the most of it’ (T3). Finally, the intergenerational work provoked some reflections about their own practice and what they learned through Gen4Gen.

Theme 2: Perceptions of the volunteers

Teachers’ perceptions of the volunteers evolved in a similar manner as their perceptions of the programme. The initial unease and reluctance were gradually replaced with a sense of appreciation, respect, and mutual understanding.

Self-conscious concerns

The prospect of having someone without an educational background in their classroom raised professional concerns in many of the teachers regarding one’s own actions and potential lack of understanding:

> T6: I felt like a little bit at the beginning a wee bit self-conscious, just because you’ve got someone coming in that’s not got an education background and they don’t know why you’re doing things. (…) Until you got to know them and they were lovely but just the initial like “You’re going to have someone else in your room who’s not a teacher,” like “What are they going to think of what I’m doing in the classroom?”

Interestingly, the sense of unease anticipated by T6, was also reported by those who worked with volunteers with an educational background. They emphasised an increased awareness of the presence of another adult in the classroom, self-conscious inquiry ‘What’s V going to think?’ (T5), worries about being judged or being wrong:

> T4: We found out that V was a teacher, so whenever we were teaching [subject] I was looking over and thinking, “Am I doing this

right?" That's something that always kept in my head, if I wasn't sure I could always ask V.

Like T4, many teachers adapted to the new classroom situation over time, and perceived it as an opportunity to get a different perspective on their teaching skills and professional advice if needed.

Volunteers' roles

All teachers reported that they tried to use volunteers in the way that would be suitable within their timetable, 'as an asset or resource, a pupil support worker' (T3):

> T8: Like with a pupil support worker. It was the same kind of relationship. I think sometimes it felt sort of like it was another teacher or somebody you could rely on, although you were doing the planning and knew what you wanted to do.

The well-established in-school role of a pupil support worker seemed to be the most appropriate to refer to when reflecting on volunteers' positions. However, teachers often emphasised that the volunteers would not be expected to know how to fulfil some of the responsibilities that were assigned to the pupil support workers. Their role also exceeded a typical school-related position:

> T2: It's not a pupil support worker, it's not that. It's something slightly different. Although they do support it's not that role. It's slightly more. It's more of a nurturing, social-type role, although they are supporting as well.

Life experiences they brought with them and their social age made it difficult to clearly define the volunteers' role within the school. Teachers perceived them as helpers who supported pupils' learning, emotional needs, as well as played 'a nice grandparent role' (T8). They also saw them 'as part of the

classroom, part of the class' (T2), or 'part of the school learning community' (T4):

> T1: They were part, as you say, of the school family, because for some of them [children] it was like sitting with their own grandparent. The children were very, very comfortable with that. There was never any evidence of any distance, or anything like that, they just got on as if they were part of the family, the school family.

Thus, the volunteers' role was perceived as both teaching assistants and a grandparent-figure for the young children. Furthermore, a sense of professional boundaries associated with the teaching posts, seemed to harmoniously co-exist in their case with trusting and more family-related attitudes.

Different skills/experience to use

The perceived role of a grandparent was also highlighted by the teachers in association with experiences and skills that volunteers brought with them and used to support their pupils. They mentioned that there were 'a lot of complicated family relationships' (T1) within their pupils that volunteers knew how to handle and provide support. Their social skills and life experience also gave the children an opportunity to talk to 'not a teacher, but an adult' (T9) and learn beyond the curriculum:

> T6: I think for me having a volunteer in class was that extra experience that they could bring with and they had something different to talk to the children about. I mean, on a few occasions you would hear V talking to the children about things, an interest that they had, that V's son had when he was at school, and it was just something that would never have come, if it was just me in the classroom.

Teachers also emphasised that 'they [volunteers] were able to communicate with the kids on their level' (T6). Drawing from their own experiences as a

parent or a grandparent, they knew how to talk to, listen and ask children questions, which was often mentioned as ‘the most important skill that they brought’ (T3). Teachers also described them frequently as ‘extremely patient’ (T6) and proactive when their support was needed:

> T6: V used her/his initiative a lot and just kind of... You know, if one child needed a bit of extra support, V would just know to work with them. I didn’t have to say, “Do you mind going to support?” a lot of the time she/he would just do things that it was really obvious that you needed help with kind of thing.

Mutual understanding between teachers and volunteers grew over time, allowing them to work ‘as a team’ (T7), but with no risk of overstepping.

Teachers were aware that each volunteer brought different practical or professional skills to their classrooms, skills that could have been used to help children who required on-to-one support or to assist small groups of pupils with outdoor activities:

> T9: V worked with children with additional needs so she/he kind of took one of the children from our class under her/his wing and has been a really good support to him and takes the pressure off a wee bit. I just think V was an angel sent. Because she/he’s so not judgemental at all. So, coming into our class at times can be quite a difficult task but with her/his background and her/his knowledge and her/his experience she/he was able to just come in and just really support us where we needed it. And V1 did outdoor learning with me and she/he was great at that because that’s her/his thing, being outdoors, and she/he was helping the children to build dens and things like that and support them outside.

Previous teaching experience or volunteers’ particular interests in doing active learning were carefully ‘sussed out’ (T3) by the teachers and incorporated into their classroom routine. Thus, teachers not only aimed to

ensure that volunteers adequately supported pupils' learning but were also open to adapt the activities to helpers' preferences and interests.

All-embracing support

Teachers reported that volunteers had appropriate preparation for their role and were able to effectively utilise their skills to embrace various classroom needs:

> T1: I felt the volunteers were well equipped, more than able to do what they were doing. There was never any question that, "I wish I had somebody I could ask to do that," because no matter what you needed support in, they were more than able to give it. It ranged from building lighthouses, they were building lighthouses, or they would be sitting with a wee group that was struggling with numbers. They would sit and do numbers. They would play games with them, board games to help the children develop their number skills.

As reflected in T1's words, volunteers engaged in a range of tasks and were 'trusted' (T7) with what they were asked to do. They were perceived as reliable support who 'as the weeks went on, grew more confident' (T4) and could be asked to work with both the high achievers and with pupils who struggled academically or exhibited some challenging behaviour. Teachers described how volunteers gradually acclimated to their classrooms and pupils' different needs, embracing them all. Some volunteers who were former teachers were asked to perform more specific forms of support that required expert skill and knowledge:

> T5: V'd usually work with this one child. She/he is doing the direct teaching things. She/he talks them through what's happening and what we're doing and why. And V is also teaching him how to do things. (…) And then she/he took another group of children who had

English as an additional language, just to build up their vocabularies with stories and things and talking about stories.

This excerpt shows that teachers tried to tailor volunteers' activities based on their skills and expertise to utilise fully their potential. Diverse needs identified in their classrooms required from the teachers considering multiple priorities and involving volunteers in several tasks and different modes of working. Teachers recognised volunteers' pre-existing or growing confidence that resulted in a sense of trust and reliance on their abilities to address a wide range of responsibilities and pupils' learning goals.

Theme 3: Volunteers' contribution

Teachers mentioned a number of ways the presence of volunteers impacted on their classroom environment. Impacts within this domain included volunteers' contribution to pupils' learning and behaviour changes, as well as building positive pupil-adult relationships. A positive impact of having volunteers as an extra resource was also recognised in terms of teaching efficiency and the relevance of engagement in general.

Impact on children's academic skills

The teachers highlighted the need to improve children's attainment was and still is apparent and was not resolved by implementing the programme. However, they also mentioned that volunteers 'were able to, while they were here, fill that need' (T1). When asked to reflect on potential changes in pupils' attainment, most of the teachers were very careful in expressing their opinions or emphasised their inability to quantify this type of impact:

> T3: There hasn't been the significant gain that you would say that need is no longer there because… That need will be there, but there were certainly gains. (…) I know there was an impact on behaviour, on

> self-esteem, on reading. I know there was, but I can't quantify that for you.(…) I just know that, generally, it was beneficial to the class.

Although the actual impact on pupils' attainment was difficult to establish, all teachers reported that the volunteers' contribution was evident, considering various aspects of children's performance or behaviour. They specified a number of learning and development dimensions where improvements were perceived after the six months of the intergenerational engagement:

> T6: I think it's a hard thing to assess, it's hard to measure, but purely from, you know, just observing, yes, I would say there's been an improvement. From like reading, their comprehension, looking into the story, just because they were used to answering the questions that V would ask. Yeah, I think in terms of like communication skills, you know, talking to people that weren't somebody that they knew, yeah, I have noticed benefits.

Improvements in some core learning outcomes such as word reading and comprehension, were facilitated by volunteers who offered them their focused attention and assistance. This impact was often illustrated by exemplifying progress of individual children needing additional support:

> T1: A wee boy I've got (…) needed someone on his shoulder in a quiet area, and specifically for him, and I asked one of the volunteers to do that. I explained the value of it to him [a pupil], why I wanted him to feel that, and when he brought back that three paragraphs of beautifully presented neat work, he was proud. You could tell. Now, I couldn't have done that, and he couldn't have done it in the room with me. That was so important to him. I mean, it really lifted him.

Teachers often reported that the extent of the impact reached beyond a well-defined framework of academic skills and goals. As reflected in the previous excerpt, the skills and abilities of a child needed to be simply acknowledged and a sense of achievement raised during the individual work.

Teachers also mentioned that some observable progress was identified in children who required consistent, one-to-one work on their basic academic and communication skills:

> T8: Well, I noticed just for the amount of time that V spends with one of the children in my class that he [a pupil] is becoming more independent, and the other day he took out a book from the library and just started to pretend he was reading it and he would never have done that before. So, wee things like that, especially with him, he's become more independent and starting to believe that he can do things because he has been doing it with the one-to-one support. So, things are starting to feed through.

Impact on children's behaviour

Some teachers reported that initially they were not aware of the impact volunteers had on children's behaviour when 'they were out working in the corridor' (T2). However, over time, they were able to recognise that children perceived the time with volunteers as a reward that they could earn with good behaviour:

> T1: I think they automatically pulled up the behaviour because they enjoyed having them [volunteers] in so much, and they wouldn't then want to be separated. So, if there's a bit of nonsense going on in the class you would quite often say, "Right, come out of that situation, you come over here a quiet time," or whatever, and they didn't want to lose any time with the volunteers, certainly the scallywags [mischievous or cheeky children] that are in my class. I'm not saying all of them, but some of them would make sure that they didn't lose time with the volunteers. So, the volunteers had a positive effect.

Not only the opportunity to work with volunteers facilitated the children's positive behaviour, but also the pupils' perceptions of the volunteers, the specific roles they assigned to them:

> T2: I had a few issues with one child, unfortunately, when the V took that group out it would always be the one child that would, unfortunately, misbehave. So, we had a conversation about that, and we had a conversation with the child. (…) This was a person that was supposed to be respected, just like his own grandparent. (…) So, he realised that was V's position and that was how he [a pupil] was supposed to behave. His behaviour did improve because of that, which was good.

Thus, children's behaviours and attitudes towards the volunteers often changed when an explicit association between the older adult helpers and their grandparents were indicated to them. This link suggested that they should treat volunteers as they were expected to treat their own family members.

Teachers also mentioned that misbehaviour was often dissuaded simply by volunteers' presence and the meaning children assigned to it based on their needs and ideations:

> T7: I think my class were quite... they really didn't like it if V saw them doing something they shouldn't have been doing. Again, because she/he's a role model, I think they were a bit more kind of... Their expectations, they were a bit different. But V was also very good if there was a particular child who was more challenging behaviour, she/he would very quickly try and support that one child.

Positive relationships

All teachers reported that volunteers were able to build positive and nourishing bonds with the pupils they worked with. The interactions with

volunteers were perceived as an important lesson for the children about respect and ‘how to talk to adults and being listened to’ (T2). They were also ‘without realising it, modelling how relationships should be and how behaviour should be’ (T1). It was of particular importance for children who were not provided with such examples in their homes:

> T1: It’s nice when they can have that relationships, especially when some children don’t have that within their own families. It’s nice to come into school and receive that care, attention, love and support.

A sense of security and reassuring continuity was reinforced in children by volunteers’ presence and meaningful and regular interactions with them. The time that they could spend with volunteers became a constant in their classroom routine, a reward they anticipated with genuine enthusiasm:

> T4: I would definitely say they really had a great impact on the class, I think across the board. They were always welcoming to the children who were constantly surrounding them, constantly wanting to be a part with them, and work in groups an in different activities with them. It just became a part of everyday school life. It just became normal that they would come in and they would work with different groups. They developed a bond with the teachers and with the pupils.

The positive and unique relationships volunteers built with both children and teachers were possible because of their great efforts to not overstep their competences and because they adjusted their professional and life experiences to the new expectations and circumstances. They did not want ‘the teacher/pupil relationship’ with children, but wanted ‘to be a helper, a supporter’ (T5):

> T6: And coming down to their level as well with V, she/he created a relationship with them very quickly just by speaking to them when they were doing their work or, finding a common interest that they could talk about. So, it was kind of they’re remembering that they’re in with

young ones, they're not up the school. (…) the kids loved it, so they made that presence and I think that's really important that they did that.

Teachers reported that children 'responded really well' (T5) to volunteers, they were perceived as someone 'who's not that kind of authority figure, but still is (…) holding the correct values' (T6) they could relate to and rely on. Their ability to communicate with children on their level came natural to them, because of their educational background as well as their experience as a grandparent.

The reference to the grandparent role and its importance emerged frequently in the teachers' accounts. Like the complex role volunteers were identified with, their relationships with children were also perceived by the teachers as both professional and familiar:

T2: It's that professional relationship that they built with them. But it was kind of bordering on that grandparent relationship as well. That's a lovely thing for the children to have, like, another grandparent.

Impact on teaching efficiency

As indicated before, many teachers highlighted that there were various needs in their classrooms that volunteers tried to fill for as long as they were present in the schools. And although the needs were not resolved as a result of their engagement, all teachers emphasised how much more they could do with their support:

T2: I think even if it was just a case of catching up on reading that hadn't been done for their homework or going over keywords or spelling or sounds or numbers or things like that, it's something that did help the teacher because then you're not having to find that little bit of time. (…) So, I think, yes, it kind of helped us to address that little gap, because that does become a bigger gap as they go up. Being

able to do wee things like that, although it doesn't seem very much, does have an impact on our time, as well as the children's learning.

Different needs and activities that were covered by volunteers would otherwise be considered as less of a priority and maybe wouldn't be addressed at all. Therefore, teachers emphasised the relevance of the volunteers' help to both them and to the children:

> T9: For me it was just having that support in quite a challenging class, so it was taking the pressure off and, you knew that the kids who would normally maybe be left to try and get on with it were then having attention and support from somebody else. And being able to take the class outdoors, which I couldn't have done if I didn't have an extra pair of hands. So yeah, just mainly the support, having somebody else in there to support you and support the children.

Limited time that the teachers had at disposal for meeting various educational goals, was not sufficient for prioritising everything they wanted to accomplish, and for 'filling in the gaps' or supporting 'the ones that really need that additional support, that one-to-one' (T4).

Thus, volunteers covered a range of responsibilities and tasks drawing on their previous experiences and professional background. They were filling the needs in a consistent manner, which would not be possible given limited time and resources available to the teachers. This consistency of support provision was disrupted when volunteers were not in the school, which was reported as the only challenging aspect of their involvement:

> T8: They were part of your whole planning and your whole experience with the children and if they weren't there, there was something missing.

Teachers highlighted not only the importance of the consistency of pupil-volunteer interactions, but also the productive ways of using volunteers' time:

> T3: So, there was always something useful. There was never anything not useful. But I did try to vary it so that I felt they were also getting a wee chance to do the craft, do the knitting, to do the chatting… Sometimes it was just taking out with a book and talking to children, and not always the lower attaining children. I liked sometimes to give them the people that were desperate to come and show off their spelling. To me it's like, "What are they going to gain from it?" You know, my high-flyers, possibly it's just motivation, it's self-esteem. So, everybody got something different from it.

Teachers made sure that volunteers were 'meaningfully occupied' (T1) and had a chance to work with different groups of children, not only those that required additional support, but also with those considered as the high achievers. Children 'thrived on that' (T1) and teachers described as 'something that was needed' (T6).

7.4.3 Summary

Based on their observations, teachers were able to identify a number of beneficial aspects of having volunteers in their classroom. The benefits encompassed various dimensions of school functioning, including pupil support provision, facilitating healthy relationships, and enhancement of teaching efficiency. Teachers gave an account of transformations and improvements that were associated with the volunteers' presence and engagement with pupils. They also acknowledged that the additional in-class support that the volunteers provided, enabled them to accomplish more of their educational goals, which may have been missed if the additional help was not available.

7.5 Pupils' perceptions and experiences of participating in Gen4Gen

7.5.1 Methods

Sampling. The core inclusion criterion for participating in the pupils' focus group was: active engagement with Gen4Gen between September 2018 and March 2019 (Cohort 1) and being a child directly supported by the volunteers. One mini focus group was organised with four children aged between 7-8 years from P3 (n = 2) and P4 (n = 2) and attending the same school. All participants were female. Another mini-focus group was conducted with the younger classes (P1-2; N = 4), but given their very young ages it provided minimal data and therefore, the decision was taken to concentrate and analyse the data from the focus group with the older children (N = 4; P3-4) only.

Data Collection. Prior to the group discussion, a semi-structured focus group schedule (Appendix X) was developed. The questions reflected different aspects of the programme and different areas of its potential positive or negative impact. Pupils were asked to reflect on their attainment, skills they might have learned from volunteers [e.g., 'How (if at all) were the activities you did with the volunteers helpful?'], their relationships with and attitudes towards volunteers (e.g., 'How would you describe in a few words the volunteer you worked with?'), and if they think they did more/less of anything at school while working with the volunteers [e.g., 'How (or in what ways) were the activities you did with a volunteer similar or different from what you usually do in the classroom?'].

Procedure. Focus groups with pupils were conducted by the researcher in April 2019, after completion of Cohort 1 engagement. Pupils met the researcher in a quiet private room in the school, after their classes had finished. Children were collected from their classrooms by the Head Teacher and walked back by the researcher when the focus group was finished. Prior to the start of each session, the researcher (moderator) discussed informed consent procedures as described previously (see Section 5.7.1). The pupils'

focus group lasted about 40 minutes. At the end of the session, children were provided with a debrief sheet.

Data Analysis. Thematic analysis was used to interpret the focus group data in the current study. Participants' names are replaced by a P (pupil), V (volunteer) or [volunteers] throughout to preserve their anonymity.

7.5.2 Results

Three inter-related themes were identified in this analysis: 1) attitudes and behaviours; 2) educational gains; and 3) intergenerational exchange (see Table 7.2). As in the previous analyses, the themes are presented in order reflecting both the chronology of Gen4Gen and frequency of information provided. First, pupils' perceptions of and attitudes towards volunteers will be described. In the same theme, the volunteers' presence will be outlined in the context of perceived changes in pupils' behaviour and their attitudes regarding school. Then, some beneficial aspects of working with volunteers will be highlighted in light of pupils' perceptions of educational achievement and learning efficacy. Finally, pupils reflected on mutual advantages of intergenerational interactions with older adult volunteers.

Table 7.2

Themes and subthemes identified in the pupils' focus group data.

Themes	Subthemes
Attitudes and behaviours	Getting acquainted Attitudes towards volunteers Attitudes regarding learning/school Behaviour change
Educational gains	Helping all learners More time and achievement/Effective learning
Intergenerational exchange	Sense of reciprocity Emotional education

Theme 1: Attitudes and behaviours

The presence of volunteers in the school appeared to be a novelty to pupils, which they welcomed and immediately adapted to. Pupils also reported that the arrival of the 'new helpers' was associated with particular attitudinal and behaviour changes in the classroom environment, including a more positive approach to learning and increased effort to behave appropriately amongst children.

Getting acquainted

Pupils reported that volunteers' appearance in the school was unexpected and evoked some uncertainty regarding the older adult helpers' roles and how they should be approached. It was also unclear to the pupils for how long the 'new helpers' (P3) would stay with them. Therefore, they made an automatic assumption that they were 'new staff members' or 'like teachers' (P4) who would help them with activities they were struggling with:

> P3: I was surprised, because I didn't know who they were, but then one of them came into our classroom, and then helped us with work, and I was really surprised, because I thought they were just staying for a day, and then the next day, they were still there.

The initial uncertainty was accompanied by enthusiasm about the opportunity to meet new people and 'make friends with them' (P2). The volunteers' arrival also arose some expectations of potential changes:

> P1: I just felt more excited, because I'd never met them before in this school, and I'm always excited to meet someone new. So, it was really exciting, because I already knew from the start of it, we were going to get a lot more done than what we usually do.

Children anticipated that they 'would get along with the new [volunteers]' (P4) and that they would accomplish more because 'they (volunteers) would always help' (P4) them if needed.

Attitudes towards volunteers

All pupils expressed positive attitudes towards the volunteers frequently describing them as 'kind', 'really patient', or 'helpful'. They appreciated volunteers' support, being approachable, and that, unlike other adults, 'they weren't just like, no you have to do that, they weren't just shouting' (P1). This positive approach motivated the pupils to take a similar stance:

> P1: I feel like when V1, and V2, and V3, give you nice… have been kind and lovely and generous, and kind-hearted to you, so you should give it back, rather than just being cheeky to them, when they've been so kind to you – I don't think that's right. So, you have to be kind to them, because they've been really really kind to you, so you have to be kind back.

This excerpt reveals a sense of reciprocal respect between volunteers and pupils. However, pupils also reported that some children in their classes exhibited disrespectful attitudes towards the volunteers that were considered as inappropriate and unjust:

> P4: Some of the boys have actually been quite cheeky and nasty to them – I wouldn't say nasty, but cheeky and rude to the volunteers. (…) It has changed, because I've actually talked to one of the boys, I told them: 'Is that nice - the way you're acting, the way you're behaving to the volunteers?' And I told them that I don't think it is. So, I told them to go and say sorry, and from that day, the boy that I've told to stop, he told the rest of the boys to stop.

Thus, positive perceptions of the volunteers seemed to not only reinforce pupils' affirmative approach to them, but also encouraged some of them to correct negative attitudes and behavioural tendencies of other children.

Attitudes regarding learning/school

The engagement with volunteers was not only beneficial in terms of shaping interpersonal attitudes, but also facilitated children's confidence in their ability to accomplish some learning goals when they did not believe they could 'get all of these right' (P1). The presence of the volunteers and the certainty of their support was also a source of reassurance and provided a sense of comfort:

> P1: Some days when I'm not at school, I feel a little bit scared, because I know what we're doing the next day, because the teacher's told us, and I feel a little bit scared to go, but then I realise, today's the day that the volunteers come, and I'm like, I'm getting out of this door to go to school, I'm not caring anymore…and I'm way more excited than what the other days are.

Knowing that they could expect volunteers in the class on a given day, made pupils less anxious about attending the school and approaching the tasks that they were worried about.

Moreover, the learning goals seemed to become more achievable not only because of volunteers' additional support, but also because of the ways the help was provided:

> P2: Well, they explained it in an easier way than people would usually, because they were very grown-up volunteers, and if anyone needed help, all they had to do was just come up to the volunteers, and if it was very hard, like fractions, they would explain it in a very easy way, or in a fun way, and I did fractions at home with Dad. Dad didn't do it in a fun way, but he did teach me how to do fractions.

Children emphasised that volunteers helped them by 'making learning funner than it usually is' (P3) and by introducing some difficult tasks as 'a lot more easier' (P4) and in a more comprehensible way.

Behaviour change

Another benefit that was related to the presence of volunteers in the school was their impact on pupils' behaviour. Children reported that volunteers often intervened if they witnessed any misbehaviour:

> P2: I think when the volunteers were around, or when they were in the playground, or in the class, if somebody was not really kind to another person, the person that wasn't very kind, would say sorry, because the volunteers would say, why did you do that? And then they would say sorry because they would understand that it was very naughty or cheeky.

Volunteers curbed problematic behaviour by providing pupils with reprimand and initiated a positive shift. They also helped facilitate and organise the in-class work:

> P3: Before the volunteers came in, we had groups in our class that were just children. If T was busy, like for maths, but some people would just argue over who's in charge, and they knew nobody was in charge. But then when the volunteers came, I felt like it really helped with the groups, because there will be no more arguing, because there was an adult there, and the adult was in charge to help you. So, there wouldn't be any arguments over who was in charge.

Thus, the presence of another adult prevented unnecessary distractions and allowed pupils to focus on their work.

In summary, this section focused on positive impacts that volunteers had on children's behaviour and attitudes. Their supportive and encouraging approach was highlighted as a facilitator of positive attitudes towards both adult helpers and learning. Volunteers' constructive influence was also acknowledged when positive behaviour changes both within the classroom and in the whole school were reported by pupils.

Theme 2: Educational gains

The opportunity to work with volunteers was cited as a reason for educational gains in both the high-achievers and children who needed additional support. The beneficial aspect of the volunteers' support was also mentioned by children in terms of time and learning efficiency.

Helping all learners

When discussing different aspects of volunteers' engagement, pupils mentioned that the additional support was provided to all children who needed it, regardless of the level of educational attainment:

> P3: I feel like they're just really helpful, and they help us improve in our work more. If someone is in a higher level in work, but they're struggling a bit with maths or writing, they'll help them get back up to their normal pace.

> P2: [A pupil] needed help. So, he got one of the volunteers to help him, because it was times tables and brackets, and he didn't understand very much, so he asked one of the volunteers to help him understand, and he did understand, and because of that he got most ticked, but he didn't get all his work done with maths, but most of it, yeah.

Children highlighted that they were able to approach volunteers and ask for help if they needed it. The support they received did not fill all the gaps in their schoolwork, but they were able to progress with some of their learning goals.

More time and achievement/effective learning

A related benefit of working with volunteers was the opportunity for uninterrupted learning that did not require turn-taking. Pupils reported that, outside of the programme, they often had 'to let the other people have their time to help' (P1) and wait until it was up:

> P1: I feel like we couldn't have got as much done without them, because they helped so much. (…) And everybody would have somebody, rather than somebody just having to wait for their reading group. And we couldn't have got as much done as what we usually get done without them.

They had an impression that more work was done because they received more constant support, possibly due to the volunteers' involvement.

Moreover, they gained not only in terms of the amount of work accomplished, but also in terms of the time that would otherwise be taken from their breaks.

Theme 3: Intergenerational exchange

Children used expressions such as ‘very grown-up [persons]’ or ‘in their days’ (P2) that indicated that they were aware of the generational gap between them and volunteers. They acknowledged and recognised it as an opportunity to learn and receive support from each other.

Sense of reciprocity

Children reported that volunteers helped them with various school-related tasks and activities such as directions, maths, reading, writing stories, or science projects. They also taught them ‘how to do a lot of things’, ‘how to knit’ (P3), or talked to them about their school times. In exchange for their support and contribution, children expressed their willingness to give something in return:

> P1: When maybe they have a group, and it’s maybe a laptop time, then we could teach them. So, we could partner up with one of them. When I went with V, I would show her/him how to log on, and things like that. So, you would tell her/him how to use it, and things, and she/he would teach me something about what she/he would do when it was her/him free time back in the days. (…). So, it was a really good opportunity to learn from them, what they used to do at school, because they told us things, that they didn’t get to do as much drawing, and free time, and art things, as much as we do.

Both computer induction offered by children and reminiscence sessions were considered by pupils as an opportunity for exchanging experiences and learning. They also suggested providing some practical support with tasks that volunteers might struggle with:

> P2: If they need us to type in something that was very hard, then we would help them, because they wouldn't know how to exactly use technology, and once when [a pupil] was on a laptop, and V was there, and I was trying to log in for [a pupil], and V helped me a wee bit, because I was getting muddled up with my username, and V said it might have been because the numbers were the wrong way round, and I checked in my diary, and it actually was that.

Two generations, by using different thinking and practical skills, appeared to work together efficiently and complement each other's efforts.

Emotional education

Children reported that they felt supported by volunteers, not only when they needed help with their learning, but also when they experienced some distress:

> P1: They're [volunteers] really patient. If you're a bit struggling, they will always be there with you. So, if you're a wee bit nervous to speak with them, they'll just be like, it's fine, and it's okay to speak with them, if you're worried about something. (…) if you're sad, they would make you happy, make a little joke to make you smile, or something like that and when they're sad, you can realise it, and when they're really excited, you can realise… and you're learning other people's emotions, rather than just learning your own.

Thus, they also perceived that IE was an opportunity to learn about other people's emotional reactions, and how to be empathetic.

7.5.3 Summary

In summary, pupils gave an account of intergenerational exchange of knowledge and skills that took place during the six-month engagement and that could be developed further. A sense of, and need for, reciprocity echoed in children's accounts when they discussed their attitudes towards the volunteers. The presence of adults who were a source of emotional support for them also constituted a lesson in empathy.

7.6 The impact of participation in Gen4Gen on school climate

7.6.1 Methods

Sampling. A school climate survey was administered in seven schools participating in the pilot study, including four active and three matched comparison schools. In relation to the Scottish Index of Multiple Deprivation (SIMD, 2020), all schools were located in areas designated as the most deprived in Scotland (1-3 quintile of deprivation). Across schools, enrolment ranged from 83 to 440 pupils (M = 195, SD = 124) arranged in 7-15 classes across P1-7. All members of school staff (including management, teaching and administration staff) were invited to take part in the survey, given their potential exposure to the intervention, or the effects of the intervention, and their familiarity and/or direct involvement with the teaching practice within the schools. They were invited to participate in the survey at two timepoints: the beginning of the school year and towards the end (i.e., in June and July). During this school year (2018-19), Cohort 1 and 2 were involved in the programme. At the baseline, response rates ranged from 9% to 60% for active schools and from 35% to 63% for control schools. Out of 53 respondents who completed the baseline, 50 completed the follow-up survey (33 in the intervention schools and 17 in the control schools). To maximise participation as far as possible, reminders were sent to school offices before and during the data collection period.

Data Collection. The School Climate Survey administered in the current study was adapted from Division of Research, Evaluation, Assessment and Accountability survey (DREAA, 2011; the form is not publicly available, but has been previously used in Parisi et al., 2015). It consisted of 36 items to assess the characteristics and effectiveness of the educational environment using a 5-point scale (1 = strongly disagree to 5 = strongly agree), with a higher score indicating a more positive climate. The survey responses were calculated as an overall school climate score and individual scores of eight sub-domains, which included: 1) school satisfaction (5 items; e.g., "This school does a good job educating students"); 2) school safety (7 items; e.g., "Fighting among students is not a problem at this school"); 3) educational values (2 items; e.g., "The school sets high standards for academic performance"); 4) parental involvement (3 items; e.g., "When a student does something bad at school, the parents are informed"); 5) creativity and the arts (2 items; e.g., "Creative thinking is shared among staff and students"); 6) learning climate (8 items; e.g., "Students talk to the teachers when they need help"); 7) teaching (3 items; e.g., "Teachers at this school set high standards for their teaching"); and 8) school resources (6 items; e.g., "The school offers sufficient in service training for staff regarding classroom behaviour management practices"). The scale has high internal consistency, with Cronbach's alpha ranging between 0.82-0.98 across individual subdomains (Parisi et al., 2015). Note, some items (n = 36) and survey dimensions (n = 2; school physical environment, school administration) included in the original survey administered by the Baltimore City Public School System (DREAA, 2011) were removed: 1) due to being more relevant to the US school environment (e.g., 'Gangs are not a problem in this school'); and 2) to ensure all members of school staff (i.e., school administration and teaching staff) would be able to answer all questions.

Procedure. The school climate survey with an attached Participant Information Sheet (Appendix P), Consent Form, and a return envelope were distributed to the staff members by the Head Teachers and returned when completed, to the locked deposit box located at the school office. The survey

was completed before the start of the intervention (September 2018) and at the end of the school year (June 2019). Participants were also asked to use pseudonyms when submitting their survey and to allow matching of data across timepoints. These processes ensured confidentiality of participation and pseudo-anonymity of data.

Data Analysis. The school climate survey data were analysed using 2 (schools: control, intervention) x 2 (time: baseline, 10-month follow-up) mixed ANOVAs. To follow up any significant interactions, the effect of time within each group was assessed using paired *t*-tests. The effect sizes of time within each group (i.e., Cohen's *d* for baseline vs 10-month follow-up) were reported; these were emphasised given the pilot nature of the research. In addition, supplementary Bayesian analyses were reported in this study. Inclusion Bayes Factors (BF_{incl}) were calculated for ANOVA effects. As a reminder, *BF* scores of 1-3 indicate weak or anecdotal evidence for the effect, 3-10 indicate moderate evidence, and BF > 10 indicate strong evidence (Jeffreys, 1961; Lee & Wagenmakers, 2013).

An alternative to the current analytical approach would be multilevel modelling that allows modelling of the data nested within participants and participants nested within schools, indicating observations at different levels (Raudenbush & Bryk, 2002). However, given the very limited sample size, particularly in certain schools, mixed ANOVAs were conducted, focused upon effect sizes. It is advisable that future higher powered, full trials would use multilevel modelling for larger datasets from the participating schools.

Main analyses in this study were carried out using SPSS 25.0 (IBM Corp., 2017). Bayes Factors were calculated using JASP 0.11.1.0 (JASP Team, 2019; Wagenmakers et al., 2018). The Exploratory Software for Confidence Intervals (ESCI; Cumming, 2012) software (https://thenewstatistics.com/itns/esci/) was used for calculating Cohen's *d.*

7.6.2 Results

Baseline data were first examined by intervention status using between subjects t-tests. Scores were relatively positive in both intervention and control schools and there were no between-group differences found on any of the dimensions of the measure or overall school climate (all $p > .21$; see Table 7.3).

Table 7. 3

Comparison of school climate between intervention and control schools over 10-month follow-up.

Outcome	Control School (n = 17)		Effect size	Intervention School (n = 33)		Effect size	Main effect		Interaction
	Baseline	Follow-up		Baseline	Follow-up		School	Time	School x Time
	M (SD)	M (SD)	*d*	M (SD)	M (SD)	*d*		*p (F)*	
Overall school climate	4.13 (0.27)	3.95 (0.28)	-.61	4.17 (0.28)	4.21 (0.24)	.19	**.045 (4.22)**	**.018 (5.96)**	**.001 (13.75)**
Subdomains:									
School satisfaction	4.51 (0.5)	4.25 (0.52)	-.51	4.62 (0.43)	4.69 (0.32)	.18	**.023 (5.52)**	**.033 (4.83)**	**.001 (13.87)**
School safety	4.24 (0.51)	4.13 (0.5)	-.19	4.08 (0.40)	4.07 (0.49)	-.01	.369 (.82)	.411 (.69)	.488 (.49)
Educational values	4.65 (0.29)	4.56 (0.39)	-.26	4.73 (0.31)	4.76 (0.33)	.09	.104 (2.74)	.572 (.32)	.250 (1.35)
Parental involvement	3.71 (0.64)	3.47 (0.64)	-.39	3.89 (0.54)	4.10 (0.6)	.34	**.016 (6.20)**	.872 (.03)	**.003 (9.78)**
Creativity and the Arts	4.38 (0.52)	4.00 (0.47)	-.78	4.17 (0.66)	4.20 (0.64)	.02	.913 (.01)	**.050 (4.03)**	**.035 (4.73)**
Learning Climate	3.88 (0.28)	3.65 (0.28)	-.75	3.97 (0.29)	3.98 (0.25)	.04	**.002 (10.46)**	**.042 (4.36)**	**.025 (5.36)**
Teaching	4.63 (0.33)	4.61 (0.43)	-.05	4.71 (0.32)	4.68 (0.45)	-.07	.429 (.64)	.715 (.14)	.938 (.01)
School Resources	3.72 (0.37)	3.55 (0.43)	-.43	3.84 (0.52)	3.89 (0.47)	.11	.074 (3.34)	.312 (1.04)	**.047 (4.18)**

The results of the ANOVAs showed a significant interaction between school status and time for school satisfaction, $F(1, 48) = 13.87$, $p < .001$, $\eta p^2 = .224$, $BF = 38$; parental involvement, $F(1, 48) = 9.78$, $p = .003$, $\eta p^2 = .17$, $BF = 12.86$; creativity and the arts, $F(1, 48) = 4.73$, $p = .035$, $\eta p^2 = .090$, $BF = 1.59$; learning climate, $F(1, 48) = 5.36$, $p = .025$, $\eta p^2 = .100$, $BF = 2.58$; school resources, $F(1, 48) = 4.18$, $p = .047$, $\eta p^2 = .080$, $BF = 1.45$; and overall school climate, $F(1, 48) = 13.75$, $p < .001$, $\eta p^2 = .223$, $BF = 38$. The results showed that baseline positive perceptions of school climate were maintained over time in the intervention schools, whereas decreases were observed in the comparison schools. Note, the *BF*s for creativity and the arts, learning climate, and school resources are relatively low indicating weak evidence, therefore, those results should be considered with particular caution.

No significant main effects or school x time interactions were found for the sub-domains of school safety, teaching, and educational values (all $p > .25$, all $BF < .049$).

To follow up, the main effect of time was assessed within each school condition for each measure. A significant, negative effect of time was found for the control schools on school satisfaction: $t(16) = 3.10$, $p = .007$, $d = 0.75$; parental involvement: $t(16) = 2.51$, $p = .023$, $d = .609$; creativity and the arts: $t(16) = 2.52$, $p = .023$, $d = .611$; learning climate: $t(16) = 2.58$, $p = .020$, $d = .626$; as well as overall school climate: $t(16) = 3.27$, $p = .005$, $d = .792$ (Figure 7.1).

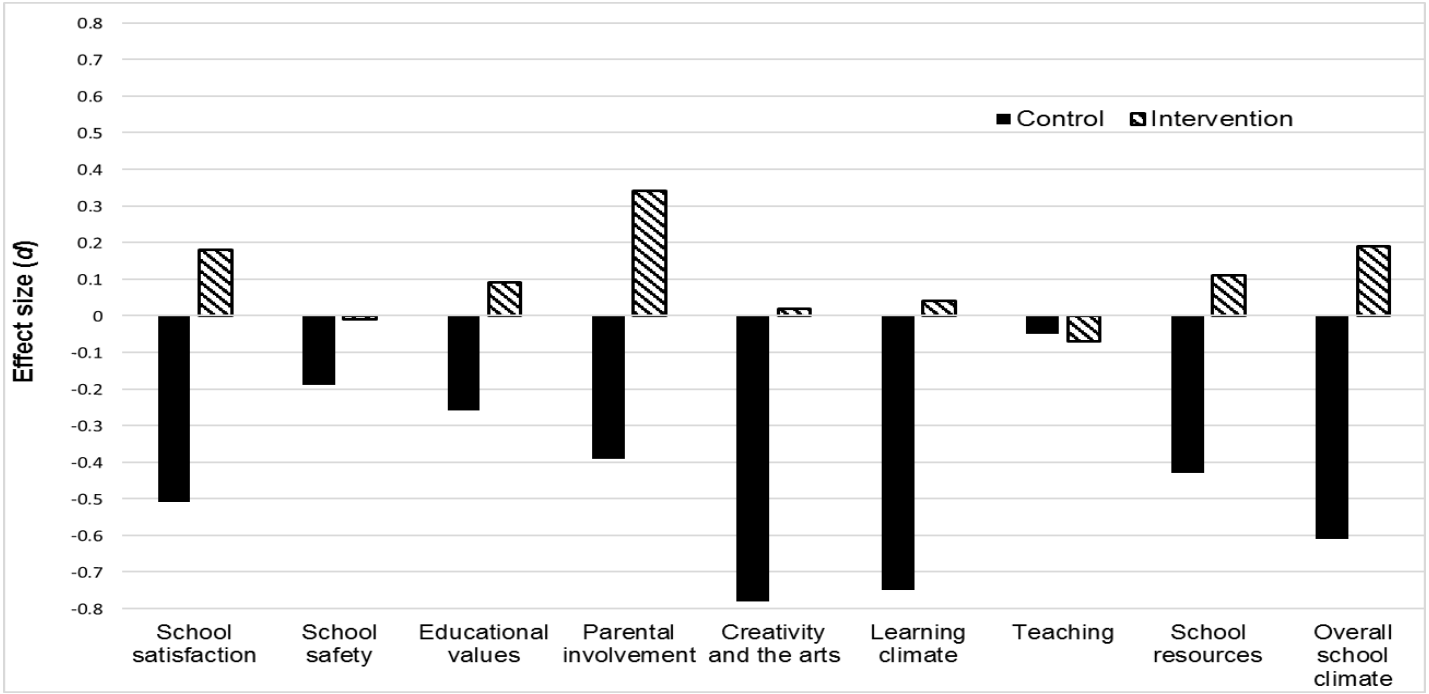
The intervention schools showed a significant, positive effect on the parental involvement sub-domain: $t(32) = -2.35$, $p = .025$, $d = .409$, but no significant differences were found for the remaining sub-domains or the overall score of the school climate (all $p > .16$).

Regarding the effect sizes of time within each group, positive effects indicate improved school climate, while negative effects indicate decreased climate scores. The intervention schools showed small, positive effects in school satisfaction, parental involvement, and overall school climate, while the

remaining measures appear similar to baseline. In contrast, small to large, negative effects were observed for the control schools on all outcomes except for teaching (Figure 7.1).

Figure 7. 1

Effect sizes of mean differences between baseline and 10-month follow-up for school climate within each of the intervention and control schools.



7.6.3 Summary

In summary, over the 10 months of participation in the programme, intervention schools tended to maintain or slightly improve their scores over time, while a consistent pattern of decline was found for most measures in the comparison schools over time. Thus, the results of this survey highlight potential for maintaining stable perceptions of school climate, as a result of engagement in a moderate-intensity school-based programme.

7.7 Discussion

This mixed-methods study assessed, from the perspectives of school staff and pupils, impacts of Gen4Gen, a school-based intergenerational intervention. A quantitative survey was used to assess school climate, and pupils' and teachers' perceptions and experiences were explored qualitatively via focus groups. By combining two different research methods, we gained a more comprehensive and explanatory account of the experiences and potential changes resulting from the presence of older adult volunteers in primary schools. Overall, the findings suggest that IE can contribute to creating a more supportive learning and teaching environment. Perceptions of the classroom-level benefits reported during the focus groups indicate the potential positive effects for pupils' academic achievement, classroom behaviour, and teachers' efficacy. The school-level benefits revealed in the school climate survey include maintaining positive perceptions of school climate over time in the intervention schools, compared with decreases observed in the comparison schools.

The qualitative evidence provided further support for the benefits associated with the presence of older adult volunteers and implementation of the IE programme. Despite some initial reluctance and doubts, teachers expressed enthusiasm for the programme and appreciated volunteers' assistance in the classroom over time. By having older adult volunteers in the classroom as 'an additional resource', teachers and pupils were able to

engage in activities that could otherwise be missed or required more time to complete. Teachers' favourable attitudes towards older adults recognised in this study are consistent with previous findings showing teachers' positive views of volunteers and confidence in their ability to work effectively with children (Rebok et al., 2004). Further, the volunteers' role was perceived as both nurturing and professional, ensuring the consistency and stability important for learning and personal growth of children (Fried et al., 1997). The presence of older adult volunteers made pupils less anxious about attending the school and approaching the school tasks, which seem to be consistent with previous research demonstrating better adjustment to stress in children participating in the programme (Yasunaga et al., 2016). Children perceived volunteers as a source of educational and emotional support, more favourably anticipated than that provided by teachers and parents (Yasunaga et al., 2016),

Pupils' positive perceptions of older adult volunteers were also in line with the existing literature on intergenerational attitudes indicating positive views of the older population, enhanced cross-age connection and comfort as a result of the intergenerational interactions (Bales et al., 2000; Piquart et al., 2000; Sun et al., 2019). Several benefits were also reported in terms of pupils' academic achievement and classroom behaviour. Similar to the Experience Corps programme, volunteers in this study supported pupils through three pathways including academic stimulation, behavioural management, and motivation/readiness for learning (Rebok et al., 2004). Although the programme was initially focused on educational support, other forms of support (i.e., outdoor learning, mentoring, knitting and other craft activities) developed over the course of intervention. As a result, both teachers and pupils mentioned improvements in vocabulary and verbal abilities, reading, and behaviour. The changes were often highlighted in relation to 'low-achievers' or pupils requiring additional support, which suggests that the programme and volunteers' role fulfilled some of the schools' unmet needs (Freedman & Fried, 1999) by addressing inequalities in educational attainment (Sosu & Ellis, 2014).

These preliminary findings are in line with previous research that found significant differences between intervention and comparison schools on several dimensions of school climate such as parental involvement and school satisfaction, as well as on overall school climate (Parisi et al., 2015). Unlike previous IE interventions, positive interaction effects were also reported for the subdomains of creativity and the arts, school resources, and learning climate, but not for teaching or educational values. These results may indicate that perceptions of the school- and classroom-level factors may differ depending on the intensity of exposure to the programme, the number of volunteers assigned to the schools, and activities the teachers were assisted with. For example, the Experience Corps (Parisi et al., 2015; Ramsey et al., 2016) programme deployed volunteers in teams of 7-10 people, with multiple teams assigned to each school. In addition, volunteers were required to commit a minimum of 15 hours per week for at least one year (Glass et al., 2004), which exceeds the more moderate exposure of the current programme. The school-based activities in EC (Fried et al., 2004) could also vary from those that were included in the present study given different needs identified by individual schools that had to be addressed.

In the current study, activities in which volunteers were involved often depended on their skills, preferences, as well as the classroom needs identified by the teachers. They also covered activities that would otherwise be considered as less of a priority and maybe would not be addressed at all. For example, one-on-one interactions were perceived by teachers as particularly beneficial at an individual pupil level, and group work (i.e., reading groups, outdoor learning) at the classroom level. Considering that teachers' perceptions are more sensitive to classroom-level factors (e.g., teaching; Mitchell et al., 2010), they might have felt less burdened and more supported when volunteers helped them keep groups of pupils or the whole class organised. However, due to a small number of volunteers in each school, they were often assigned to two or more classrooms, which meant limited time spent with the same class and potentially less impact on the teachers' efficacy. Teachers often mentioned timetabling issues that affected

the intensity and efficiency of IE. The short timeslots did not always allow them to complete their work with children, which disrupted the consistency of support provision. Thus, the lack of effect on the teaching sub-domain of the school climate survey could to some extent be explained by the mode and intensity of assistance the volunteers provided. Having more volunteers assigned to each school and classroom, as well as volunteering in longer timeslots, would potentially allow more consistent and effective engagement, and give teachers more time to focus on teaching activities. The current intervention required the volunteers to commit 8 hours per week, which may not have been as impactful in this respect, then, as the more intensive engagement included in Experience Corps (15hrs/week; Carlson et al., 2008).

The benefits of this intervention for overall classroom and school functioning seem to be in line with the social ecological framework (Bronfenbrenner, 1997), social cognitive theory (Bandura, 1997), and the social identity approach (Maxwell et al., 2017). We demonstrated how volunteers' engagement (cognitive, social) embedded within a school context, can activate the positive influence of school climate on pupils' academic performance and teachers' practice. Consistent with social cognitive approach that identifies supportive attitudes as a main source of motivation and achievement, volunteers addressed pupils' academic and emotional needs as well as, contributed to the teachers' sense of increased self-efficacy (Bandura, 1997; Goddard et al., 2000). Specifically, supportive volunteer-pupil and volunteer-teacher relations and consistency of engagement facilitated sense of belonging to a school 'team' or school 'family' and, in turn, motivated learning and achievement. This is in line with the social identity approach (Maxwell et al., 2017) that highlights the relevance of pupils' and teachers' school identification as one of the factors determining positive, educational and behavioural changes. Further, pupils' academic gains and improved behaviour, as well as having volunteers as an additional resource seemed to improve classroom dynamics and efficacy of teaching (Collie et al., 2012). That is, the teachers had more time to focus on

teaching activities instead of dealing with disruptive behaviour. These indirect positive effects of IE revealed in both quantitative and qualitative component of this study may indicate that some socio-contextual dimensions of school functioning can be maintained or enhanced by an effective intervention that in turn can contribute to improvements in learning and teaching outcomes.

In addition, the duration of the programme was found to be particularly important in terms of the ability to alter the perceptions of school climate. Several studies on school-wide interventions such as positive behavioural interventions that were designed to improve school climate demonstrated that post-implementation effects are difficult to achieve and are typically observed at the 3- or 5-year follow-ups (Bradshaw et al., 2009; Charlton et al., 2020; Horner et al., 2009). The improvements were also more apparent for specific school climate domains that were related to engagement and environment (e.g., parental involvement, learning environment; Charlton et al., 2020). This evidence may suggest that even trivial positive changes following relatively short-term implementation can be indicative of large effects at longer follow-ups and that future school-based interventions should be carefully tailored to influence the targeted school climate dimensions. As indicated by Parisi et al. (2015), the impact of the intervention on the school staff's perceptions of school climate could also depend on the personal experience of a notable difference at the classroom or school level.

The quantitative and qualitative evidence reported in this study supports the potential positive impacts of IE on participating schools. Teachers and pupils who participated in this intervention reported general satisfaction with and appreciation for the programme and volunteers' assistance. These positive classroom-level evaluations seemed to expand to stability in relatively favourable perceptions of school climate over the course of the school year. A significant interaction effect found in learning climate and overall school climate may suggest that the additional support may lessen school-related stress in both pupils and teachers that may develop over the academic year, and lead to increased retention of teachers and pupils' attendance in the long run (Ravalier & Walsh, 2017). Finally, considering a

significant, positive effect of IE on the parental involvement found in the intervention schools, it may be that the volunteers' assistance in the classroom gave the teachers more time to accomplish their educational goals and consequently, more time to talk with parents/guardians about pupils' progress or problems. The presence of volunteers in the school might have also indirectly contributed to increased parental engagement in school life (e.g., planning and implementing school events and activities).

7.7.1 Strengths and limitations

This study used a mixed-method approach to provide a comprehensive picture of how IE can impact the functioning of participating schools. By conducting the school climate survey, we were able to examine data for staff who were both directly and indirectly impacted by the older adult involvement. Expectations and potential implications of this community-based programme were identified in qualitative data, providing a guide for future school-based intergenerational initiatives. Although some organisational challenges were recognised, the successful implementation of the programme and the current findings suggest that school settings offer potential not only for health promotion in older adults, but also for positive school-level changes.

There are several limitations of this study that need to be considered. First, the schools involved in this project were recruited from small towns/villages in one geographical area of Scotland and their number was relatively small (n = 7), commensurate with the pilot nature of this research programme. However, this may limit the generalisability of our findings to other settings, such as larger urban schools. Second, due to initial challenges during recruitment of the older adult volunteers and their preferential assignment to schools, randomisation to schools was not possible for the current study. Although, the feasibility of random assignment to schools for a programme of considerable duration is questionable (e.g., travel). Finally, the researcher's direct involvement in co-ordinating the programme and

collecting the data may have resulted in bias towards reporting more favourable views of the project by both pupils and teachers. However, to minimise the risk of participant bias, the researcher specifically encouraged focus group participants to reflect on challenges as well as benefits of the programme. Most importantly, challenges were indeed reported, particularly from the staff's perspective, showing their inclination to provide a full account of their experiences.

Finally, engagement duration, small sample size, the small number of volunteers (i.e., 1-3) assigned to each school, and involvement of only primary years 1-4 (out of the 7 primary years) may have limited the ability to detect significant effects for individual school climate subdomains, especially in the larger schools involved. Further research should therefore involve a larger sample of schools and define the minimum number of volunteers needed to have a school-wide effect (Glass et al., 2004). It may be also useful to explore the experiences and impacts of a programme extending into more or all of the primary school years, although the volunteers' confidence and abilites for working with the older children would need to be carefully considered.

7.7.2 Implications for future research and practice

Given the pilot nature of this study, the statistical results should be treated as preliminary and interpreted with caution. The effects detected for the individual subdomain and overall school climate score could be short-term and associated with the novelty of the intervention, in that the potential to impact perceptions of school climate may decline over time (Parisi et al., 2014). Therefore, longer-term, larger scale interventions are recommended in future to determine how school climate can be changed or maintained depending on duration of exposure to IE.

In this study we have not accounted for school staff/teacher/school characteristics that could potentially affect perceptions of the changes. For example, rotation of the teachers and administrative staff, size of the schools

and classrooms, teachers' work experience, or other initiatives being conducted parallel to the current intervention could have impacted results. Thus, in order to gain a better understanding of how the staff's and pupils' perceptions were shaped, future research should control for potential confounding factors at both the classroom- and school-level. For example, collecting data and monitoring for organisation-level characteristics (e.g., school size, number of support workers, level of deprivation) and rotation of teachers and management could provide further explanation for perceived changes on the school climate measure. Moreover, the qualitative evidence from focus groups with pupils could be further validated by pre- and post-analysis of their school records on attainment and classroom behavior, which was not possible in the current study.

Considering organisational issues reported in qualitative data, this research lacked the capacity and resources needed to monitor fully the delivery of the intervention within the school system. However, for a programme such as this it is important to allow a degree of autonomy for participating schools, to acknowledge that there will be operational differences across schools, and that some flexibility is required. The efficiency of the programme could be improved further by teachers' direct involvement in managing the volunteers' timetables and the project itself. This could be incorporated into guidance for schools but should be considered as a recommendation rather than a directive, given not all schools may be in favour of this approach. In addition, implementing a larger-scale school-based intervention in the future would require increased input of the local councils and partnerships with community-based organisations. Their support is crucial to standardise and ensure efficiency of the programme recruitment and implementation (Rebok et al., 2014).

7.8 Summary

This chapter presented findings from the school climate survey completed by the school staff (Head Teachers, teachers, administrative staff) and from

focus groups conducted with pupils and teachers experiencing the Gen4Gen IE programme. The quantitative results showed that the already favourable perceptions of overall school climate and learning climate among staff in the intervention schools were maintained compared to declines over the school year in the control schools. These perceptions were in line with experiences of both teachers and children supported by Gen4Gen volunteers. Both groups identified a number of positive aspects of having volunteers in their classroom environment, including using volunteers as an additional resource (teachers)/source of help (pupils) and improving in-class teaching/learning efficiency. Further interpretation of the current findings will be presented in the general discussion chapter, in the context of the whole research programme (Chapter 8).

CHAPTER 8. The impact of Generation for Generation for older adult volunteers and participating schools: Key findings and future directions.

8.1 Chapter overview

This final chapter presents a general overview of key findings from the current primary school-based intergenerational engagement (IE) intervention, Generation for Generation (Gen4Gen), and places them in the context of existing knowledge and theory. First, a broad spectrum of potential benefits of IE for older adult volunteers will be outlined and discussed. Then, positive effects for participating schools and their relevance will be considered. Subsequent sections will highlight strengths and acknowledge limitations of the current pilot study, revealing contributions to existing literature on IE and areas for potential improvement. Lastly, implications for policy and practice will be outlined, followed by final study conclusions.

8.2 Benefits of school-based IE for older adult volunteers

School-based IE as an example of a real-world intervention constitutes an opportunity for increasing older adult activity in multiple ways. Previous research has demonstrated that IE offers enhanced cognitive stimulation, physical activity, and social engagement, which in turn, can lead to positive health and social outcomes (Fried et al., 2004; Glass et al., 2004). The positive health consequences are in line the engagement hypothesis (described in more detail in section 1.3.1) highlighting that participation in socially and mentally demanding activities could contribute to reduction of age-related declines in intellectual functioning (Schooler et al., 1999; Stine-Morrow et al., 2007). This process can be explained by a protective mechanism that allows people to compensate for neural changes and maintain a higher level of brain functioning by engaging supplementary

neural circuitry, or scaffolds (Park & Reuter-Lorenz, 2009). Thus, engaging in various forms of activities that are novel and/or mentally challenging may positively contribute to neural scaffolding and improve brain function.

The link between neuroplasticity and enhanced mental engagement was previously examined in experimental studies such as ACTIVE (see section 1.3.1 for more details) that were focused on untrained abilities and used ability-specific training to examine changes in neural function and brain structures (Tennstedt & Unverzagt, 2013; Valenzuela et al., 2003). The aim of ACTIVE was to implement three cognitive interventions (memory, reasoning, and speed of processing) and train the participants in the targeted mental ability by using strategy instruction, practice in the use of the strategy, or solving problems that contained a serial pattern (Tennstedt & Unversagt, 2013). These interventions showed immediate improvements in trained abilities, but little or no improvement in performance on daily tasks at the 2-5- and 10-year follow-ups (Ball et al., 2002; Rebok et al., 2014; Wolinsky et al., 2009). Thus, experimental studies provide evidence of immediate gains in trained cognitive domains and potentially postpone further age-related declines, however, they seem to offer limited transfer of the exercised skills to the daily living tasks.

Conversely, the real-world interventions, such the Senior Odyssey (Stine-Morrow et al., 2008; Stine-Morrow et al., 2007), the Synapse Project (Park et al., 2014), or Experience Corps (e.g., Carlson et al., 2008; Fried et al., 2004) showed a clear link between engagement and cognition. These longitudinal studies found that substantive complexity of engagement could lead to improvements in executive function (Carlson et al., 2008), memory (Park et al., 2014), speed of processing, divergent thinking (Stine-Morrow et al., 2008), and reasoning (Stine-Morrow et al., 2008; Tranter & Kautsaal, 2008). In addition, Experience Corps showed that creating high-impact voluntary roles within the community allow older adults meet their need to be generative and leave legacy (Erikson, 1982; Gruenewald et al., 2016). In line with the Erikson's concept of generativity (Erikson, 1950; see section 1.3.3), by guiding and nurturing the next generations, older adults had a chance to

share their wisdom and experience that benefited others. In addition, the intergenerational interactions resulted in establishing new relationships and regaining a sense of purpose in older adult volunteers (Erikson, 1950).

As outlined in Chapter 2, there is growing and promising evidence on effectiveness of IE in response to the challenges of an ageing society. Older adults involved in intergenerational activities were found to experience a range of biopsychosocial benefits, including improvements in cognitive function (e.g., Carlson et al., 2008, 2009), physical activity and functioning (Fried et al., 2004; Tan et al., 2006, 2009), mental wellbeing (e.g., Murayama et al., 2015; DeMichelis et al., 2015), and social outcomes (Ehlman et al., 2014; Gamliel et al., 2014; Gruenewald et al., 2016). IE programmes of different duration and level of exposure, implemented in various settings and involving a wide range of activities, showed reliable effects of IE on older adults' functioning (e.g., Ehlman et al., 2014; Hsu et al., 2014; Sakurai et al., 2016). The most consistent patterns of improvement were demonstrated in relation to social connectedness, including cross-age attitudes, generativity (e.g., Chippendale & Boltz, 2015; Gruenewald et al., 2016), anxiety (e.g., Halpin et al., 2017; Sng and Jung, 2020), as well as physical activity (e.g., Tan et al., 2006, 2009). However, as our systematic review revealed, existing evidence on positive effects of IE needed to be explored further, in high quality research using comparable models, standardised measures, and examining a range of health and social outcomes.

The main focus of this research was to explore short-term effects (after 3- and 6-month periods) of participating in a school-based IE intervention on older adults' cognitive, health, and social outcomes. Based on the Experience Corps model (Fried et al., 2004) we assumed that continued involvement in IE might increase volunteers' level of cognitive functioning, physical activity, and social engagement holistically. We also aimed to explore perceived benefits and challenges of participating in the Gen4Gen programme and capture perceptions and experiences of IE for future implementation and further development of the current intervention.

8.2.1 Cognitive outcomes

Considering potential benefits of IE on cognitive functioning, this pilot RCT demonstrated reliable effects on four out of five measures of cognitive performance. Large positive effects of time for the intervention group were found on working memory, episodic memory, auditory verbal learning, and executive function (although only for the full available sample and after 3 months of participation for this latter outcome). Reliable effects for working memory, episodic memory, and auditory verbal learning were observed at 3 months and maintained at 6 months. These promising findings suggest that a moderate-intensity programme (i.e., 8 hours per week) can provide similar and potentially even better (if verified after a full trial) benefits as high-intensity volunteering implemented in existing, gold-standard interventions (i.e., 15 hours per week; Carlson et al., 2008; Fried et al., 2004).

The RCT findings are in line with predictions about neuroplasticity and the brain's capacity for adaptive changes in response to functional and structural losses in brain integrity (Greenwood, 2007; Reuter-Lorenz & Park, 2014). These theories suggest that experience/use-dependent compensatory mechanisms associated with the ageing brain can be activated by practising skills that may have not been applied for years (Carlson et al., 2009). By engaging in activities that we assume involved organisational skills, problem solving, following teachers' instructions, and controlling attention, our older adult volunteers were challenged to use their cognitive skills in new ways, providing a beneficial boost for performance. Following relatively short duration of exposure to tasks of varying degress of mental challenge, volunteers demonstrated reliable improvements in memory and executive function (after 3 months), high-level cognitive abilities particularly sensitive to ageing (Reuter-Lorenz & Lustig, 2016). Although these positive effects were not substantially complemented by the qualitative data, volunteers did mention that they 'started to pay more attention' (V2), became 'a wee bit more observant' (V6), and their 'memory had got better' (V3). Thus, environmental enrichment provided by this intervention contributed to a range

of objective and perceived cognitive benefits that may further lead to neurocognitive protection in later life.

The impact of participating in novel and mentally challenging activities on different cognitive abilities has been demonstrated in experimental studies. However, those interventions focused mainly on untrained abilities and used ability-specific training to examine changes in cognition and functional independence (Ball et al., 2002; Wolinsky et al., 2009). Moreover, the gains in terms of real-world outcome measures (e.g., mental wellbeing, functional status) were not apparent immediately (i.e., limited or no effects within two years after training; Ball et al., 2002). Conversely, immediate improvements in cognitive abilities have been demonstrated in longitudinal studies on social and intellectual engagement (Schooler & Mulatu, 2001; Schooler et al., 1999). Schooler and colleagues (1999, 2001) revealed a relationship between engagement in complex work and enhanced mental flexibility. However, for this interrelationship to occur, an individual's work environment needs to involve frequent decision-making and self-direction in the face of uncertainty, as well as to reward and motivate their cognitive effort (Schooler et al., 2004). In other words, self-direction in solving ill-defined, complex problems requires exercising multiple abilities that enhance cognition and promote intellectual growth (Schooler & Mulatu, 2001).

Although this pilot study did not control for self-direction of volunteer work, environmental conditions or motivational factors, qualitative data provided important insights into the demands of a volunteer role and characteristics of the classroom environment. Volunteers reported a range of resposibilies that often required them taking charge of a situation and developing strategies for improving pupils' academic performance and behaviour. According to qualitative evidence (see Sections 6.4.2 and 6.5.2), over time they were rewarded by the teachers for showing initiative and confidence in decision-making, with more trust and an increased level of self-directed work. Such acknowledgment motivated further involvement, which might potentially be associated with greater magnitude of positive changes in cognitive abilities as the programme progressed. Thus, these findings are

consistent with the assumptions of Schooler et al. (1999, 2004) on the role of occupational self-directed conditions of complex work in increasing intellectual functioning, even though this study did not explicitly require that volunteers take on duties or show initiative. Monitoring the extent of self-directed work should be however considered in the future interventions.

However, participation in this programme also required a degree of conformity to school norms and authorities, specifically not overstepping in the classroom situations, which could reduce the positive effects of engagement on cognitive functioning (Schooler et al., 2004). Improvements on cognitive outcomes that were observed in this study may suggest that engaging in complex volunteer work after retirement can bring similar effects as paid work (Schooler et al., 1999), even if less structured, less frequent, and less self-directed. In addition, the low level of routinisation involved in school-based volunteering (i.e., being engaged in various activities often with different pupils) and associated increase in cognitive function (Schooler et al., 2004), could potentially balance the diminishing effects of teachers' supervision and a sense of not being in charge. Little is known about how perceptions of complex, IE work may impact, positively or negatively, an individual's levels of commitment and intellectual functioning (Varma et al., 2015).

In summary, unlike cognitive training trials that involve engagement with/stimulation by specific cognitive tasks for potential enhancement of broader cognitive function (e.g., ACTIVE; Ball et al., 2002), this study aimed at promoting cognitive health via real-world engagement. We believed this could be potentially more appealing and accessible to harder-to-reach older adults in the community and potentially would result in better long-term retention. Although both cognitive 'training' and this community-based programme both seem to be potentially effective as cognitive enhancement interventions by showing improvements in memory and executive function, it is important to keep in mind that the observed gains might not be equally transferable into everyday challenges. For example, gains in mental wellbeing or functional status were not apparent immediately after cognitive

training (Ball et al., 2002). Conversely, this IE programme successfully demonstrated positive effects on a range of outcomes, because it not only provided a context for cognitive enhancement, but also social interactions and broader personal growth.

An increasing number of recent research and literature reviews provides evidence for effectiveness of social engagement and mental activities in maintaining later-life cognitive function by contributing to cognitive reserve and resilience (Evans et al., 2019; Lee et al., 2019; Oh et al., 2021; Stine-Morrow et al., 2022; Zhou et al., 2020). They all suggest that social engagement can lower risk of developing cognitive impairment and therefore can have protective effects on cognitive health. It is also emphasised that neurocognitive, socioemotional, and motivational mechanisms are important factors that contribute to those positive effects (Stine-Morrow, 2022). For example, engaging in complex and/or novel tasks may enhance neuroplasticity through impacting neuroendocrine pathways or protect against cell death in hippocampus (Düzel et al., 2010; Shors, 2014). A sense of purpose as an example of motivational effects can stimulate a sustained engaged lifestyle which, in turn, may support cognitive health (Lewis et al., 2017). Furthermore, by engaging in enjoyable social activities that boost confidence and self-efficacy, cognitive function can be influenced through enhanced emotional well-being (Ryff et al., 2016). Therefore, a more real-world, holistic approach should be applied more often in future research in order to understand all the determinants of potential cognitive gains in the everyday life context.

8.2.2 Health and wellbeing outcomes

Considering health and wellbeing outcomes, a reliable difference over time was found for daytime dysfunction (sleep quality domain) and a significant interaction effect for the hours spent sitting per week, but not for depression, life satisfaction, loneliness, physical activity measure, and the other sleep quality domains. Although no significant interaction effects were found for any

of three wellbeing outcomes, moderate negative effect sizes were identified for the intervention group on loneliness (i.e., reduced loneliness scores that indicated improvement) both at 3-month and 6-month follow-up, compared to trivial effect sizes in controls, which may indicate the potential for improvement that need to be tested in a full-scale trial. In addition, the qualitative component of this pilot study captured several health and wellbeing related aspects of participating in an IE programme. The main positive experiences identified in the diaries and the focus group included a sense of satisfaction and a sense of purpose, whereas the main negative experiences were related to physical challenges of volunteering such as pain and physical exhaustion after hours of engagement.

The results from the pilot RCT for the number of hours spent sitting and daytime dysfunction (i.e., inability to stay awake/alert to carry out daily functions and engage in social activity) provide support for previous research suggesting that IE reduced sedentary behaviour and improved volunteers' daily functioning (Fried et al., 2004; de Souza et al., 2007). The lack of significant benefits on the remaining health and wellbeing outcomes may indicate that this sample was underpowered to detect small effect sizes, that those measures require a longer-term IE exposure to show reliable effects, or indeed, that these are true null effects. Moreover, improvements in physical activity specifically may be better assessed using more sensitive techniques (e.g., accelerometers) rather than self-reported questionnaires that may generate over- or under-estimates or be difficult for respondents to interpret (Johnson-Kozlow et al., 2006; Matsudo et al., 2001). These initial findings also suggest that immediate health benefits may not be easy to identify among high-functioning older adults, such as those involved in the current programme, but may be more apparent in less physically and socially active individuals at baseline (e.g., Tan et al., 2006). IE has potential to enhance self-perceptions of generative contribution that, in turn, may be an important factor in promoting physical health and psychological wellbeing in older adulthood (An & Cooney, 2006; Moieni et al., 2020).

Despite no significant benefits being observed across most of the health and wellbeing outcomes, maintenance in many of these measures in the intervention group and declines in controls provide some support for the broader impact of the IE programme, though must be interpreted with caution and confirmed in longer and larger studies. Where the intervention group appeared to show stability in function across the intervention period, it may be that 'benefit' should be assessed not only in terms of significant health gains, but rather prevention of decline (Fried, 2000), particularly over longer study durations. Moreover, for the beneficial health changes to be sustainable, the social and health and wellbeing goals should be simultaneously introduced and promoted (Fried et al., 2004; Glass et al., 2004). In this study, volunteers responded to advertisements that indicated an opportunity to help others rather than a chance to improve their own health and wellbeing, which suggests a strong implication of social/generative factors for recruitment and adherence of older adults, in relation to public health interventions (Barron et al., 2009; Morrow-Howell et al., 2009). The relevance of social components became even more evident in light of qualitative data and positive changes in cross-age attitudes.

Qualitative analyses of diaries and focus group data (see sections 6.4.2 and 6.5.2) revealed several personal and interpersonal factors that reinforced continued engagement. That is, the rewarding aspects reported by Cohort 1 such as a sense of purpose or satisfaction of seeing children grow seemed to lead to volunteers' over 90% retention, as well as their consistent and occasionally, increased intensity of engagement (over 8hours/week; n = 4). Challenges of participating in the programme, ranging from volunteers' health and fitness issues to uncertainties related to the role requirements, were also reported. However, the challenging factors appeared to be balanced by beneficial aspects of involvement, providing a generally favourable overview of the programme. Those findings support observations that identified a number of unique rewards and stressors (e.g., children's in-class problem behaviour, helping children and teachers) associated with school-based engagement (Varma et al., 2015). Understanding these experiences is

essential to identify specific characteristics of the sample and classroom environment that can potentially explain effects, or their absence, in objective outcome measures.

8.2.3 Social outcomes

Considering social outcomes, a reliable difference in the pattern of outcomes was found over time for cross-age attitudes (e.g., how active-passive, friendly-unfriendly, happy-sad, likeable-unlikeable participants viewed schoolchildren) and generative achievement (but not generative desire). Medium positive effect sizes were found in both measures at 3-month follow-up and large positive effect sizes at 6-month follow-up. The benefits of engagement in cross-age attitudes were reliably observed at 3 months and maintained at 6 months, and in generative achievement were reliably observed at 6-months. These findings are consistent with evidence from other studies examining the impact of IE on older adults' attitudes towards children (e.g., Meshel et al., 2004; Gamliel et al., 2014), and generativity (Ehlman et al., 2014, Sanders et al., 2013).

However, unlike previous research (Gruenewald et al., 2016), no reliable change in generative desire was found in this study, which indicates the potential impact on that subscale needs to be examined in a full-scale trial. In support of the findings from the objective measures, in the diaries and the focus group, volunteers frequently reported feelings of meaningful contribution and usefulness that could be linked to significantly enhanced perceptions of generative achievement. In addition, building new relationships and gaining a sense of belonging seem to indicate overcoming generational barriers reflected in the increased positive attitudes towards children found on the semantic differential scale.

Traditionally, intergenerational programmes aim to strengthen social cohesion and create meaningful community-based relationships (Kaplan, 2001; Newman, 1989). Accordingly, the current IE programme allowed volunteers to establish new social connections, providing opportunities to

reduce negative and improve positive attitudes towards younger generations (Allport, 1954). Frequent classroom interactions increased volunteers' understanding of pupils' academic abilities, their needs and struggles that, in turn, made them revisit their own preconceptions of the school environment they held before entering the new role. Their accepting and receptive approach to children and teachers was reciprocated by school's appreciation and inclusion. Feeling valued and accepted facilitated their sense of belonging and meaningfulness, consistently observed in previous studies (e.g., Chippendale & Boltz, 2015; Murayama et al., 2015). This may be one pathway supporting the promising numerical decreases observed in levels of loneliness and depression in the intervention group (Lee & Kim, 2020; Hernandez & Gonzalez, 2008). Thus, impacts of such a holistic, community-based intervention on older adult volunteers cannot be understood through isolated effects, but need to be approached as causal multiple pathways that are expected to have additive effects on various age-related concerns (Fried et al., 2004; Glass et al., 2004).

By giving back to the community and supporting younger generations, older adults were able to fulfil their perceived obligation to generative contributions (Erikson, 1950). Yet their motivations for joining in the programme were not limited to meeting generative desire, but constituted a mixture of altruistic and self-oriented reasons as demonstrated in previous literature (Chen & Morrow-Howell, 2015; Martinez et al., 2006). For example, they highlighted their willingness to share knowledge and experience with children in order to help them grow, but they also sought a new personal/professional challenge and a sense of purpose. This variety of motives, as well as an initially high level of generative desire may explain relatively small improvements found on this subscale in the intervention group. Moreover, the anticipation of joining the programme after 6 months, could contribute to maintaining a relatively stable level of generative desire in the control/wait-list group. As such, it can be hypothesised that a longer non-engagement lag time between beginning and completion of the programme, may decrease controls' altruistic motivations, while increasing their level in

the intervention group. This assumption would explain the higher drop-out among controls (16%) and large positive effects on generative desire after 2-year engagement observed elsewhere (Gruenewald et al., 2016).

As mentioned in Section 8.2.1, the positive effects demonstrated in cognitive measures were not substantially complemented by qualitative data. Overall, participants found it difficult to reflect on cognitive changes or tended to minimise the impacts of the programme on their thinking skills. However, they did occasionally report being more attentive or vigilant in certain situations while working with children. Moreover, the new context and interactions with pupils required them to engage in everyday problem solving, decision-making, multitasking, and managing/controlling their time efficiently. Specifically, then, the 6 months of engagement, during which new names, contexts, responsibilities, and routines had to be learned, and children managed, could lead to a boost in cognitive functioning. Those efforts of adapting to the new environment seemed to corroborate the medium effect size in executive function observed in the intervention group at 3-month follow-up (full sample, n = 36) and large effect sizes on memory both at 3- and 6-month follow-ups.

Although no significant interaction effects were found for any wellbeing outcomes (life satisfaction, loneliness, and depression), moderate negative effect sizes were identified for the intervention group on loneliness at both at 3-month and 6-month follow-up. This decrease appears to be reflected in volunteers' excerpts when they discussed building new quality relationships with children and other adults in schools, and when they highlighted a sense of belonging, support, appreciation, and respect they experienced. No effect on life satisfaction is seemingly inconsistent with qualitative evidence that frequently highlighted volunteers' joy and satisfaction of work they did and contributions they made. However, it is important to note that volunteers reported a relatively high level of life satisfaction already at baseline assessment that potentially limited the measurable impact of engagement. A significant decrease in time spent sitting and daytime sleep dysfunction (a subscale of the sleep quality measure) found in the quantitative study was

also confirmed by qualitative data. Participants mentioned that the new weekly routine was awaited with great anticipation, encouraged them to be more active and 'prevented two pyjama days'. Further, the regular trips to and from schools, as well as engaging in various school-based physically demanding activities could potentially explain the positive effects found on walking and daytime sleepiness/alertness.

Overall, the most consistent evidence, both qualitative and quantitative, is associated with social outcomes. Volunteers' excerpts, reflecting on the meaningful contribution including sharing, supporting, and empowering the younger generation, are in line with the positive effects of the intervention on generative achievement. Furthermore, their positive attitudes towards the pupils, emphasising their potential to learn and grow, as well as kindness and friendliness were mirrored in significant effects on cross-age attitudes. The lack of effect on generative desire could to some extent be explained by the discrepancies in motivations that brought volunteers to the programme, as well as their already high levels of generative desire observed at the baseline. Thus, generative motivation to share experiences and knowledge were balanced by intrapersonal reasons such as a need to experience something new, challenge themselves or explore changes in the school system.

8.3 Benefits of a school-based intergenerational intervention for participating schools.

The nature of the organisational environment of the school, including its qualities and resources are of great importance for establishing healthy pupil-teacher interactions and fulfilling the educational goals of the school system (Welsh, 2000). Previous research has shown that positive perceptions of school climate were associated with the improved performance of the school staff, which consequently contributed to positive effects on pupils' behaviour and attainment (Bryk et al., 2010; Grayson & Alvarez, 2008). In light of a socio-ecological perspective, perceptions of socio-contextual characteristics

of the school/classroom environment can impact pupils' and teachers' interactions, as well as their attitudes towards the school in general (Bronfenbrenner, 1997; Wang, 2009). For example, lack of teacher/peer support are predictive of educators' negative perceptions of pupils and their decreased efficacy, and for pupils may lead to increased level of misbehaviour and declines in wellbeing (Grayson & Alvarez, 2008; Way et al., 2007).

Conversely, teachers' high self-efficacy and supportive attitudes can activate the positive influence of school climate on pupils' academic performance (Goddard et al., 2000). This is in line with the social cognitive theory that posits learners' motivation and achievement in the social context (Bandura, 1997). Finally, pupils' and teachers' school identification (i.e., sense of belonging/connection) can be facilitated by positive school climate and in turn predicts pupils' achievement and behaviour (Reynolds et al., 2017). To understand better the implications of these theoretical approaches, it is important to apply them in the context of IE interventions that may impact educational and behavioural improvements.

As outlined in section 7.2, interventions positively impacting school climate could be of particular importance considering its key role in promoting pupils' academic achievement, as well as teachers' efficacy and retention (Cohen et al., 2009). However, to date, limited evidence is available on the effects of IE interventions on the school environment (Parisi et al., 2015; Ramsey et al., 2016). Furthermore, no research on IE examined pre- and -post intervention data on the measure, to investigate the interaction between intervention and time. To our knowledge, there is also no comprehensive qualitative evidence on the perceived effects of a school-based IE programme from teachers' perspective and qualitative data on pupils' experiences of IE are still limited (Chapman & Neal, 1990). Thus, one of the objectives of this pilot study was to explore the impacts and perceptions of a school-based intergenerational programme in the participating schools. It was hypothesised that the presence of older adult volunteers would have an indirect positive impact on perceptions of the school/classroom environment

among the school staff and pupils, as investigated by both qualitative and quantitative methods.

To examine effectiveness of an IE intervention on the participating schools, a mixed-method approach was used. A qualitative study that involved three mini focus groups investigated the experiences of the teachers and pupils of primary schools participating in Generation for Generation (for more details see sections 7.4 and 7.5). Additionally, a quantitative school climate survey collected from the school staff examined the wider potential impacts of the programme on the environment of the schools. The findings demonstrated that IE could contribute to creating a more supportive learning and teaching environment. Perceptions of the classroom-level benefits reported during the focus groups indicated the potential positive effects for pupils' academic achievement, classroom behaviour, and teachers' efficacy. The school-level benefits revealed in the school climate survey included maintaining positive scores of school climate over time in the intervention group compared to decreases observed in the comparison schools.

After 10 months of participating in the programme, the schools' staff maintained their perceptions of parental involvement, school satisfaction, creativity and the arts, school resources, learning climate, as well as an overall school climate, compared to declines observed in staff in the comparison schools. These findings support previous research demonstrating significant differences in perceptions of the overall school climate and individual subdomains between the staff in the intervention and control schools, as a result of implementation of an intergenerational programme (Parisi et al., 2015). Qualitative data provided a complementary account for the school climate results, indicating a range of positive aspects of the programme, as well as some unique characteristics of a school-based IE programme (see Sections 7.4 and 7.5). Teachers and pupils consistently highlighted the volunteers' meaningful contribution in terms of impacts on teaching and learning efficiency. Their help was not only evaluated in relation to assistance with academic tasks, but also in terms of emotional support and practical knowledge/skills exchange. Finally, it was concluded that the

programme met a variety of primary and secondary classroom needs such as numeracy and literacy support, and/or one-on-one tutoring.

Understanding how school-level factors such as access to resources, learning climate or teaching, can be influenced by the presence of older adult volunteers is particularly important to optimise the benefits of IE for aspects of social capital for pupils and teachers. As observed in this study, the teacher-volunteer collaboration and pupil-volunteer relationships were built upon mutual trust and experience/information exchange, important components of social capital (Putnam, 1995). Promoting these features can be of great relevance particularly for vulnerable groups, including older adults and children, who are at greater risk of social disengagement (Morrow, 1999; de Souza & Grundy, 2007), but can also benefit school staff seeking improved access to resources and social support (Glass et al., 2004; Penuel et al., 2009). Consistent with social capital theory (Narayan & Cassidy, 2001; Putnam, 1993), by creating new intergenerational networks and interpersonal relationships within a school setting, this programme provided more resources to achieve desired education-related outcomes. Volunteers, as "an untapped resource", contributed their skills, knowledge, values, and lifelong experience to pupils' growth and teachers' more productive and efficient performance (Rebok et al., 2011, p. 470).

In light of an increase in the number of children who require additional support for learning (Carmichael & Riddell, 2017; Scottish Government, 2019d), this programme offered flexible and individualised support provision that resulted in perceived improvements in pupils' sense of achievement and inclusion. Specifically, regular one-on-one tutoring or group sessions with pupils who required additional support or those with English as an additional language, provided an opportunity to facilitate an individual pupil's attainment and address their socio-emotional needs. Additionally, these volunteer-led activities gave the teachers more time to devote to their in-class activities and teaching targets. Although no pre-and post-assessment of child outcome measures were administered in this study, teachers acknowledged some improvements in pupils' academic achievement and behaviour as a result of

having volunteers in the classroom. These perceived changes seemed to have had a positive effect on teachers'sense of self-efficacy in classroom management that was found to be associated with teachers' work-related stress and burnout (Collie et al., 2012; Jennings & Greenberg, 2009).

Thus, an intervention that supports teachers' efforts to support pupils' academic competence and manage their behaviour, not only benefits children but the teachers themselves (Hayes et al., 2020). However, despite all the positive effects IE had on pupils and teachers, a few volunteers raised some concerns about unintended negative impacts on the schooling system that could potentially result from their involvement. The aim of Generation for Generation was not to replace pupil support workers, reduce employability of the professional teaching staff or decrease associated funding. The intention of creating high-impact volunteer roles was to facilitate existing school dynamic and provide additional resource to address school needs. This aim was emphasised to both volunteers and teachers at the onset of the study, but may be revisited in future interventions and communicated in a more explicit way to avoid misunderstandings.

It can be therefore hypothesised that educational challenges arising from socio-economic inequalities (i.e., poverty-related attainment gap) and worsening teacher retention in the UK (Worth at al., 2015) could be partly addressed by voluntary in-class support that can indirectly contribute to improved school climate and creates "a culture of empowerment and collaboration" (Scottish Government, 2019b, p. 6). This collaborative approach between schools and older adult volunteers was implemented to tackle challenges related to both learning and teaching (Scottish Government, 2018). It may also lead to developing a shared and ongoing community-based practice in future (Marcia & Garcia, 2016; Wenger et al., 2011). However, to enable this new practice to function effectively, it is important to promote "a community of knowledge" built on all participants' accumulated skills and expertise that are of value for both individuals and organisations (Schuller & Theisens, 2010, p. 102). In this light, the current programme encouraged collective reciprocity and mutuality that provided

older adults with an opportunity to learn about innovations in the school system, pupils with a chance to acquire new skills, and teachers to draw on volunteers' experience and professional background.

In conclusion, Generation for Generation provided a unique context for dialogue and knowledge exchange between different generations living in the same community. Perceived improvements in school climate, pupils' sense of achievement and teachers' efficacy, suggest that IE can be a practical and cost-effective response to some challenges associated with the educational system, in addition to the ageing population. Moreover, qualitative data captured the meaning of volunteers' contribution beyond their initially defined roles, indicating the relevance of their professional background and personal skills in creating a learning/teaching-friendly and experience-rich school environment. Their supportive approach and consistent engagement provided stability important to learning and teaching, as well as improved access to social and human capital (Fried et al., 1997). Considering the relatively short exposure of the programme and the small number of volunteers assigned to each of the intervention schools, the promising findings may suggest that the impact of individual volunteers could be as beneficial for schools as the contributions of teams of helpers suggested elsewhere (7-10 volunteers per school; Glass et al., 2004). Thus, the generative potential and professional background of our volunteers appeared to be important indicators of a change at both individual and organisational levels. However, based on the qualitative evidence, some older adults emphasised the benefits of being part of the volunteer team, including mutual support and building close relationships (see Section 6.5.2). Therefore, although positive effects of IE were often observed in volunteers who were not assigned to schools in teams, engaging a higher number of volunteers per school could have potentially brought additional benefits and/or enhanced the impact on volunteers and the schools involved.

8.4 Strengths and limitations

The current study has many notable strengths. Most importantly, to our knowledge, this research is the first evidence-based IE intervention implemented in Scottish primary schools in the context of an RCT. This experimental demonstration combined with qualitative evaluations provides a comprehensive assessment of a moderately intensive and cost-effective programme that achieved positive effects across diverse outcomes in the older adults and schools involved. This intervention suggests that intergenerational interventions may act through various biopsychosocial pathways promoting health and wellbeing in the older population and optimal education in children. They can also contribute to the professional growth of educators, as well as facilitate the teaching process and some aspects of the school climate. Considering current challenges associated with population ageing and the attainment gap affecting younger generations (Scottish Government, 2019a; WHO, 2020), IE programmes can offer a potential solution that is local and community based. Purposeful collaboration between local schools and local councils has the potential to address those social issues at the regional level and strengthen connectivity and solidarity amongst different generations living in the same community.

As noted throughout this thesis, given the pilot nature of this study, the statistical results should be treated as preliminary and exploratory, and interpreted with caution. However, they warrant future, large-scale, robust interventions to be able to confirm the current findings and examine other benefits of intergenerational engagement. Although, this study demonstrated the feasibility of implementing an intergenerational school-based intervention in local Scottish primary schools, the programme was situated in small-town schools within one council area. A larger trial conducted in a more diverse spectrum of community-based settings, including urban and rural primary schools, would allow further examination of both feasibility and benefits of this intervention in the UK. Implementing the programme in the diverse sites will also potentially aid recruitment of volunteers, which this study found

challenging, and extend the pool of volunteers to those who are hard to reach and isolated.

There are some limitations of the current intervention that need to be considered. First, as this intervention was a pilot study, the sample size was small, limiting the power to detect changes, particularly with small effect sizes, in the intervention group compared to the control group. However, the aim of this study was to estimate effect sizes for power calculations of the larger scale interventions rather than determining efficacy. The sample was also relatively homogenous in terms of participants' level of education, gender, and ethnicity. Therefore, the effects of this intervention might not be generalisable to the general ageing adult population living in the UK or worldwide. Moreover, many of the volunteers assigned to the intervention group were former teachers which could reduce the effects of cognitive stimulation associated with engaging in new tasks in an unfamiliar environment. However, it shows programme's attractiveness for teaching staff who look for opportunities to help out post-retirement.

Another limitation is related to the duration of this study. A longer trial would reinforce the conclusions made from this 6-month pilot study and potentially provide more information on changes that may take longer to occur. Furthermore, the design of this research, based on the multiple-pathway model by Experience Corps (Fried et al., 2004; see section 3.3.1), allowed us to demonstrate concurrent improvements in cognitive, health, and social function outcomes, but did not provide explanation of the primary mechanisms of the change. In other words, it can be assumed that the beneficial effects of IE resulted from a general increased activation in all functional pathways, but the mediating interrelations between cognitive, social, and health-related factors remain unclear and need to be addressed in larger trials that incorporate multiple control conditions [e.g., non-engagement group, social engagement (non-IE) group].

Finally, the recruitment process in this study was challenging and required continuous improvements in strategies and building collaborations with local organisations. Implementing the programme in the large urban

schools could have potentially aided the recruitment efforts and allowed to deploy volunteers in teams, as suggested elsewhere (Glass et al., 2004). However, despite those initial difficulties, the retention rate in the programme was relatively high (90%), 34 out of 38 participants stayed for the duration of the study (aside from the COVID-19 outbreak period).

A notable loss to the 6-month cognitive follow-ups occurred during the last data collection phase for Cohort 3, due to the COVID-19 pandemic. Participants' involvement both regarding participation in schools, as well as all face-to-face data collection sessions had to be terminated at the end of March 2020. However, the collection of questionnaire data (i.e., health and wellbeing, and social outcomes) for Cohort 3 was not affected by the COVID-19 outbreak and missing data did not occur. Although there is the potential that introducing restrictions and uncertainty during the period might have had a negative impact on volunteers' health and wellbeing that in turn, could have affected the data.

8.5 Recommendations and implications

8.5.1 Recommendations for future school-based intergenerational engagement programmes

Based on participants' evaluative comments (see Chapter 6 & 7) and the researcher's experience of implementing and co-ordinating the project, certain suggested guidelines can be established in terms of organisational and collaborative issues:

Recruitment and sampling. The necessary, extended recruitment period of this study was challenging, and despite the researcher's best efforts did not reach the target sample of 50 participants. To improve the process, the full trial could engage multiple local recruitment centres to ensure more schools and potential volunteers are approached and invited to participate in the programme. As mentioned in the previous section, implementing the full trial in large urban areas (e.g., Edinburgh and Glasgow) could also potentially

aid recruitment of volunteers. If a substantial expansion of the programme is planned, a coordinating agent or research team should be assigned to oversee multiple recruitment centres to ensure they do not fail to recruit, as it was reported elsewhere (Bugge et al., 2013).

Due to the small sample size in the current pilot study, estimations in terms of sample size for a full trial could be problematic. Although some researchers have use pilot effect sizes to power a future definitive trial, this is a practice that should be approached with extreme caution, and indeed tends no longer to be recommended. This is because the estimation tends to be poor due to the small sample size (Kraemer et al., 2006). For example, the pilot study effect size can overestimate the true effect size, underestimating the sample size for the main trial and underpowering the study. In terms of future recommendations, the targeted number of participants for the full trial should be relatively high, as in those obtained in gold standard interventions (e.g., n = 349, Sakurai et al., 2016; n = 420, Tan et al., 2009; or n = 720, Gruenewald et al., 2016). However, this will depend on the scope of the research, funding and number of researchers available, the number and capacity of schools involved, and of course the number of measures included/precise analyses planned. Future research should use power analysis, which is conventionally set for at least a medium effect size (Hickey et al., 2018; Kemal, 2020; Schulz & Grimes, 2005). For example, power analysis conducted using MorePower 6.0 software (Campbell & Thompson, 2012) shows that, for detecting a medium effect size for a 2 x 3 interaction, with minimum power of 0.8 and $\alpha = .05$, would require a minimum total sample size of 80 participants.

In terms of the recruitment of schools, engaging community organisations or charities with a history of effective partnerships with schools would allow identifying and effectively enlisting schools that are both in need of external support and willing to receive that support in the way it is offered by the IE programme. The target number of schools for the full trial should depend on the sample size required and the resources available/number of volunteers to be taken on by each school. Although the schools involved in

the current study covered the costs of volunteers' travel and PVG applications, the same approach cannot be assumed for future interventions. The larger-scale trial may need to cover all the expenses associated with running the programme to allow volunteers and potentially schools to participate cost-free. Based on the experiences of this study, if there were more schools involved in the project, this could potentially improve the recruitment of participants by improving the local population size/recruitment pool and removing the travel barrier. However, there was also no guarantee that volunteers would be recruited in the school area or would be willing to join the particular school to which they were randomised, and a somewhat flexible approach is usually needed in these real-world interventions (e.g., Fujiwara et al., 2009).

Duration and intensity. This study demonstrated that positive impacts of participation in the IE programme were typically apparent after 3 months, that is, shorter-term changes in lifestyle, and maintained at 6 months of engagement. This suggest that a greater duration of IE is not needed to result in greater benefits, but that engagement may be required to continue in order that effects are not removed. However, considering outcomes that showed no significant interactions, but small to medium effect sizes, a longer trial would potentially reinforce the conclusions made from this 6-month pilot study, provide more information on changes that may take longer to occur, as well as outcomes after intervention withdrawal. The duration of future school-based IE programmes should also be planned considering more carefully the schools' routine and children's need for consistency (see *Consistency* section below).

In terms of the intensity of engagement, the 8 hours per week commitment was considered optimal and acceptable by all participants in the current study. However, the adherence varied between individual volunteers and across three cohorts, which may suggest that relatively moderate engagement may still be a difficult goal to achieve for some volunteers, because of their personal commitments, ill health, or care responsibilities.

Therefore, future research could examine different intensities of engagement, for example 8-hour vs 4-hour per week commitments. Additionally, if sufficient variability and power exists, follow-up analyses may assess engagement effects as a continuous variable or control for actual engagement. This could aid identifying the minimum dosage that results in the highest adherence rates and positive changes in outcomes under consideration.

The proposed outcome measures. Most of the self-reported measures used in this study were simple for the volunteers to interpret, which resulted in no missing data and no concerns raised at the follow-up sessions. An exception was the physical activity questionnaire (IPAQ-SF; Craig et al., 2003) considered by volunteers as the most difficult to complete. Specifically, they were unsure about the accuracy of the estimates they provided, which could result in over- or underestimates of their physical activity level. Using a longer-term intervention and objective measures of activity would provide more accurate estimates of participants' physical engagement and prevent potential recall bias. The battery of cognitive tests (NIH Toolbox; Gershon et al., 2013) was found to be cost-effective, easily administered and time-efficient, allowing the researcher to collect standardised, objective data from a few participants a day within efficient testing sessions. However, future research with more researchers involved may consider using more comprehensive test batteries that allow measuring latent variables for each outcome (i.e., abilities based on more than one measure).

Volunteers' roles and responsibilities. Based on the gold standard model of Experience Corps (Fried et al., 2004; Glass et al., 2004), the core roles of volunteers in this study were tailored to academic needs identified by the schools, while providing sufficient cognitive and physical stimulation. Volunteers and the schools involved were informed by the research team about the specificity of the roles and activities that were not considered appropriate (e.g., teachers' duties, administrative tasks). Nonetheless, the focus groups revealed initial uncertainties in relation to the extent and types

of volunteer responsibilities. Therefore, a list of tasks/activities should be defined in more detail and presented prior to the commencement of the intervention during a meeting with both volunteers and teachers present, to allow a group discussion. A range of potential curricular and extracurricular activities also need to be discussed between the classroom staff and older adults to avoid misunderstandings and disappointment of anyone involved. Most importantly, participation in activities such as outdoor learning, gardening or PE class, should be considered with caution, taking into account participants' physical abilities and preferences. In addition, issues related to engagement in activities such as PE or music classes were associated with changes of timetables that were not actively considered when determining volunteers time at school.

Management. The teachers' role in coordinating IE needs to be clearly specified in the protocol of future interventions. The current project relied exclusively on the central organisation of the volunteers' activities that was developed and maintained by Head Teachers. Although initially perceived as helpful and efficient, this top-down approach to programme management did not always fit the classroom routine and volunteers' interests. Therefore, as indicated in the teachers' excerpts, they should be more involved in planning volunteers' tasks in order to use their time more efficiently. A large-scale programme would also benefit from the deployment of an in-school programme co-ordinator. In the initial protocol of this programme, the role of a team leader was meant to be assigned to one of the volunteers in each school. However, the small number of volunteers recruited for this study, did not allow this role to be established among participants.

Consistency. The regular presence of Gen4Gen volunteers allowed teachers to develop a new in-class routine that provided the consistency their pupils needed. The moderate-intensity commitment (8 hrs/week) required in this intervention appeared to be sufficient to build school-based relationships, efficient teamwork between volunteers and teachers, and to relieve teachers' workload. However, mid-term changes in pupils' timetables often interrupted

the established routine and caused less efficient use of volunteer time. Moreover, although some volunteers were still engaging with the programme beyond their 6-month placement (not required by the intervention protocol), four out of nine left after completion of their commitment. According to teachers' excerpts, termination of engagement before the end of the school year disrupted the classroom routine that was established over months and evoked sadness and confusion in pupils. Therefore, future school-based IE programmes should plan more consistent commitment, at least a year long, taking into account school dates and holidays. Finally, we implemented 2 days x 4 hours model of engagement to balance the intensive exposure that was initially planned for this intervention (3 days x 5 hours) in line with the Experience Corps (EC) recommendations (Fried et al., 2004; Glass et al., 2004). According to qualitative evidence presented in this study (see Sections: 6.5, 7.4.2, 7.5.3), the relatively frequent interactions and moderate intensity of involvement was found to be sufficient to allow relationships to develop and to establish the consistency that pupils required (Glass et al., 2004).

Reimbursement of expenses. Participation required most volunteers to have a short- or long-distance commute, the cost of which was covered by the schools involved. However, due to limited school funding, reimbursement to volunteers who decided to continue engaging beyond their 6-month placement could not be provided (although not required by the protocol), and one school was not able to accommodate more volunteers for Cohort 3.To offset any potential expenses associated with participation in the programme and prevent an overburden of already limited school resources, future large-scale interventions should secure grant funding from a university or external sources. Most importantly, eliminating financial barriers to joining the programme and continuing the commitment constitutes a symbolic but also practical gesture to acknowledge volunteers' contribution and support for the project (Glass et al., 2004).

Evaluation of pupils' attainment. According to pupil and teacher reports, improvements in core learning outcomes such as word reading and comprehension, as well as in classroom behaviour were facilitated by the assistance of volunteers. Progress was specifically identified in children who required consistent, one-to-one work on their basic academic and communication skills. However, the objective impact on pupils' attainment and behaviour changes was not established as no child outcome measures were administered in this pilot study. To obtain better understanding of the IE effects on pupils' academic performance and school behaviour, future large-scale interventions should conduct pre- and post-evaluations of the school records (if available) and use batteries of standardised achievement tests where possible. Future community-based projects may also monitor potential impacts on child attainment in consultation with schools and parents.

Potential confounders. This research did not control for some variables that could potentially influence the effects of the intervention. For example, activities outside the programme, personal responsibilities and health issues of older adult volunteers; or workload issues and rotation of school staff could distort or mask the effects of the engagement. Regarding older adults, a full-scale intervention should attempt to account for social interactions (e.g., with family, friends, children, other community members), changes in their functional capacity and their engagement in other cognitively stimulating or physical activities. In terms of future school assessments, monitoring for organisation-level characteristics (e.g., school size, location, number of support workers, level of deprivation) and rotation of teachers and management could provide further explanation for perceived benefits or declines on the school climate measure.

8.5.2 Implications for policy

To ensure a fairer, more connected and healthier Scotland, the Scottish Government (2018, 2019c) highlighted a need to support older people in

maintaining social connections by engaging with and contributing to their communities. The main strategic actions are to tackle negative perceptions of older people, social isolation and loneliness, as well as physical and financial barriers to social engagement (Scottish Government, 2019). Supporting volunteering and promoting intergenerational work that provides positive/beneficial contexts for people to connect are considered within a priority list of the national action plan (Scottish Government, 2018). This research project is in line with the Government objectives and offers a potential solution for social disconnection and health-related concerns associated with population ageing. This cost-effective, evidence-based initiative was implemented with support of local authorities and charity organisations, and has potential for improvement of the public's health, which has critical implications for government policy and the socio-economic resilience in Scotland, and beyond.

In addition, the collaborative approach between the University, primary schools and the local council allowed us to tackle some challenges related to both learning and teaching (Scottish Government, 2018). Observable positive changes in pupils' academic and communication skills, as well as in teaching efficiency and school climate suggest beneficial effects of the programme in schools located in areas with the highest levels of deprivation. Considering that one of the key priorities of the Scottish Government (2019a) is to address social and educational inequality, specifically the poverty-related attainment gap, it is crucial the policy makers promote programmes/interventions that offer social capital to support the needs of the education system (Frick et al., 2004; Glass et al., 2004). It is also essential that children requiring additional support for learning get the best from their education by receiving support that is not limited to school provision but extended to in-class voluntary services (Scottish Government, 2017).

8.6 Overall conclusions

This research enhanced our understanding of the impacts of Generation for Generation, a school-based IE intervention, on older adults' cognitive, health and social outcomes, as well as the effects on participating schools. We were able to build upon the existing IE literature by demonstrating improvements on working memory, episodic memory, auditory verbal learning, executive function, sleep (daytime dysfunction), cross-age attitudes, and generative achievement in intervention participants. Positive effects of the programme were also found on the school climate measure, showing maintained level of overall school climate and most sub-scales for staff in interventions schools, compared to declines in staff in comparison schools. In addition, explanatory qualitative findings provided a deeper understanding of the context of IE and explored a wide spectrum of positive and challenging experiences of participating in an IE programme. Example benefits include building new social connections, positive impacts on pupils' attainment and behaviour, sense of achievement, while example challenges include physical demands, fear of overstepping, and timetabling issues. This indicates great potential for future implementation and further development of the current intervention.

A core value of this pilot study was the application of a mixed-methods design that allowed a holistic consideration of issues, benefits, and implications of a school-based intergenerational intervention. The wide scope of data collected improved our understanding of the potential for IE to promote health, enable more efficient school environment, and support community-based social connections. Although the current findings were intended as preliminary and should be interpreted with caution, they are also very promising and bring new and emergent questions for a future, follow-up large-scale research project. Most importantly, this intervention demonstrated feasibility of IE programme implementation, community-based collaboration, and recruitment potential that can enhance the likelihood of success of a full-scale project. All in all, the feasibility and effectiveness of this pilot study revealed an opportunity for an applicable solution and positive change that

can, as volunteers' ongoing commitment confirmed, retain beyond a fixed time frame of an intervention.

8.7 Summary

This final chapter provided an overview of key findings from the current school-based IE intervention, Gen4Gen, in relation to existing theory and research. A wide range of benefits of IE for older adult volunteers, pupils, and school staff were discussed indicating implications for development of social capital and a shared community-based practice. Gen4Gen was developed to bring older adults and children together for their mutual benefits and the opportunity to learn from each other. As intended, this programme helped promote intergenerational relations in the community and showed how important these kinds of relations were, not only for older adults and children, but to the whole school environment.

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APPENDICES

Appendix A

Rationale for 'no' responses within the MMAT evaluation.

Study	Criterion	Rationale
Adam, J.E. (1992)	3.4	No formal consideration or analyses of confounding factors provided.
Barbosa, M.R., et al. (2020)	1.3	The authors claimed that they used content analysis, however, there was no description of the analytical process used.
	1.4	The excerpts from a focus group with older adults (OAs) are very limited and rarely reflect the listed categories. The wellbeing and community involvement were mentioned but not substantiated by the data included. Most of the excerpts included came from the professionals/technicians involved.
	1.5	It is not clear how much of the analysis is based specifically on OAs' focus group data. The main categories were listed, but the data were not organised accordingly.
	3.4	No formal consideration or analyses of confounding factors provided.
	5.4	As per points 1.3 and 1.4, the findings and interpretations were not adequately derived from the included data. Authors claimed that there were similarities between quantitative and qualitative findings, but this was not supported by the data included.
	5.5	The authors stated that content analysis was used. However, there was no description of the analytical process. The main categories were briefly mentioned, but the findings were not organised accordingly, and it was not clear what content was coded and how.
Barnard, D. (2014)	1.3	No description of the data analysis method was provided.
	1.4	The authors provided quotes without any interpretation. Description of the findings also was not supported by the data included.
	1.5.	The process of the fieldwork and data collection was not fully described. Regarding findings, a list of identified themes was provided, but not all were substantiated by data included.
Belgrave, M.J. and Keown, D.J. (2018)	1.4	The categories were not sufficiently supported by the data. OAs' excerpts are very limited and did not always reflect the interpretation provided (e.g., regarding participants' wellbeing and cross-age interactions).
	1.5	It was not clear how much of the analysis was based on OAs' reflective journal data, therefore there was incoherence in the presentation of the findings.
	3.1	A clear description of the target sample (inclusion and exclusion criteria) was not provided.
	3.4	No formal consideration provided in relation to confounders.
	5.4	Neither divergences nor similarities between qualitative and quantitative findings were discussed. In the discussion, the authors provided no summary of the two main themes identified.
	5.5	Authors provided no clear description of the analytical method used in the qualitative component (i.e.,, stages of analysis; coding).
Carstensen, L., et al. (1982)	3.4	No formal consideration or analyses of confounding factors provided.
	2.4	Outcome assessors were not blinded to intervention condition.

Chippendale, T. and Boltz, M. (2015)	5.5	Blinding was not included in the RCT.
Chung, S. and Kim, J. (2020)	3.1	Participants were selected based on their previous experience of participating in the Senior Policy Monitoring Group Project. No exclusion criteria were defined for OAs, e.g., age, health status, general health etc., and about 65% reported experiences of participating in an intergenerational programme with young adults.
	3.2	The intergenerational solidarity measure was not developed, validated, or used as a scale, rather as individual items. Perceptions of the younger generation were measured despite a high proportion of the OAs having previous experience of intergeneration engagement.
	3.4	No formal analyses of confounding factors provided (e.g., an impact of previous intergenerational experience).
de Souza, E.M. and Grundy, E. (2007)	2.4	Outcome assessors were not blinded to intervention condition.
	2.5	The percentage of intervention participants who actually attended intervention activities was very low (21%).
DeMichelis, C., et al. (2015)	3.1	A description of the target population (i.e., inclusion and exclusion criteria) was not provided. Considering the quantitative component of this study, the sample size (n = 10) was very small.
	3.4	No formal consideration or analyses of confounding factors were provided.
Fujiwara, Y., et al. (2009)	3.3	High drop-out rates at first follow-up (20.6% dropped out by 9-month follow-up).
Gaggioli, A., et al. (2014)	3.1	A description of the target population (i.e., inclusion and exclusion criteria) was not provided. Furthermore, considering the lack of specified criteria, the sample size (n = 32) does not appear representative of OAs recruited from various centres for older people.
	3.4	No formal consideration or analyses of confounding factors were provided.
Halpin, S.N., et al. (2017)	1.5	The interpretation of the data included is very limited. Findings are set in some context in the Discussion section, but not when being reported.
	3.1	A clear description of the target population (i.e., inclusion and exclusion criteria) was not provided.
	3.3	High drop-out rate (31% dropped out by 11-month follow-up).
Hernandez, C.R. and Gonzalez, M.Z. (2008)	3.4	No formal consideration or analyses of confounding factors provided.
Johnson, W. (2014)	3.3	High drop-out rate (20% dropped out during 8-week programme).
	3.4	No formal consideration or analyses of confounding factors provided.
June, A. and Andreoletti, C. (2020)	3.1	A clear description of the target sample (inclusion and exclusion criteria) was not provided.
	3.4	No formal consideration or analyses of confounding factors provided.
Kamei, T., et al. (2011)	1.4	The interpretation mainly comprised a summary of the field notes. It is not clear what findings were derived from the interview records. The interpretation was not sufficiently supported by the data included.
	1.5	There are no clear links between data sources, analysis and interpretation. The triangulation was not discussed, and findings insufficiently supported by the data.
	3.1	A clear description of the target sample (inclusion and exclusion criteria) was not provided.
	5.5	Considering criteria set 1 and 3, both the qualitative and quantitative components could not be rated as high quality.
	3.1	A clear description of the target sample (inclusion and exclusion criteria) was not provided.

Lee, O.E.-K. and Kim, D.-H. (2019)	3.4	The authors provided cognitive status and demographic variables, but there was no formal consideration of confounding factors and no appropriate methods to control for confounders were used.
	5.4	The quantitative and qualitative outcomes were not discussed in terms of their similarities or divergence. It was not explained how different results supplemented each other.
	5.5	Lack of a clear description of inclusion and exclusion criteria was considered an important omission in the quantitative component of the study.
Lin, Y.-C., et al. (2017)	1.3	Authors reported that they used thematic analysis, but no description of the analysis was provided, only a statement that two themes were identified.
	1.4	Only two quotes from OAs' responses were provided with no interpretation included.
	1.5	No clear link between data sources, analysis and interpretation was provided.
	3.1	No inclusion and exclusion criteria were provided for OAs. The sample size (n = 9) was also very small for a quantitative study.
	3.4	The authors provided demographic information, but there was no formal consideration of confounding factors and no appropriate methods to control for confounders were used.
	5.5	Considering criteria set 1 and 3, both qualitative and quantitative components could not be rated as high quality.
Mahoney, N., et al. (2019)	3.4	The authors reported demographic variables, but there was no formal consideration of confounding factors and no appropriate methods to control for confounders were used.
Meshel, D.S. and McGlynn, R.P. (2004)	3.4	No formal consideration or analyses of confounding factors provided.
Murayama, Y., et al. (2015)	3.3	High drop-out rate (41.2% dropped out by 2–year follow-up).
Newman, S., et al. (1995)	3.1	A clear description of the target sample (inclusion and exclusion criteria) was not provided. Volunteers were not to have had any previous intergenerational volunteer experience in the school setting, but age range, health etc. were not defined.
Perry, C.K. and Weatherby, K. (2011)	1.4	The interpretation was not sufficiently supported by the data. Qualitative evidence included is very limited.
	1.5	Authors provided no information on how they attained rigour at each stage of the qualitative component of the study (e.g., credibility check). The analysis process was also not described in detail and therefore it is not clear how the themes were identified. Interpretation of the findings was supported by limited data extracts. Different sources of data were listed, but it is not clear how they were triangulated and analysed.
	3.1	The sample size was very small (n = 7) considering the quantitative component included, the extent of the recruitment effort, and simplified inclusion criteria.
	3.3	High drop-out rate (30% dropped out by 8-week follow-up).
	3.4	The authors reported demographic variables, but there was no formal consideration or analyses of confounding factors provided.
	5.4	No explanation was provided regarding how different results supplemented each other or how various factors interfering with the intervention (e.g., challenging aspects of performed activities, attendance rates) potentially contributed to the quantitative results.
	5.5	Considering assessments for criteria set 1 and 3, this criterion could not be rated as high quality.
Pinquart, R., et al. (2000)	3.1	A clear description of the target sample (inclusion and exclusion criteria) was not provided.
	3.4	No formal consideration or analyses of confounding factors provided.
Posada, M.M. (2006)	3.1	The total sample comprised only a very small proportion of the 700 nursing home residents (n = 22). Furthermore, this included both cognitively healthy and impaired older adults, further reducing the sample size for sub-group analyses.

Sakurai, R., et al. (2016)	3.3	High drop-out rate at 7-yr follow-up (53.6% - 57.9% of baseline participants' data analysed, depending on outcome).
Sakurai, R., et al. (2018)	3.3	High drop-out/participant exclusion rate (49.3% of baseline participants at 6-yr follow-up).
Sanders, M. J., et al. (2013)	3.3	High drop-out rate: 32.7% dropped out by 4-wk follow-up.
	3.4	No formal consideration or analyses of confounding factors were provided.
Santini, S., et al. (2018)	1.5	Authors reported that ethnographic notes, audio and video materials, the collected participants' impressions and feedback on the delivered activities, and the relational interaction experienced by the researchers contributed to data building. However, there was no description of who collected the data and how it was recorded and analysed. Findings were substantiated by the data. However, baseline data were not provided for two out of four themes.
Sng, J.R.H. and Jung, Y. (2020)	3.1	A clear description of the target sample (inclusion and exclusion criteria) was not provided.
	3.4	No formal consideration or analyses of confounding factors were provided.
Strand, K.A., et al. (2014)	1.1	The qualitative research approach was not defined.
	1.3	No description was provided regarding how the data were categorised (i.e., coded) and 'reviewed'. The analysis process was not outlined.
	3.3	High drop-out rate (32.4% dropped out by 25-wk follow-up).
	5.5	There was no description of the qualitative research method and analytical process used.
Xu, X., et al. (2016)	3.3	A high drop-out rate after one week of engagement (27.1% dropped out).
Young, T.L. and Janke, M.C. (2013)	3.1	A clear description of the target sample (inclusion and exclusion criteria) was not provided.
	3.3	Only 24.6% of the sample completed both pre- and post-programme assessments.

Appendix B

SCHOOL OF PSYCHOLOGICAL SCIENCES & HEALTH

University of Strathclyde Humanities & Social Sciences

Research Partnership Invitation: School-Based Intergenerational Engagement

Researchers at the University of Strathclyde are currently seeking primary schools for an exciting intergenerational engagement project. With the aim of positively contributing both to teaching provision and child attainment in the schools involved, the project will place older adult volunteers within schools to help with learning and teaching activities. By assessing the older adults before, during, and after their placements, the project will explore whether they might experience benefits in their health and wellbeing due to their volunteering. The research will begin late 2017/early 2018, however, we are now keen to establish partnerships with schools that would like to be involved in the project.

What is intergenerational engagement, and why might it be useful?

Scotland is experiencing rapid population ageing, bringing a range of health, economic, and social challenges. Age-related changes in thinking and memory skills are among the most feared aspects of ageing, with implications for quality of life and independence. School-based intergenerational engagement is a promising approach to help maintain or enhance thinking skills, and wider wellbeing, in Scotland's older adults. The approach involves older adults volunteering in local schools, for example to help children improve their reading skills, as in the world-leading Experience Corps® project, with whom we are collaborating (http://www.aarp.org/experience-corps/). Such programmes offer a range of benefits, including better cognitive abilities in older people, and improving children's reading. In this project, we aim to develop and deliver intergenerational engagement through local schools, supported by Generations Working Together. We plan to investigate the feasibility of the programme, and the cognitive, social, and health outcomes in the older adult participants. We will also assess the experiences of the older adults, schools, and children participating in the programme.

What would the project involve?

We are seeking schools who are interested in helping to develop and set up an intergenerational engagement programme in Scotland. The schools will host healthy older adult volunteers, for up to 15

hours per week, and would benefit from the volunteers' time and input as a supplement to their teaching delivery. The volunteers (aged approximately 60+ years), from each school's local community, will be randomly assigned either to a wait-list control group (which does not go into schools) or the intervention group (which participates in the school-based intervention). The intervention will involve the volunteers helping with a range of activities within the classroom, which are expected to engage their thinking skills (memory, attention, etc.). We anticipate that the volunteers might help with one-to-one reading, comprehension, and writing skills, and organisational duties in the context of school libraries, and history/field projects, for example. The research will assess any changes in thinking skills, as well as key health and social outcomes, in the older adults participating in the programme over a 12-week period. We will also assess the volunteers' experiences of the intervention, and key outcomes for the schools involved. The study will be conducted in the context of a doctoral project, funded by the University of Strathclyde. In total, the intervention and associated data collection is likely to be spread over approximately 1.5-2 years, at key stages coinciding with the school year.

Why get involved?

The project is anticipated to make an important contribution to the evidence base regarding intergenerational engagement and its development and implementation in Scotland. We recognise that there will be effort required on the part of the schools who contribute to the project, in terms of accommodating volunteers in the schools, and initially supporting them in the context of your individual school. However, research has shown that, while the older adults gain cognitive, physical, and social engagement from their experience, the schools, teachers, and children can also benefit from the input and resources that the volunteers contribute. We therefore anticipate that there will be measurable benefits for everyone involved. We expect to involve a number of schools, in order to achieve the number of participants we require, but all data, including individual school data, will be anonymous. Finally, it is important to note that, before commencing, all our research will be ethically approved.

If you are interested to find out more about the project, or to express interest, please inform Generations Working Together, or the lead researcher on the project, Dr Louise Brown (University of Strathclyde):

Email: l.brown@strath.ac.uk

Telephone: 0141-548-2661

Appendix C

Please join us NOW!

Generation for Generation

SCHOOL YEAR 2018/2019

Would you like to help children in your community improve their attainment?

Would you like to volunteer for 8 hours a week at a local West Lothian primary school?

If you're aged 60-85, please get in touch:

Email: anna.krzeczkowska@strath.ac.uk | Call: 07376468498
Or write to me at: School of Psychological Sciences and Health
University of Strathclyde
40 George Street, Glasgow, G1 1QE

This research is being conducted by The University of Strathclyde, and is supervised by Dr Louise Brown Nicholls: l.nicholls@strath.ac.uk

Volunteers needed !

University of Strathclyde Glasgow

Please join us NOW!

GENERATION FOR GENERATION

SCHOOL YEAR 2019/2020

Would you like to volunteer for 8 hours a week at a local West Lothian primary school? This will help us understand how health and wellbeing could change when interacting with younger generations.

If you're aged 60-85, please get in touch:

Email: anna.krzeczkowska@strath.ac.uk
Call: 07376468498

Or write to me at:
School of Psychological Sciences and Health
University of Strathclyde
40 George Street
Glasgow, G1 1QE

This research is being conducted by The University of Strathclyde, and is supervised by
Dr Louise Brown Nicholls: l.nicholls@strath.ac.uk

Appendix D

Telephone Screening Session Record Form

Phone consent	
1. Introduction of the researcher and how the researcher obtained the contact information of the participant.	☐
2. Participant verbally received study information (e.g., study aims, benefits, and requirements) and was informed that participation is voluntary.	☐
3. Participant was offered to ask questions about the project.	☐
4. Participant was informed about the time needed for the telephone interview.	☐
5. Participant was informed he/she will be asked to provide their contact details and basic background information.	☐
6. Participant was informed briefly how the data collected over the phone will be used and stored.	☐
7. Participant verbally agreed to provide these details and for us to store them.	☐
8. Participant received a unique participant number.	☐

Contact details	
Name:	
Postal Address:	
Phone number:	
Email Address:	

Background information			
Age:		Date of Birth:	
Is English your first language?		Yes ☐ No ☐ If **NO** please specify_____	
Do you live independently?		Yes ☐ No ☐	
In general, how would you describe your health?		Excellent ☐ Very good ☐ Good ☐ Fair ☐ Poor ☐	

Do you have a physical or mental health condition that affects your ability to carry out day to day activities?	Yes ☐ No ☐ If **YES** please specify_____
Do you have a diagnosis of Parkinson's, epilepsy, or other neurological conditions?	Yes ☐ No ☐
Have you been diagnosed with cognitive impairment, such as mild cognitive impairment or Alzheimer disease?	Yes ☐ No ☐
Have you had a stroke in the past that that affects your ability to carry out day to day activities?	Yes ☐ No ☐
Do you have any hearing problems?	Yes ☐ No ☐
Do you have any problems with your vision?	Yes ☐ No ☐ If **YES** please specify how you attempt to correct it: glasses ☐ contact lenses ☐

Study Requirements	
Are you willing to commit 8 hours a week (over 2 days) from September 2018 to March 2019?	Yes ☐ No ☐
Are you currently a member of the Protecting Vulnerable Groups Scheme required by the ethics process and the schools?	Yes ☐ No ☐ If **YES**, do you agree to update your PVG? Yes ☐ No ☐ If **NO**, do you agree to join the scheme? Yes ☐ No ☐
Which of the following schools is the nearest to your home?	1. School A ☐ 2. School B ☐ 3. School C ☐ 4. School D ☐
Any unavailability (e.g., holiday plans) for June, July, and August?	
What days and times are the best to arrange the in-person meeting?	(I will be in touch when sessions dates finalised/ or if sessions dates decided, I will ask which of the dates suit the participant best)

Appendix E

Next of kin form

Volunteer name:

_____

In the event of an emergency (such as accident or death), please immediately inform the following:

Name: _____

Address:_____

Telephone: _____

Relationship: _____

Any other instructions:

_____

SIGNATURE:_____

DATE: _____

Appendix F

School of Psychological Sciences & Health
University of Strathclyde
40 George Street
Glasgow, G1 1QE

August 2018

Dear sir/madam,

Re: Assignment to school participation in Generation for Generation research study

Thank you once again for volunteering to participate in this important research, which is designed to investigate the potential benefits of participating in school-based intergenerational engagement. We are delighted to be able to assign you as a volunteer to one of our participating schools, to help young primary school children (P1-P4) with their school work. As previously communicated to you, participation will be for 6 months, at 8 hours per week (2 days x 4 hours).

Anna will be providing you with details about the next steps but, briefly, you will be asked to participate in initial induction activities at your school, including shadowing some teachers' or support assistants' work, and then assisting some pupils yourself. Remember, we will be asking you to complete weekly logs of your activities and to deposit these in the box in your school for us to collect.

In this research, some people are assigned to a wait-list group, and others are actively involved in school work until after the final assessments take place in 6 months' time. Both groups are very important to the project, and we will not be able to report valid results unless we are able to compare the participants going into the schools in the first 6 months, with participants who do not. Therefore, as previously described in the Participation Information Sheet, in addition to your voluntary work in the schools, we would very much appreciate your continued participation in the research by meeting us in November 2018 and March 2019 to repeat the tasks and questionnaires that you recently completed.

Thank you again for your enthusiasm and support for this programme, and we hope that you enjoy your work in our partner schools.

Yours faithfully,

Anna Krzeczkowska
(PhD Student)

Dr Louise Brown Nicholls
(Chief Investigator)
Tel: 0141-548-2661
l.brown@strath.ac.uk

School of Psychological Sciences & Health
University of Strathclyde
40 George Street
Glasgow, G1 1QE

August 2018

Dear sir/madam,

Re: Assignment to <u>control condition</u> in Generation for Generation research study

Thank you once again for volunteering to participate in this important research, which is designed to investigate the potential benefits of participating in school-based intergenerational engagement. We appreciate that you may have been very much looking forward to joining the programme in September – the school staff and our research team would also have loved to have you join us at this time.

However, we are sure that you understand the important reasons why some people are assigned to the wait-list group, and won't be actively involved in school work until after the final assessments take place in 6 months' time. The wait-list group you were assigned to is crucial to the research study attached to the programme, and we will not be able to report valid results unless we are able to compare the participants going into the schools in the first 6 months, with participants who do not. Therefore, without your help, we will not be able to show any benefits of 'Generation for Generation'. As previously described in the Participation Information Sheet, we would very much appreciate your continued participation, by keeping in touch with us over the next 6 months, and by meeting us in November 2018 and March 2019 to repeat the tasks and questionnaires that you recently completed.

Please also bear in mind that, as you have been assigned to a wait-list group, you will have the opportunity to join a participating school from April 2019, should you wish. Further details will be provided later.

Thank you again for your enthusiasm and support for this programme, and we very much look forward to seeing you again in 3 months.

Yours faithfully,

Anna Krzeczkowska
(PhD Student)

Dr Louise Brown Nicholls
(Chief Investigator)
Tel: 0141-548-2661
l.brown@strath.ac.uk

Appendix G

Generation for Generation

Sign-in/Sign-out Sheet

Date	Name	Time In	Time Out	Initials

Appendix H

Background Demographics Questionnaire

Participant number:

Date:

1. How would you describe your ethnic group? *Choose **one** section from A to F, then **tick** the appropriate box to indicate your ethnic group or background.*

White	☐ Scottish	☐ Irish	☐ English	☐ British
	☐ Northern Irish	☐ Scottish	☐ Welsh	☐ Polish
	☐ Gypsy/Traveller			
	☐ Any other White ethnic background? (please specify)			
Mixed	☐ Any mixed ethnic background? (please specify)			
Asian; Asian Scottish; Asian British				
	☐ Pakistani, Pakistani Scottish or Pakistani British	☐ Indian, Indian Scottish or Indian British	☐ Chinese, Chinese Scottish or Chinese British	
	☐ Bangladeshi, Bangladeshi Scottish or Bangladeshi British	☐ Any other Asian background? (please specify)		
Black; Black Scottish; Black British				
	☐ Caribbean, Caribbean Scottish or Caribbean British	☐ African, African Scottish or African British	☐ Black, Black Scottish or Black British	
	☐ Any other Black ethnic background? (please specify)			
Other ethnic group				
	☐ Arab		☐ Any other ethnic background? (please specify)	

2. What is your country of birth? _____

3. What is your marital status? _____

☐ single ☐ married ☐ engaged ☐ divorced ☐ widowed

☐ Domestic Partnership ☐ prefer not to answer

4. Do you use any Mobility Aids? (If yes, please specify) _____

5. Do you have any mobility requirements? (if yes, please specify) _____

6. How do you plan to commute to the school?

by bus ☐ by car ☐ walk ☐ cycle ☐

7. Will you need a financial aid to cover the cost of your transportation? Yes ☐
No ☐

8. How many years of primary education have you completed? _____

How many years of high school education have you completed?

_____

9. Have you completed any further/higher education? _____

How many years of further/higher education have you completed?_____

10. What is the highest education qualification you have achieved? _____

11. Are you currently employed? Yes ☐ No ☐

If **yes**, please specify number of hours and days you work per week_____

12. What is/was the name of your main occupation? _____

13. Are you retired? Yes ☐ No ☐

If **yes**, please specify your age of retirement_____

14. Are you volunteering? Yes ☐ No ☐

If **yes**, please specify describe your role_____

If **yes**, please specify the number of hours and days per week_____

15. Have you worked in the school environment before? Yes ☐ No ☐

If **yes**, please specify your role. _____

16. Do you have any children/ grandchildren? Yes ☐ No ☐

If **yes**, please specify how many children/grandchildren you have_____

17. Do they attend any of the local primary schools? Yes ☐ No ☐

If **yes**, please specify the name of the school_____

18. Do you smoke nowadays? Yes ☐ No ☐

19. Do you ever drink alcohol nowadays? Yes ☐ No ☐

If yes, please specify how many units per week_____

Appendix I

INSTRUMENTAL ACTIVITIES OF DAILY LIVING SCALE (IADL)

Volunteer's Number_____ Date_____

Instruction: Please read each statement on the list and circle the answer that most closely reflects your attitude toward the statement. There are no right or wrong answers and your opinion on each of the statements is important.

Question	Answer
A.	
1. I operate telephone on my own initiative; look up and dial numbers, etc.	YES/NO
2. I dial a few well-known numbers.	YES/NO
3. I answers telephone but do not dial.	YES/NO
4. I do not use telephone at all.	YES/NO
B.	
1. I take care of all shopping needs independently.	YES/NO
2. I shop independently for small purchases.	YES/NO
3. I need to be accompanied on any shopping trip.	YES/NO
4. I am unable to shop.	YES/NO
C.	
1. I plan, prepare and serve adequate meals independently.	YES/NO
2. I prepares adequate meals if supplied with ingredients.	YES/NO
3. I heats, serve and prepare meals or prepare meals but do not maintain adequate diet.	YES/NO
4. I need to have meals prepared and served.	YES/NO
D.	
1. I maintain house alone or with occasional assistance (e.g. "heavy work domestic help").	YES/NO
2. I perform light daily tasks such as dish-washing, bed making.	YES/NO

3. I perform light daily tasks but cannot maintain acceptable level of cleanliness.	YES/NO
4. I need help with all home maintenance tasks.	YES/NO
5. I do not participate in any housekeeping tasks.	YES/NO
E.	
1. I do personal laundry completely.	YES/NO
2. I launder small items; rinse stockings, etc.	YES/NO
3. All my laundry must be done by others.	YES/NO
F.	
1. I travel independently on public transportation or drive own car.	YES/NO
2. I arrange my own travel via taxi, but do not otherwise use public transportation.	YES/NO
3. I travel on public transportation when accompanied by another.	YES/NO
4. My travel is limited to taxi or automobile with assistance of another.	YES/NO
5. I do not travel at all.	YES/NO
G.	
1. I am responsible for taking medication in correct dosages at correct time.	YES/NO
2. I take responsibility if medication is prepared in advance in separate dosage.	YES/NO
3. I am not capable of dispensing own medication.	YES/NO
H.	
1. I manage financial matters independently (budgets, writes checks, pays rent, bills goes to bank), collect and keep track of income.	YES/NO
2. I manage day-to-day purchases, but I need help with banking, major purchases, etc.	YES/NO
3. I am incapable if handling money.	YES/NO

Appendix J

NART

Participant:_____ Score (number errors):_____

Predicted full-scale IQ:_____

CHORD	SUPERFLUOUS
ACHE	SIMILE
DEPOT	BANAL
AISLE	QUADRUPED
BOUQUET	CELLIST
PSALM	FACADE
CAPON	ZEALOT
DENY	DRACHM
NAUSEA	AEON
DEBT	PLACEBO
COURTEOUS	ABSTEMIOUS
RAREFY	DETENTE
EQUIVOCAL	IDYLL
NAIVE	PUERPERAL
CATACOMB	AVER
GAOLED	GAUCHE
THYME	TOPIARY
HEIR	LEVIATHAN
RADIX	BEATIFY
ASSIGNATE	PRELATE
HIATUS	SIDEREAL
SUBTLE	DEMESNE
PROCREATE	SYNCOPE
GIST	LABILE
GOUGE	CAMPANILE

Appendix K

INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

LONG LAST 7 DAYS SELF-ADMINISTERED FORMAT

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the **last 7 days**. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** and **moderate** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

1. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling? Think about *only* those physical activities that you did for at least 10 minutes at a time.

_____ days per week

□ None →Skip to question 3

2. How much time did you usually spend on one of those days doing **vigorous** physical activities?

_____ hours per day _____ minutes per day

3. Now think *only* about those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do moderate physical activities like carrying light loads, bicycling ta a regular pace, or doubles tennis? Do not include walking.

_____ days per week

□ None → Skip to question 5

4. How much time did you usually spend on one of those days doing **moderate** physical activities?

_____ hours per day _____ minutes per day

5. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time to go from place to place? This includes walking at home and at work, walking to travel from place to place, and any other walking.

_____ days per week

□ No walking from place to place →Skip to question 7

6. How much time did you usually spend on one of those days **walking** from place to place?

_____ hours per day _____ minutes per day

The last question is about the time you spend **sitting** while at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading or sitting, lying down to watch television, or travelling on a bus.

7. During the **last 7 days**, how much time did you usually spend sitting on a **week day**?

_____ hours per day _____ minutes per day

Appendix L

Geriatric Depression Scale (Short Form) Self-Rated Version

Volunteer's Number:_____ Date:_____

Instructions: Choose the best answer for how you felt over the past week.

No.	Question	Answer
1.	Are you basically satisfied with your life?	YES / NO
2.	Have you dropped many of your activities or interests?	YES / NO
3.	Do you feel that your life is empty?	YES / NO
4.	Do you often get bored?	YES / NO
5.	Are you in good spirits most of the time?	YES / NO
6.	Are you afraid that something bad is going to happen to you?	YES / NO
7.	Do you feel happy most of the time?	YES / NO
8.	Do you feel helpless?	YES / NO
9.	Do you prefer to stay at home, rather than go out and do things?	YES / NO
10.	Do you feel that you have more problems with memory than most?	YES / NO
11.	Do you think it is wonderful to be alive now?	YES / NO
12.	Do you feel pretty worthless the way you are now?	YES / NO
13.	Do you feel full of energy?	YES / NO
14.	Do you feel that your situation is hopeless?	YES / NO
15.	Do you think that most people are better off then you are?	YES / NO

Appendix M

The Semantic Differential Scale

Instructions: Make your ratings by checking the appropriate space. For example

Knowledgeable ___:✓:___:___:___:___:___ Ignorant

Rate schoolchildren on each of the following dimensions:

Skillful	____:____:____:____:____:____:____	Clumsy
Independent	____:____:____:____:____:____:____	Dependent
Mentally alert	____:____:____:____:____:____:____	Mentally lazy
Helpful	____:____:____:____:____:____:____	Unhelpful
Active	____:____:____:____:____:____:____	Passive
Friendly	____:____:____:____:____:____:____	Unfriendly
Happy	____:____:____:____:____:____:____	Sad
Likable	____:____:____:____:____:____:____	Unlikeable
Generous	____:____:____:____:____:____:____	Selfish
Kind	____:____:____:____:____:____:____	Mean

Appendix N

The International Personality Item Pool (IPIP)

Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are, and roughly your same age. So that you can describe yourself in an honest manner, your responses will be kept in absolute confidence. Indicate for each statement whether it is 1. Very Inaccurate, 2. Moderately Inaccurate, 3. Neither Accurate Nor Inaccurate, 4. Moderately Accurate, or 5. Very Accurate as a description of you.

	Very Inaccurate	Moderately Inaccurate	Neither Accurate Nor Inaccurate	Moderately Accurate	Very Accurate
1. Am the life of the party.	O	O	O	O	O
2. Feel little concern for others.	O	O	O	O	O
3. Am always prepared.	O	O	O	O	O
4. Get stressed out easily.	O	O	O	O	O
5. Have a rich vocabulary.	O	O	O	O	O
6. Don't talk a lot.	O	O	O	O	O
7. Am interested in people.	O	O	O	O	O
8. Leave my belongings around.	O	O	O	O	O
9. Am relaxed most of the time.	O	O	O	O	O
10. Have difficulty understanding abstract ideas.	O	O	O	O	O
11. Feel comfortable around people.	O	O	O	O	O
12. Insult people.	O	O	O	O	O
13. Pay attention to details.	O	O	O	O	O
14. Worry about things.	O	O	O	O	O
15. Have a vivid imagination.	O	O	O	O	O
16. Keep in the background.	O	O	O	O	O
17. Sympathize with others' feelings.	O	O	O	O	O
18. Make a mess of things.	O	O	O	O	O
19. Seldom feel blue.	O	O	O	O	O
20. Am not interested in abstract ideas.	O	O	O	O	O
21. Start conversations.	O	O	O	O	O
22. Am not interested in other people's problems.	O	O	O	O	O
23. Get chores done right away.	O	O	O	O	O
24. Am easily disturbed.	O	O	O	O	O
25. Have excellent ideas.	O	O	O	O	O

26.	Have little to say.	O	O	O	O	O
27.	Have a soft heart.	O	O	O	O	O
28.	Often forget to put things back in their proper place.	O	O	O	O	O
29.	Get upset easily.	O	O	O	O	O
30.	Do not have a good imagination.	O	O	O	O	O
31.	Talk to a lot of different people at parties.	O	O	O	O	O
32.	Am not really interested in others.	O	O	O	O	O
33.	Like order.	O	O	O	O	O
34.	Change my mood a lot.	O	O	O	O	O
35.	Am quick to understand things.	O	O	O	O	O
36.	Don't like to draw attention to myself.	O	O	O	O	O
37.	Take time out for others.	O	O	O	O	O
38.	Shirk my duties.	O	O	O	O	O
39.	Have frequent mood swings.	O	O	O	O	O
40.	Use difficult words.	O	O	O	O	O
41.	Don't mind being the center of attention.	O	O	O	O	O
42.	Feel others' emotions.	O	O	O	O	O
43.	Follow a schedule.	O	O	O	O	O
44.	Get irritated easily.	O	O	O	O	O
45.	Spend time reflecting on things.	O	O	O	O	O
46.	Am quiet around strangers.	O	O	O	O	O
47.	Make people feel at ease.	O	O	O	O	O
48.	Am exacting in my work.	O	O	O	O	O
49.	Often feel blue.	O	O	O	O	O
50.	Am full of ideas.	O	O	O	O	O

Appendix O

Parent Information Letter

Anna Krzeczkowska
School of Psychological Sciences and Health
University of Strathclyde
40 George Street
Glasgow, G1 1QE
Email: anna.krzeczkowska@strath.ac.uk

15 August 2018

Re: Intergenerational project

Dear Parents,

My name is Anna Krzeczkowska and I am a PhD student at the University of Strathclyde. I am currently planning to implement and study a school-based intergenerational project, under the supervision of Dr Louise Brown, Dr William McGeown, and Dr Alan Gow. I am contacting you as your child's school has recognised the potential value of this project and has kindly agreed to partner with us. Now we would like you to inform you about it, before the project commences.

What is the purpose of this investigation?

Previous research has reported a range of the potential benefits as a result of formal school-based volunteering programmes, in which older people help supplement young children's learning at school. Such programmes have potential to enhance health and wellbeing in adults aged 60-85, and improve pupils' attainment. The aim of this study is to assess the feasibility of implementing an intergenerational programme in Scotland, and its impact on the various outcomes in the older adult participants.

How long will this project last?

This project will last approximately 6 months in the school year 2018-2019. The intervention will start mid-August 2018 and finish in April 2019.

Who are the participants in this study and what is their role?

Participants in this study are older adults aged 60-85 that live in your community and chose to take part. We have designed this project to provide older adults with roles that can help improve academic outcomes of young children. The roles will include: literacy support, math support, and library support.

Will the participants be interviewed and their criminal records checked?

Yes, the participants will be interviewed by both the researcher and a member of school staff. Further, as required by the school system in Scotland, they will be required to join the Protecting Vulnerable Groups (PVG) scheme before the intervention begins, meaning a background criminal records check will be completed.

Will this project change my child's curriculum?

No, this project will have no impact on the school syllabus, and will only be a supplement to their learning. Volunteers will assist teachers and children in the classroom, but their presence will not require any changes in the teaching schedule. More importantly, volunteers will not run a class, either with or in the absence of a teacher.

Will this project require my child to complete any assessment?

No, only older adult volunteers and teachers will be asked to complete formal assessments.

What are the potential benefits to my child in being involved in this project?

There is a growing body of literature on the educational and behavioural benefits that result from intergenerational (IE) programmes designed to bring unrelated old and young together. Children whose schools were randomly selected for the program had significantly higher scores on a standardized reading test than children in the schools that were not part of intergenerational projects. There was also a trend for improvement in alphabet recognition and vocabulary ability among kindergarten children in the IE programmes. Office referrals for classroom misbehaviour were found to decrease by about half in the IE schools, but remained the same in the other schools. We are anticipating that this project will also enhance pupils' attainment.

What are the potential risks related to conducting this project?

There are no anticipated risks to implementing this study. However, if your child feels uncomfortable at any time during the project, we encourage you to reach out to the Head teacher or the researcher of the current project for advice and support.

Does my child have to take part?
No, it is up to you to decide whether or not your child will take part in this project. If you wish to opt-out your child from this intergenerational programme, please fill in a reply slip (see below) and pass it on to the school office in an attached envelope.

Will my child's personal information be protected?

Yes, no personal information about individual children will be required in this study's data.

This investigation was granted ethical approval by the School of Psychological Sciences and Health and the West Lothian Council ethics committee.

Thank you for reading this information. If you have any questions/concerns, during or after the investigation, please contact:

Researcher contact details:	**Chief Investigator details:**
Anna Krzeczkowska School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: anna.krzeczkowska@strath.ac.uk	Dr Louise Brown School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: l.brown@strath.ac.uk Phone: 0141 548 2661

Please cut this reply-slip out and pass it on in an attached envelope to the school office.

I would like to opt-out my child from the intergenerational project.

Child's name_____ Child's grade _____

Signature_____ Date_____

Appendix P

Participant Information Sheet (older adult volunteer) - RCT

Name of department: School of Psychological Science and Health, University of Strathclyde

Title of the study: The impact of school-based intergenerational engagement on older adults' wellbeing.

Introduction

My name is Anna Krzeczkowska. I am conducting this study under the supervision of Dr Louise Brown, Dr William McGeown, and Dr Alan Gow (Heriot-Watt University) as part of my PhD degree at the University of Strathclyde. Contact details can be found at the end of this information sheet. Before you decide whether or not to take part, it is important for you to understand why the research is being carried out and what it will involve. Please take time to read through the following information carefully and discuss it with others, if you wish. Please ask me if there is anything that is not clear or if you would like more information.

What is the purpose of this investigation?

Previous research suggests potential benefits for older adults' health and wellbeing when they engage in a school-based volunteering programme. Such programmes are designed to help improve pupils' attainment at school. The aim of this study is to assess the feasibility of implementing an intergenerational programme in Scotland, and its impact on the health and wellbeing outcomes in the older adult participants.

Do you have to take part?

No, it is up to you to decide whether or not to take part. If you do decide to take part you will be read this information, have an opportunity to ask questions and then you will be asked to give your written consent. If you decide to take part, you are still free to withdraw at any time, without giving a reason and without any consequences. Withdrawing from the study means that all electronic and paper data associated with your participation will be securely destroyed. To ensure that your data are not included in any analyses, however, you will need to withdraw by one week after your participation dates.

What will you do in the project?

Firstly, you will be asked to complete an initial cognitive screening and a set of questionnaires and tasks before some people take part in the intervention. The tasks and questionnaires will look at your cognitive abilities (i.e., memory, attention, information processing), sleep quality, mood, wellbeing, and attitudes towards younger generations. Regardless of who is asked to participate in the school programme, everyone will be asked to complete the same tasks and questionnaires after 3 months from the start of the programme (December 2018) and again at the end of the programme (April 2019).

After completing pre-programme questionnaires, you will be randomly assigned to one of two groups: 1) 8 hours per week school-commitment group, or 2) wait-list control group. If you are assigned to either of the first group, you will be asked to commit 8 hours per week, for 6 months in the school year 2018/2019. It is very important to be aware that everyone participating in the research must be able to join any of the two groups (i.e., participants can't choose which one, otherwise the study's findings could be negatively affected). The programme will start mid-August with training and induction sessions organised by the primary school and researcher, that will allow you to learn more about project and school policies, as well as familiarise with the school and staff members. If assigned to participate in the programme, beginning in September, you will be assisting teachers and children in the classroom. That may involve helping children with reading, numeracy or comprehension tasks. You will be also asked to complete a brief weekly diary to record your participation in that week. You will leave your diaries after the last session each week in a safe place box in the school office. Only I will have access to your notes and after being collected they will be securely stored in the locked cabinet at the University of Strathclyde. You can write about any aspect of your school engagement (e.g., activities you were involved in, number of hours you spent at school and engaging with children).

As it is required by the school system in Scotland, you will be asked to join the Protecting Vulnerable Groups (PVG) scheme before the programme begins. The applications will be provided for you by the school management and the cost of the application will be covered by the government fund.

Why have you been invited to take part?
You have been invited to take part as you are an adult aged 60 – 85 years, the age group that we are interested in. We are seeking people in this age who report being generally healthy, and independently living in the local community.

What are the potential risks to you in taking part?

There are no anticipated risks to taking part in the study. However, if you feel uncomfortable at any time during the study, then you may withdraw from participation at any time without giving a reason. Also, you will be provided with helpline information prior to commencing the project, should you need any additional support.

What happens to the information in the project?
We will be storing your identifying information (consent/contact details forms) separate from all the other data that will be collected, and these will be pseudo-anonymised (i.e., will be identified by a participant number only). The overall results of this study will be included in my PhD thesis and may be submitted for publication or conference presentations. Data will be accessed by the researchers associated with the work; they will be securely stored in a locked room in the School of Psychological Sciences & Health, and on password-protected computer systems. Anonymised data may also be shared with other academic researchers in future, either for further analyses or verification of our findings. Data will be securely destroyed when

no longer required, either after graduation or the period required for the publication process. While we cannot provide individual feedback on performance after your sessions, if you would like to know the overall outcomes of the investigation, please do not hesitate to contact me using the email address below.

The University of Strathclyde is registered with the Information Commissioner's Office who implements the Data Protection Act 1998. All personal data on participants will be processed in accordance with the provisions of the Data Protection Act 1998.

Thank you for reading this information – please ask any questions if you are unsure about what is written here.

What happens next?
If you would like to take part in this study, please sign the provided consent form and return it to the researcher prior to beginning your participation. If you do not wish to take part in the project, thank you for your attention and for taking the time to read this information.

Researcher contact details:	**Chief Investigator details:**
Anna Krzeczkowska School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: anna.krzeczkowska@strath.ac.uk	Dr Louise Brown School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: l.brown@strath.ac.uk Phone: 0141 548 2661

This investigation was granted ethical approval by the School of Psychological Sciences and Health ethics committee. If you have any questions/concerns, during or after the investigation, or wish to contact an independent person to whom any questions may be directed or further information may be sought from, please contact:

Dr Leanne Flemming (Convener of the ethics committee)
School of Psychological Sciences and Health
University of Strathclyde
Graham Hills Building
40 George Street Glasgow,
G1 1QE Telephone: 0141 548 4705
Email: l.fleming@strath.ac.uk

Participant Information Sheet (school staff members) – School Climate Survey

Name of department: School of Psychological Science and Health, University of Strathclyde

Title of the study: The impact of school-based intergenerational engagement on older adults' wellbeing.

Introduction

My name is Anna Krzeczkowska. I am conducting this study under the supervision of Dr Louise Brown, Dr William McGeown, and Dr Alan Gow (Heriot-Watt University) as part of my PhD degree at the University of Strathclyde. Contact details can be found at the end of this information sheet. Before you decide whether or not to take part, it is important for you to understand why the research is being carried out and what it will involve. Please take time to read through the following information carefully and discuss it with others, if you wish. Please ask me if there is anything that is not clear or if you would like more information.

What is the purpose of this investigation?

Previous research suggests potential benefits for older adults' health and wellbeing when they engage in a school-based volunteering programme. Such programmes are designed to help improve pupils' attainment at school. The aim of this study is to assess the feasibility of implementing an intergenerational programme in Scotland, and its impact on the health and wellbeing outcomes in the older adult participants.

Do you have to take part?

No, it is up to you to decide whether or not to take part. If you do decide to take part you will be read this information, have an opportunity to ask questions and then you will be asked to give your written consent. If you decide to take part, you are still free to withdraw at any time, without giving a reason and without any consequences. Withdrawing from the study means that all electronic and paper data associated with your participation will be securely destroyed. To ensure that your data are not included in any analyses, however, you will need to withdraw by one week after your participation dates.

What will you do in the project?

You will be asked to complete a School Climate Survey. The questionnaire will look at your experiences of school environment.

Why have you been invited to take part?
You have been invited to take part as you are a parent of a child that was involved in the intergenerational programme. We are seeking parents/ teachers/head teachers who could reflect on the current school climate.

What are the potential risks to you in taking part?

There are no anticipated risks to taking part in the study. However, if you feel uncomfortable at any time during the study, then you may withdraw from participation at any time without giving a reason. Also, you will be provided with helpline information prior to commencing the project, should you need any additional support.

What happens to the information in the project?
We will be storing your identifying information (consent/contact details forms) separate from all the other data that will be collected, and these will be pseudo-anonymised (i.e., will be identified by a participant number only). The overall results of this study will be included in my PhD thesis and may be submitted for publication or conference presentations. Data will be accessed by the researchers associated with the work; they will be securely stored in a locked room in the School of Psychological Sciences & Health, and on password-protected computer systems. Anonymised data may also be shared with other academic researchers in future, either for further analyses or verification of our findings. Data will be securely destroyed when no longer required, either after graduation or the period required for the publication process. While we cannot provide individual feedback on performance after your sessions, if you would like to know the overall outcomes of the investigation, please do not hesitate to contact me using the email address below.

The University of Strathclyde is registered with the Information Commissioner's Office who implements the Data Protection Act 1998. All personal data on participants will be processed in accordance with the provisions of the Data Protection Act 1998.

Thank you for reading this information – please ask any questions if you are unsure about what is written here.

What happens next?
If you would like to take part in this study, please sign the provided consent form and return it to the researcher prior to beginning your participation. If you do not wish to take part in the project, thank you for your attention and for taking the time to read this information.

Researcher contact details:	**Chief Investigator details:**
Anna Krzeczkowska School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: anna.krzeczkowska@strath.ac.uk	Dr Louise Brown School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE

	Email: l.brown@strath.ac.uk Phone: 0141 548 2661

This investigation was granted ethical approval by the School of Psychological Sciences and Health ethics committee. If you have any questions/concerns, during or after the investigation, or wish to contact an independent person to whom any questions may be directed or further information may be sought from, please contact:

Dr Leanne Flemming (Convener of the ethics committee)
School of Psychological Sciences and Health
University of Strathclyde
Graham Hills Building
40 George Street Glasgow,
G1 1QE Telephone: 0141 548 4705
Email: l.fleming@strath.ac.uk

Participant Information Sheet (for older adult volunteers) Focus Group

Name of department: School of Psychological Science and Health, University of Strathclyde
Title of the study: Experiences of participating in a school-based intergenerational programme.

Introduction

My name is Anna Krzeczkowska. I am conducting this study under the supervision of Dr Louise Nicholls and Dr William McGeown (University of Strathclyde), along with Dr Alan Gow (Heriot-Watt University), as part of my PhD degree. Contact details can be found at the end of this information sheet. Before you decide whether or not to take part, it is important for you to understand why the research is being carried out and what it will involve.

What is the purpose of this investigation?

The planned discussion session ('focus group') is designed to explore different aspects of an intergenerational programme from the volunteers' perspective. By sharing your thoughts and experiences with us, either positive or more challenging aspects, you will help us better understand the experience of being part of an intergenerational programme and improve the programme in the future.

Do you have to take part?

No, it is up to you to decide whether or not to take part. You will have the opportunity to ask questions and, if you do decide to take part, you will be asked to give your written consent. You would still be free to withdraw at any time, without giving a reason and without any consequences. Withdrawing from the study means that all audio and paper data associated with your participation will be either securely destroyed (consent form) or removed from the transcript (audio recording).

What will you do in the project?

You will be asked to talk about your experiences of volunteering in an intergenerational programme. Example questions include: 'why did you decide to become a Generation for Generation volunteer' and 'what types of activities did you do as a volunteer in the school?' The entire session will last for approximately 1-1.5hrs. With your permission, I will record the interview on a digital voice recorder. This is just so that I can give you my full attention and so that I can type the interview up at a later date. This is a normal procedure for this type of research. I will also take some notes during our session to make sure all the important points of our discussion are captured in the transcript.

Why have you been invited to take part?

You have been invited to take part as you have worked as a volunteer in the programme since September 2018.

What are the potential risks to you in taking part?
There are no anticipated risks to taking part in the study. However, if you feel uncomfortable at any time during the study, then the researcher will be available to support you. Also, you will be provided with contact information for the research team prior to commencing the project, should you need any additional support. Please remember that you do not have to answer any questions that you do not wish to. You may also withdraw from participation at any time without giving a reason and without any consequences.

What happens to the information in the project?
We will be storing your identifying information (consent form) separate from all the other data that will be collected, and these will be pseudo-anonymised (i.e., will be identified by a participant pseudonym only). The overall results of this study will be included in my PhD thesis and may be submitted for publication or conference presentations. The audio recording of this discussion will be accessed by the researchers associated with the work; they will be securely stored at the University of Strathclyde, and on password-protected University computer systems. Anonymised transcripts may also be shared with other academic researchers in future, either for further analyses or verification of our findings. Both paper and audio data will be securely delated when no longer required, either after graduation or the period required for the publication process. If you would like to know the overall outcomes of the investigation, please do not hesitate to contact me using the email address below.

Please also read our attached Privacy Notice for Research Participants.

Thank you for reading this information – please ask any questions if you are unsure about what is written here.

What happens next?
If you would like to take part in this study, please sign the consent form and return it to the researcher prior to beginning your participation. If you do not wish to take part in the project, thank you for your attention and for taking the time to read this information.

Researcher contact details:	**Chief Investigator details:**
Anna Krzeczkowska School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: anna.krzeczkowska@strath.ac.uk	Dr Louise Brown Nicholls School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: l.nicholls@strath.ac.uk Phone: 0141 548 2661

This investigation was granted ethical approval by the School of Psychological Sciences and Health ethics committee at the University of Strathclyde and West Lothian Council. If you have

any questions/concerns, during or after the investigation, or wish to contact an independent person to whom any questions may be directed, or further information may be sought from, please contact:

Dr Diane Dixon (Convener of the ethics committee)
School of Psychological Sciences and Health
University of Strathclyde
Graham Hills Building
40 George Street
Glasgow, G1 1QE
Telephone: +44 (0)141 548 2571
Email: diane.dixon@strath.ac.uk

Participant Information Sheet (for teaching staff) – Focus Group

Name of department: School of Psychological Science and Health, University of Strathclyde
Title of the study: Experiences of participating in a school-based intergenerational programme.

Introduction
My name is Anna Krzeczkowska. I am conducting this study under the supervision of Dr Louise Nicholls and Dr William McGeown (University of Strathclyde), along with Dr Alan Gow (Heriot-Watt University) as part of my PhD degree. Contact details can be found at the end of this information sheet. Before you decide whether or not to take part, it is important for you to understand why the research is being carried out and what it will involve.

What is the purpose of this investigation?
The planned discussion session ('focus group') is designed to explore different aspects of an intergenerational programme from the teaching staff's perspective. By sharing your thoughts and experiences with us, either positive or more challenging aspects, you will help us better understand the experience of being part of an intergenerational programme and improve the programme in the future.

Do you have to take part?
No, it is up to you to decide whether or not to take part. You will have the opportunity to ask questions and, if you do decide to take part, you will be asked to give your written consent. You would still be free to withdraw at any time, without giving a reason and without any consequences. Withdrawing from the study means that all audio and paper data associated with your participation will be either securely destroyed (consent form) or removed from the transcript (audio recording).

What will you do in the project?
You will be asked to talk about your experiences of being part of the 'Generation for Generation' engagement. The entire session will last for approximately 1-1.5hrs. With your permission, I will record the interview on a digital voice recorder. This is just so that I can give you my full attention and so that I can type the interview up at a later date. This is a normal procedure for this type of research. I will also take some notes during our session to make sure all the important points of our discussion are captured in the transcript.

Why have you been invited to take part?
You have been invited to take part as you are working in school classes that have been involved in the intergenerational programme.

What are the potential risks to you in taking part?
There are no anticipated risks to taking part in the study. However, if you feel uncomfortable at any time during the study, then you may withdraw from participation at any time without giving a reason and without any consequence. Please remember that you do not have to answer any questions that you do not wish to. Also, you will be provided with contact information for the research team prior to commencing the project, should you need any additional support

What happens to the information in the project?

We will be storing your identifying information (consent form) separate from all the other data that will be collected, and these will be pseudo-anonymised (i.e.,, will be identified by a participant pseudonym only). The overall results of this study will be included in my PhD thesis and may be submitted for publication or conference presentations. The audio recording of this discussion will be accessed by the researchers associated with the work; they will be securely stored at the University of Strathclyde, and on password-protected University computer systems. Anonymised transcript data may also be shared with other academic researchers in future, either for further analyses or verification of our findings. Both paper and audio data will be securely destroyed when no longer required, either after graduation or the period required for the publication process. If you would like to know the overall outcomes of the investigation, please do not hesitate to contact me using the email address below.

Please also read our attached Privacy Notice for Research Participants.

Thank you for reading this information – please ask any questions if you are unsure about what is written here.

What happens next?
If you would like to take part in this study, please sign the provided consent form and return it to the researcher prior to beginning your participation. If you do not wish to take part in the project, thank you for your attention and for taking the time to read this information.

Researcher contact details:	**Chief Investigator details:**
Anna Krzeczkowska School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: anna.krzeczkowska@strath.ac.uk	Dr Louise Brown Nicholls School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: l.brown@strath.ac.uk Phone: 0141 548 2661

This investigation was granted ethical approval by the School of Psychological Sciences and Health ethics committee at the University of Strathclyde and West Lothian Council. If you have any questions/concerns, during or after the investigation, or wish to contact an independent person to whom any questions may be directed, or further information may be sought from, please contact:

Dr Diane Dixon (Convener of the ethics committee)
School of Psychological Sciences and Health
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40 George Street
Glasgow, G1 1QE
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Email: diane.dixon@strath.ac.uk

Appendix Q

Participant Debrief Sheet (Intervention - RCT)

Name of department: School of Psychological Sciences & Health
Title of the study: The impact of school-based intergenerational engagement on older adults' wellbeing.

Thank you for taking the time and effort to participate in my study. Your help is very much appreciated, and I hope that your experience was interesting and enjoyable.

This study aims to develop, implement and test the effectiveness of an intergenerational engagement programme in Scottish schools during 2018-2019.Specifically, we are interested in whether an intergenerational engagement could bring measurable benefits for persons involved. Previous research has shown that intensive engagement may provide more significant health gains and social benefits, as compared to no engagement or minimal involvement. However, there is no clear indication so far regarding the minimal intensity of intergenerational interaction that may result in significant and sustained effects on persons involved. Therefore, you were randomly assigned to one of two groups: 1) 8 hours per week school-commitment, or 2) a wait-list group (no intervention). Then, after 3 and 6 months from the start of the intervention, we asked you to complete a set of questionnaires and tasks designed to help us to identify possible changes in your cognitive, health, and social function.

The results of this study are anticipated to form the basis of future policy and practice in the UK by revealing potential benefits for older adults and the schools they support.

Further information
Should you experience any negative impacts as a result of participating in the project, you may contact school staff, who will discuss any upsetting issues with you and try to resolve them. You may also contact the researcher if you think this is appropriate. You may also wish to speak to your GP if you if you have any concerns about your health and wellbeing. For emotional support, you can also contact MIND by phone: 0300 123 3393 or by email: info@mind.org.uk

Right to Withdraw
As specified earlier, as a volunteer participant you have the right to withdraw from the study, without explanation and without penalty. You may therefore now request that any information collected up to this point is destroyed. If you wish to avoid your data being included in any final analyses, then you must withdraw your data by one week after your participation.

If you have any questions about this study please feel free to ask now, or you may contact me or my supervisor as follows:

Researcher contact details:	**Chief Investigator details:**
Anna Krzeczkowska School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: anna.krzeczkowska@strath.ac.uk	Dr Louise Brown Nicholls School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: l.nicholls@strath.ac.uk Phone: 0141 548 2661

This investigation was granted ethical approval by the School of Psychological Sciences and Health ethics committee at the University of Strathclyde. If you have any questions/concerns, during or after the investigation, or wish to contact an independent person to whom any questions may be directed or further information may be sought from, please contact:

Dr Diane Dixon (Convener of the ethics committee)
School of Psychological Sciences and Health
University of Strathclyde
Graham Hills Building
40 George Street
Glasgow, G1 1QE
Telephone: +44 (0)141 548 2571
Email: diane.dixon@strath.ac.uk

Thank you again for all your help over the last 6 months with our research!

Participant Debrief Sheet (Post-cognitive screening)

Name of school: School of Psychological Sciences and Health
Title of the study: The impact of school-based intergenerational engagement on older adults' wellbeing.

Thank you very much for contributing to our study.

This study aims to develop, implement and test the effectiveness of an intergenerational engagement programme in Scottish schools during 2018-2019. Specifically, we are interested in whether an intergenerational engagement could bring measurable benefits for persons involved. Previous research has shown that intensive engagement may provide more significant health gains and social benefits, as compared to no engagement or minimal involvement. However, there is no clear indication so far regarding the minimal intensity of intergenerational interaction that may result in significant and sustained effects on persons involved. Therefore, we aim to randomly assign participants to one of two groups: 1) 8 hours per week school-commitment group, or 2) a wait-list group (no intervention). Then, after 3 and 6 months from the start of the intervention, we will ask them to complete a set of questionnaires and tasks designed to help us to identify possible changes in their cognitive, health, and social function.

Why didn't I go on to complete other cognitive tasks and the main school intervention?

Before carrying out the main cognitive testing and intervention, all older adults carry out a short task to determine how their general cognitive functioning is performing. This brief task involves memory and concentration (e.g., orientation to time and place, word recall, design drawing). We anticipate that most participants will perform relatively well and within a pre-set range, and we can only include people in the study who do so. We did not go on to complete the whole study today because your score was below the pre-determined range, but there are many potential reasons for this. For example, you may not be feeling at your best today, or you may have performed better if the task had been completed within a better known environment. It is very important for you to understand that our purposes for conducting the task are purely research-related and that they have no clinical significance, particularly given that the task is so brief. We are not clinicians and the task was not designed to identify clinical impairments. However, if you have any concerns, and particularly if you have noticed experiencing any problems recently, you may wish to visit your GP, who will be glad to perform a memory check-up.

Should you have any questions about the research please feel free to ask the researcher now. You may also contact the chief investigator, Dr Louise Brown (details below) at any time.

Right to Withdraw

As specified earlier, as a volunteer participant you have the right to withdraw from the study, without explanation and without consequence. You may therefore request that any information collected up to this point is destroyed. Should you wish to withdraw your data, please say so now, or contact me or my supervisor (details below). You may request your data to be destroyed at any time, however, if you do not wish your data to be included in the final analysis then you will need to inform us by one week after your participation.

Further Information

My supervisor and I will be glad to answer any questions you have about the study and your participation:

Researcher contact details: Anna Krzeczkowska School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: anna.krzeczkowska@strath.ac.uk	**Chief Investigator details:** Dr Louise Brown Nicholls School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: l.nicholls@strath.ac.uk Phone: 0141 548 2661

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University of Strathclyde
Graham Hills Building
40 George Street
Glasgow, G1 1QE
Telephone: +44 (0)141 548 2571
Email: diane.dixon@strath.ac.uk

Once again, many thanks for volunteering to participate in this research. Your help is very much appreciated.

Participant Debrief Sheet (for older adults)

Name of department: School of Psychological Sciences & Health
Title of the study: Experiences of participating in a school-based intergenerational programme.

Thank you for taking the time and effort to participate in my study. Your help is very much appreciated, and I hope that your experience was interesting and enjoyable.

This discussion session ('focus group') was designed to explore different aspects of an intergenerational programme from the volunteers' perspective. By sharing your thoughts and experiences with us, you are helping us better understand the experience of being part of an intergenerational programme and to improve the programme in the future. The results of this wider project may help to inform future education and/or health-related policy and practice regarding the outcomes of older adults supporting primary school pupils.

Further information
Should any issues have arisen as a result of participating in this project, you may speak to the researcher now or later, using the details below. You may also wish to speak to your GP if you if you have concerns about your health and wellbeing. For emotional support, you can also contact MIND (www.mind.org.uk) by phone: 0300 123 3393 or by email: info@mind.org.uk

Right to Withdraw
As a volunteer participant you have the right to withdraw from the study, without explanation and without penalty. You may therefore now request that any information collected up to this point is destroyed. If you wish to avoid your data being included in any final analyses, then you must withdraw your data by one week after your participation.

If you have any questions, please ask now, or contact me or my supervisor as follows:

Researcher contact details:	**Chief Investigator details:**
Anna Krzeczkowska School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: anna.krzeczkowska@strath.ac.uk	Dr Louise Brown Nicholls School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: l.nicholls@strath.ac.uk Phone: 0141 548 2661

This investigation was granted ethical approval by the School of Psychological Sciences and Health ethics committee at the University of Strathclyde and West Lothian Council. If you have

any questions/concerns, during or after the investigation, or wish to contact an independent person to whom any questions may be directed or from whom further information may be sought, please contact:

Dr Diane Dixon (Convener of the ethics committee)
School of Psychological Sciences and Health
University of Strathclyde
Graham Hills Building
40 George Street
Glasgow, G1 1QE
Telephone: 0141 548 2571
Email: diane.dixon@strath.ac.uk

Thank you again for all your help with our research!

Participant Debrief Sheet (teaching staff)

Name of department: School of Psychological Sciences & Health
Title of the study: Experiences of participating in a school-based intergenerational programme.

Thank you for taking the time and effort to participate in my study. Your help is very much appreciated, and I hope that your experience was interesting and enjoyable.

This discussion session ('focus group') was designed to explore different aspects of an intergenerational programme from the perspective of teaching staff. By sharing your thoughts and experiences with us, you are helping us better understand the experience of being part of an intergenerational programme and to improve the programme in the future. The results of this wider project may help to inform future education and/or health-related policy and practice regarding the outcomes of older adults supporting primary school pupils.

Further information
Should any issues have arisen as a result of participating in this project, you may speak to the researcher now or later, using the details below. You may also wish to speak to your GP if you if you have concerns about your health and wellbeing. For emotional support, you can also contact MIND (www.mind.org.uk) by phone: 0300 123 3393 or by email: info@mind.org.uk

Right to Withdraw
As specified earlier, as a volunteer participant you have the right to withdraw from the study, without explanation and without penalty. You may therefore now request that any information collected up to this point is destroyed. If you wish to avoid your data being included in any final analyses, then you must withdraw your data by one week after your participation.

If you have any questions, please ask now, or contact me or my supervisor as follows:

Researcher contact details:	**Chief Investigator details:**
Anna Krzeczkowska School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: anna.krzeczkowska@strath.ac.uk	Dr Louise Brown Nicholls School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: l.nicholls@strath.ac.uk Phone: 0141 548 2661

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have any questions/concerns, during or after the investigation, or wish to contact an independent person to whom any questions may be directed or from whom further information may be sought, please contact:

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Email: diane.dixon@strath.ac.uk

Thank you again for all your help with our research!

Participant Debrief Sheet (for pupils: read out at the end of the session and a copy to be taken home)

Name of department: School of Psychological Sciences & Health
Title of the study: Experiences of participating in a school-based intergenerational programme.

Thank you for taking the time and effort to participate in my study. Your help is very much appreciated, and I hope that your experience was interesting and enjoyable.

This discussion was to find out about your thoughts and experiences of working with the older adult volunteers. You helped us better understand the programme and will help us to improve it in the future. We hope this research may help schools and older people in future, too.

Further information
Should you feel uncomfortable or unhappy in any way, please speak to the researcher, the school staff or your parent(s) or guardian(s), either now or after today's session.

Right to Withdraw
You can stop your involvement in the study, without telling us why and without this causing any problems. You can ask us to get rid of any of the information we collected, but you need to let us know about that by one week after our today's discussion.

If you have any questions, please ask now, or ask a teacher or your parent/guardian to help you contact us using the following information:

Researcher contact details:	**Chief Investigator details:**
Anna Krzeczkowska School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: anna.krzeczkowska@strath.ac.uk	Dr Louise Brown Nicholls School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: l.nicholls@strath.ac.uk Phone: 0141 548 2661

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Dr Diane Dixon (Convener of the ethics committee)
School of Psychological Sciences and Health

University of Strathclyde
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Thank you again for all your help with our research!

Appendix R

Baseline Comparisons of Cognitive, Health and Wellbeing, and Social Measures by Intervention Status.

	Control group (n = 18)	Intervention group (n = 18)	Full sample (n = 36)	
Outcome	**M (SD)**	**M (SD)**	**M (SD)**	***p (t)***
Cognitive function				
Executive function	7.42 (0.73)	7.73 (0.72)	7.57 (0.73)	.208 (-1.28)
Processing speed	37.94 (8.19)	40.67 (9.75)	39.31 (8.89)	.371 (-0.91)
Working memory	19.00 (2.91)	20.72 (3.08)	19.86 (3.08)	.094 (-1.72)
Episodic memory	10.11 (4.95)	10.72 (6.04)	10.42 (5.45)	.742 (-.33)
Auditory Verbal Learning	28.89 (3.83)	28.22 (5.58)	28.56 (4.73)	.679 (0.42)
Health and wellbeing				
Depression	1.94 (2.98)	1.39 (2.68)	1.67 (2.81)	.560 (0.59)
Loneliness	34.89 (11.64)	33.56 (11.93)	34.22 (11.63)	.736 (0.34)
Life satisfaction	52.83 (9.79)	52.94 (11.43)	52.89 (10.49)	.975 (-0.03)
Vigorous physical activity	876 (1168)	547 (1050)	711 (1107)	.381 (0.89)
Moderate physical activity	449 (689)	231 (426)	340 (575)	.262 (1.14)
Walking	1095 (817)	2367 (2482)	1731 (1932)	.052 (-2.06)
Hours spent sitting	30.97 (11.28)	30.69 (18.63)	30.83 (15.18)	.957 (0.05)
Physical activity - Total	2420 (1883)	3125 (3689)	2772 (2908)	.475 (-0.72)
Subjective Sleep Quality	0.89 (0.68)	0.89 (0.76)	0.89 (0.71)	1.00 (0.00)
Sleep latency	1.06 (1.06)	0.72 (0.67)	0.89 (0.89)	.266 (1.13)
Sleep duration	0.67 (0.77)	0.56 (0.62)	0.61 (0.69)	.635 (0.48)
Habitual sleep efficiency	0.44 (0.62)	0.72 (1.02)	0.58 (0.84)	.329 (-0.99)
Sleep disturbance	1.06 (0.42)	1.11 (0.58)	1.08 (0.50)	.744 (-0.33)
Use of sleeping medication	0.11 (0.32)	0.00 (0.00)	0.06 (0.23)	.163 (1.46)
Daytime dysfunction	0.61 (0.50)	0.61 (0.70)	0.61 (0.60)	1.00 (0.00)
Sleep quality - Total	4.83 (3.03)	4.61 (2.52)	4.72 (2.75)	.815 (0.24)
Social function				
Cross-age attitudes	11.83 (8.72)	13.50 (8.69)	12.67 (8.62)	.570 (-0.57)
Generative Desire	34.78 (3.41)	34.50 (4.11)	34.64 (3.72)	.826 (0.22)
Generative Achievement	24.28 (5.14)	23.61 (5.65)	23.94 (5.33)	.713 (0.37)
Personality:				
Extraversion	32.00 (10.28)	32.17 (8.45)	32.08 (9.28)	.958 (-0.53)
Agreeableness	43.78 (4.49)	44.06 (4.66)	43.92 (4.51)	.857 (-0.18)
Conscientiousness	37.50 (7.01)	41.06 (4.52)	39.28 (6.08)	.079 (-1.81)
Emotional Stability	36.11 (10.49)	33.06 (7.55)	34.58 (9.14)	.323 (1.00)
Openness to Experience	39.17 (5.26)	39.56 (6.93)	39.36 (6.07)	.851 (-0.19)

Appendix S

Cognitive functioning at baseline and 3-month follow-up across intervention and control groups.

Outcome	Control (n = 18)		Intervention (n = 18)		Main effect		Interaction
	Baseline	3 months	Baseline	3 months	Group	Time	Group x Time
	M (SD)	M (SD)	M (SD)	M (SD)	*p (F)*		
Executive function	7.4 (0.7)	7.2 (1.0)	7.7 (0.7)	8.1 (0.6)	**.019 (6.06)**	.507 (.45)	**.024 (5.57)**
Processing speed	37.9 (8.2)	38.3 (9.5)	40.7 (9.8)	43.7 (9.3)	.161 (2.05)	.173 (1.94)	.291 (1.15)
Working memory	19.0 (2.9)	18.4 (3.2)	20.7 (3.1)	23.9 (1.7)	**< .001 (28.03)**	**.049 (4.18)**	**.006 (8.50)**
Episodic memory	10.1 (5.0)	11.3 (5.1)	10.7 (6.0)	16.6 (8.3)	.116 (2.60)	**< .001 (13.38)**	**.020 (6.00)**
Auditory Verbal Learning	28.9 (3.8)	27.7 (4.0)	28.2 (5.6)	35.3 (3.6)	**.005 (9.05)**	**.002 (11.83)**	**< .001 (23.69)**

Appendix T

Correlations between volunteer engagement and cognitive, health and social outcomes from baseline to 3-month and 6-month follow ups.

Outcome^	**Engagement (hours)**					
	3 months			6 months		
	r	*p*	r^2	r	*p*	r^2
Cognitive function:						
Executive function	-.072	.777	.005	-.443	.200	.192
Processing speed	-.399	.101	.159	-.349	.323	.122
Working memory	-.065	.798	.004	.229	.525	.069
Episodic memory	.113	.657	.013	-.251	.484	.063
Auditory Verbal Learning	-.649	**.004***	.421	-.442	.201	.195
Health and wellbeing:						
Depression	.080	.753	.006	.152	.573	.023
Life satisfaction	.172	.495	.030	-.016	.954	.000
Loneliness	-.029	.908	.001	.202	.454	.041
Vigorous PA	.067	.790	.005	.137	.614	.019
Moderate PA	-.335	.174	.112	-.397	.128	.158
Walking	-.339	.169	.115	-.359	.172	.129
Sitting	-.171	.496	.029	.251	.348	.063
Physical Activity - Total	-.268	.283	.072	.383	.143	.147
Subjective SQ	.007	.977	.000	.192	.476	.037
Sleep latency	.137	.588	.019	.166	.540	.028
Sleep duration	-.141	.577	.020	.203	.450	.041
Habitual sleep efficiency	-.129	.610	.017	.050	.853	.003
Sleep disturbance	-.020	.938	.000	.321	.226	.103
Use of sleep medication	.335	.174	.119	.058	.832	.003
Daytime dysfunction	-.406	.094	.165	-.146	.589	.021
Sleep quality – Global score	.019	.941	.000	.238	.375	.057
Social function and personality:						
Cross-age attitudes- Total	.225	.370	.099	-.055	.838	.006
Generative Desire	.067	.793	.005	-.285	.285	.203
Generative Achievement	.175	.488	.030	-.155	.567	.069
Extraversion				.323	.222	.088
Conscientiousness				.097	.722	.002
Emotional Stability				-.204	.449	.045
Agreeableness				.071	.794	.003
Openness to experience				.137	.613	.006

^Note:Correlations for 3-month follow-up include the entire intervention group (n = 18); whereas for 6-month follow-up the sample size is n = 10 (cognitive outcomes) or n = 16 (health and wellbeing, and social outcomes).

*Correlation is significant at 0.01 level (2-tailed).

Appendix U

Anna Krzeczkowska
School of Psychological Sciences and Health
University of Strathclyde
40 George Street
Glasgow, G1 1QE
Email: anna.krzeczkowska@strath.ac.uk

<<insert Head teacher's Name>>

<<School Address>>

Re: Intergenerational project: Focus groups with teachers and pupils

Dear<<insert Head teacher's Name>>,

My name is Anna Krzeczkowska and I am a PhD student at the University of Strathclyde. I am contacting you as your school has been one of the active schools involved in the intergenerational programme called 'Generation for Generation'. Now we would like to hear from the pupils and teachers about their experiences of working with the volunteers. Therefore, we would like to ask you for your permission to conduct short group discussions with teachers and pupils who have been supported by the programme volunteers for the last six months. Before you make your decision, we would like to inform you about the study in more detail:

What is the purpose of this investigation?
To explore different aspects of the 'Generation for Generation' programme from the pupils' and teachers' perspective. Anything teaching staff and pupils may share with us during our group discussions ('focus group'), either positive or challenging aspects, will be very helpful in allowing us to better understand the experience of being part of the programme and to help improve the programme in the future.

How long will the focus groups last and when/where they will take place?
We are planning to conduct two focus groups with the pupils (1 x P1-P2 and 1 x P3-P4) and one focus group with the teachers/ support assistants. Each of the two discussions with pupils will last approximately 30-40 minutes and the discussion with the teaching staff approximately 1-1.5hrs. They will be conducted at your school during April 2019.

Do teachers and pupils have to take part?
No, it is up to teachers, pupils, and pupils' parents (they will be provided with an opt-in form) to decide whether or not they will take part. If they do decide to take part, they will be informed about the study, have an opportunity to ask questions. Teachers and children will be then asked to give written (teachers)/ verbal (pupils) consent. If they decide to take part, they are still free to withdraw at any time, without giving a reason and without any consequences.

Withdrawing from the study means that all data associated with their participation will be removed from the analysis.

What are the potential risks related to conducting this research?
There are no anticipated risks to implementing this study. However, if anyone feels uncomfortable at any time during the discussion, he/she can withdraw from the study at any time without explanation or consequence. Children will be taken to the classroom and encouraged to talk to the class teacher about the potential concerns related to their participation in the discussion. Should a pupil or a teaching staff member disclose some negative experiences, the researcher will support the person and then he/she will be referred to you as a trusted school staff member to discuss the concerns in more detail.

Will school staff members' and pupils' personal information be protected?

Yes, no personal information about individual participants will be required in this study. I will be audio recording the session and taking notes. However, I will not include any information that would identify any individuals by name in any report of research findings. Any identifiable information (e.g. consent form) will be stored separately from the content of the discussions.

Thank you for reading this information. If you have any questions/concerns, during or after the investigation, please contact:

Researcher contact details:	**Chief Investigator details:**
Anna Krzeczkowska School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: anna.krzeczkowska@strath.ac.uk	Dr Louise Brown Nicholls School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: l.nicholls@strath.ac.uk Phone: 0141 548 2661

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Dr Diane Dixon (Convener of the ethics committee)
School of Psychological Sciences and Health
University of Strathclyde
Graham Hills Building
40 George Street
Glasgow, G1 1QE
Telephone: 0141 548 2571
Email: diane.dixon@strath.ac.uk

Appendix V

Parent/Guardian Information Letter

Anna Krzeczkowska
School of Psychological Sciences & Health
University of Strathclyde
40 George Street
Glasgow, G1 1QE
Email: anna.krzeczkowska@strath.ac.uk

15 March 2019

Dear Parents/Guardians,

Re: Intergenerational project

My name is Anna Krzeczkowska and I am a PhD student at the University of Strathclyde. As you are aware, your child's school is involved in the intergenerational programme called 'Generation for Generation'. I am contacting you as your child was one the pupils who worked with one of our older adult volunteers. Now we would like to hear from your child about their experiences of working with the volunteers. Therefore, I would like to ask you for your permission to involve your child in a short group discussion with me and other school pupils.

What is the purpose of this research?

To explore different aspects of the 'Generation for Generation' programme from the pupils' perspective. Anything your child may share with us during our group discussions ('focus group'), either positive or more challenging aspects, will be very helpful in allowing us to better understand the experience of being part of the programme and to help improve the programme in the future.

How long will this focus group last and when/where it will take place?
The discussion will last approximately 30-40 minutes and it will be conducted at your child's school during April 2019.

Does my child have to take part?
No, it is up to you and your child to decide whether or not they will take part. If your child does decide to take part, they will be informed about the study, have an opportunity to ask questions and then asked to give verbal consent. If your child decides to take part, they are still free to withdraw at any time, without giving a reason and without any consequences. Withdrawing from the study means that all data associated with your child's participation will be removed from the analysis.

What are the potential risks related to conducting this research?
There are no anticipated risks to implementing this study. However, if your child feels uncomfortable at any time during the discussion, he/she can withdraw from the study at any time without explanation or consequence. He/she will be taken to the classroom and encouraged to talk to the class teacher about the potential concerns related to the study.

Will my child's personal information be protected?
Yes, no personal information about individual children will be required in this study. I will be audio recording the session and taking notes. However, I will not include any information that would identify your child or other individuals by name in any report of research findings.

Please also read our attached Privacy Notice for Research Participants.

Thank you for reading this information. If you have any questions/concerns, before, during or after the focus group, please contact:

Researcher contact details:	**Chief Investigator details:**
Anna Krzeczkowska School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: anna.krzeczkowska@strath.ac.uk	Dr Louise Brown Nicholls School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: l.nicholls@strath.ac.uk Phone: 0141 548 2661

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Graham Hills Building
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Telephone: 0141 548 2571
Email: diane.dixon@strath.ac.uk

Intergenerational programme focus group research: opt-in form

If you DO WANT your child to take part in this ‘focus group’ research, please complete this opt-in form as soon as possible, and ask your child to hand it to their teacher.

“I would like to opt my child in to participate in a focus group.”

Child’s name_____ Child’s class _____

Signature of parent/guardian_____ Date_____

Letter of Invitation (For Teaching Staff)

Anna Krzeczkowska
School of Psychological Sciences and Health
University of Strathclyde
40 George Street
Glasgow, G1 1QE
Email: anna.krzeczkowska@strath.ac.uk

Date:

Dear <<insert Teacher's Name>>,

Re: Intergenerational project

My name is Anna Krzeczkowska and I am a PhD student at the University of Strathclyde. As you'll be aware, I am currently implementing a school-based intergenerational project ('Generation for Generation') in your school, under the supervision of Dr Louise Nicholls and Dr William McGeown (University of Strathclyde), along with Dr Alan Gow (Heriot-Watt University). I am contacting you as we would like to invite you to take part in a focus group discussion session that will give you an opportunity to reflect on your experiences of the programme.

What is the purpose of the focus group?
This focus group is to explore different aspects of an intergenerational programme from the teaching staff's perspective. By sharing your thoughts and experiences with us, either positive or more challenging aspects, you will help us better understand the experience of being part of an intergenerational programme and to improve the programme in the future.

Do you have to take part?
No, it is up to you to decide whether or not to take part. If you do decide to take part you will be read this information, have an opportunity to ask questions and then you will be asked to give your written consent. If you decide to take part, you are still free to leave at any time, without giving a reason and without any consequences.

What will you do in the focus group?
Firstly, I will give you and the other teaching staff involved more information about the discussion and you can ask me any questions. Then, I would like us to talk about your experiences of being part of 'Generation for Generation'. The entire session will last for approximately 1-1.5hrs.

Why have you been invited to take part?
You have been invited to take part as you are a member of teaching staff that has worked with one of the 'Generation for Generation' volunteers.

What happens next?
If you might be interested in taking part in this study, please send me an email as soon as you can, using the contact details provided below, and I will provide you with our more detailed information sheet. If you do not wish to take part in the project, thank you for your attention and for taking the time to read this information. If you have any questions regarding the focus group, please feel free to contact me using the details below.

Please note, this investigation was granted ethical approval by the School of Psychological Sciences and Health ethics committee at the University of Strathclyde, and by the West Lothian Council ethics committee.

Your sincerely,

Anna Krzeczkowska

Researcher contact details:	**Chief Investigator details:**
Anna Krzeczkowska School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: anna.krzeczkowska@strath.ac.uk	Dr Louise Brown Nicholls School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: l.nicholls@strath.ac.uk Phone: 0141 548 2661

Letter of Invitation (For Older Adult Programme Volunteers)

Anna Krzeczkowska
School of Psychological Sciences and Health
University of Strathclyde
40 George Street
Glasgow, G1 1QE
Email: anna.krzeczkowska@strath.ac.uk

Date:

Dear <<insert Volunteer's Name>>,

Re: Intergenerational project

I am contacting you as I would like to invite you to take part in a 'focus group' (discussion session) that will give you an opportunity to reflect on your experiences of volunteering in our intergenerational programme 'Generation for Generation'.

What is the purpose of the focus group?
This focus group is to explore different aspects of an intergenerational programme from the volunteer's perspective. By sharing your thoughts and experiences with us, either positive or more challenging aspects, you will help us better understand the experience of being part of an intergenerational programme and improve the programme in the future.

Do you have to take part?
No, it is up to you to decide whether or not to take part. If you do decide to take part you will be provided with the more detailed information sheet, and will have an opportunity to ask questions. Then, if you wish to participate, you will be asked to give your written consent. If you decide to take part, you are still free to stop or withdraw at any time, without giving a reason and without any consequences.

What will you do in the focus group?
Firstly, I will provide you and other volunteers with information about what is planned for the discussion and you can ask me some questions. Then, I plan for us to talk about your experiences of being part of the 'Generation for Generation' programme. The entire session will last for approximately 1-1.5hrs.

Why have you been invited to take part?
You have been invited to take part as you worked as a volunteer in the 'Generation for Generation' programme since September 2018.

What happens next?
If you would like more information or to take part in this study, please send me an email as soon as you can, using the contact details provided below. If you do not wish to take part in the project, thank you for your attention and for taking the time to read this information.

If you have any questions/concerns regarding the focus group, please contact me using the details below. Please note, this investigation was granted ethical approval by the School of Psychological Sciences and Health ethics committee at the University of Strathclyde, and by the West Lothian Council ethics committee.

Your sincerely,

Anna Krzeczkowska

Researcher contact details:	**Chief Investigator details:**
Anna Krzeczkowska School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: anna.krzeczkowska@strath.ac.uk	Dr Louise Brown Nicholls School of Psychological Sciences and Health University of Strathclyde 40 George Street Glasgow, G1 1QE Email: l.nicholls@strath.ac.uk Phone: 0141 548 2661

Appendix W

The Volunteer Diary

Code:

Date:

Number of hours spent at school this week:

Tell me about your week at school (e.g., activities, new tasks).
What did you like the most/the least about this week?
Have you experienced any difficulties?
Other thoughts and reflections:

Appendix X

Focus Group Script (Older Adults)

WELCOME SCRIPT:

I want to thank you for coming today and for helping me better understand your volunteer experiences.

My goal for today is to understand your thoughts and opinions of the Generation for Generation programme and your volunteer experience, including any positive or challenging aspects of your volunteering. My aim is to use the information that you provide to improve the program and make it more rewarding for volunteers, as well as the pupils and the school staff. Thus, it is really important for us to get an accurate picture of your volunteer experiences. Please share your true thoughts and feelings on the topics we will discuss.

The entire session should take approximately 1- 1.5 hours.

I want to remind you that your participation in this group is voluntary and you have the right to withdraw and stop participation at any time. For research purposes, I will be tape recording the session and taking notes. However, I will NOT include any information that would identify by name a specific volunteer (including you), student, teacher or other individual in any report of research findings. I am also available after the session if you have thoughts you would like to share outside the group discussion. Also, it is fine not to share your thoughts on a particular topic you are not comfortable discussing.

All of this information about confidentiality as well as more information about the study is located on the consent form. Please read the consent form carefully and sign at the bottom if you would like to participate. If you have any questions, please ask me before signing the form. I will collect the form once you finish.

FACILITATOR SCRIPT:
Thank you for consenting to participate, we will now proceed with the discussion. I am going to lead our discussion with a series of questions. There are no right or wrong answers to the questions I will ask, only differing points of view. Please share with me your true feelings on the topics we will discuss even if your thoughts differ from others' opinions. There can be both positive and challenging aspects of almost any activity we do in life and we can learn as much from the bad as the good, so please keep in mind that we are interested in learning about both the positive and the negative aspects of your volunteer experience.

Before we begin our discussion, I want to share some ground rules. Please speak up so everyone can hear but only one person should be speaking at a time. As we noted earlier, I am tape-recording the session because I don't want to miss any of your comments. I will be on a first name basis for this discussion but as I noted previously, no names will be attached to your comments outside of this room. You may be assured of complete confidentiality. Also, even though the goal of this group discussion is to understand each other's views, I also want to ask for your participation in making sure that we maintain confidentiality in terms of exactly who said what during our discussion within the group. In other words, please don't leave here today and tell someone outside the group that a particular person made a particular comment or shared a specific experience. You can tell others the thoughts and ideas

that were expressed in the discussion, but please don't identify specific individuals who shared specific comments or thoughts.

Does anyone have any questions or concerns before we start?

INTRODUCTIONS:

OK, let's begin by going around the table and finding out more about each other. Let's start by introducing ourselves by first name and sharing what classroom or grade levels you volunteered in.

KEY QUESTIONS:

<u>The Volunteer Experience</u>:

1. I would like to start by talking about the reasons you became a Generation for Generation Volunteer and how some of your motivations for volunteering may have been impacted during your time as a volunteer. Let's start with when you decided to sign-up for the program. *Can you share some of the reasons why you decided to become a Generation for Generation volunteer?*

    Additional probes:

    a. What was your main motivation for signing up for the programme? What were your first thoughts when you read or heard about the project?

    b. Did your reasons for being a Generation for Generation volunteer change over time? In what ways?

2. Now, I would like to talk about the activities you have participated in as a volunteer. To get us rolling, I would like each of you to share with us what activities you have performed as a volunteer. *What types of activities did you do as a volunteer in the school?*

    Additional probes:

    a. How (or in what ways) were the activities you engaged in as a volunteer similar or different from what you expected before you entered the school?

    b. What skills were important to your main volunteer activities? Were you missing any important skills you needed to be an effective volunteer?

    c. What factors or resources, either within yourself or from others in the program or in the school, were most helpful to you in carrying out your volunteer activities? What factors made it difficult to carry out your volunteer activities?

3. OK, I would like to delve a little deeper and talk in further detail about different aspects of your role as a volunteer. *So, let's start with sharing what we might have found positive or rewarding about volunteering.*

    Additional probes:

    a. Describe a positive experience (if there were any) that stands out in your memory? In other words, what have you enjoyed the most?

    b. What were some of the positive aspects (if there were any) in working with the children?

    c. What were some of the positive aspects (if there were any) in working with other Gen4Gen volunteers?

    d. What were some of the most positive aspects (if there were any at all) in working with school teachers and staff?

    e. What were the most personally rewarding aspects (if any) of volunteering?

    f. Do you feel like your contributions as a volunteer have been meaningful? In what ways?

Now let's turn to sharing what you might have found challenging about volunteering.

Additional probes:

a. Describe a challenging experience (if there is any) that stands out in your memory? In other words, what have you enjoyed the least?

b. What were (if at all) some of the challenging aspects in working with the children?

c. What were (if at all) some of the challenging aspects of working with other Gen4Gen volunteers?

d. What were (if at all) some of the challenging aspects of working with school teachers and staff?

e. What aspects of volunteering (if there were any at all) did you find to be physically demanding or tiring?

f. What aspects of volunteering (if there were any) did you find to be emotionally demanding?

g. How did you cope with any demanding aspects of volunteering?

h. What resources might have helped you better cope with your volunteer demands?

4. Thank you for sharing your thoughts on both the positive and challenging aspects of volunteering. I really appreciate your willingness to share your thoughts and feelings with me. Now, I would like to talk a bit more about the possible impact of the programme on your health, thinking skills and social activities. Firstly, I would like to focus on your thinking skills, which includes abilities like memory, attention, and problem solving.

Can you share with me how (if at all) your engagement in the programme impacted your thinking skills?

Additional probes:

a. What impact has your volunteering had on how you concentrate or remember things?

b. What did you think about your thinking skills before joining the programme and what do you think now?

Now let's turn to sharing how you found your participation impacted your health and wellbeing.

Additional probes:

a. What impact has your volunteering had in terms of your physical and mental wellbeing?

b. Has your physical activity levels changed due to your volunteering? If yes, in what way?

c. In what way has your experience as a volunteer changed how you perceive everyday life (e.g., do you enjoy your life/ things that you do on daily basis more than before you joined the programme)?

And finally, can you tell me how participation in the programme impacted on your social skills or networks?

Additional probes:

a. What social activities have you engaged in during the programme? (e.g., Have you attended any meetings/outings with the teaching staff or other volunteers?)

b. How (if at all) have other activities outside the school been impacted due to your volunteering?

5. Given our discussion today, what else would you like to share, positive or challenging, about your experiences in the Gen4Gen programme? Once again, I will be available after this session and happy to discuss any additional comments you may want to contribute.

Concluding comments:

Thank you very much for sharing your thoughts and experiences with me today. Everything you have shared with me today will be very helpful in allowing us to better understand the volunteer experience and to improve the programme for volunteers like you and those you supported. Finally, we would like to thank you once again for all of the time and effort you have committed to the programme over the last 6 months. We, the schools, and the pupils really appreciate it.

Focus Group Script (Teachers)

WELCOME SCRIPT:

I want to thank you for coming today and for helping us better understand your experiences of the Generation for Generation programme. My name is Anna Krzeczkowska and I will be a facilitator for our discussion.

My goal for today is to understand your thoughts and opinions of the Generation for Generation programme, including any positive or challenging aspects of it. My aim is to use the information that you provide to improve the program and make it more rewarding for volunteers, as well as the pupils and the teaching staff. Thus, it is really important for us to get an accurate picture of being part of the programme. Please share your true thoughts and feelings on the topics we will discuss.

The entire session should take approximately 1- 1 1/2 hours.

I want to remind you that your participation in this group is voluntary and you have the right to withdraw and stop participation at any time. For research purposes, I will be tape recording the session and taking notes. However, I will NOT include any information that would identify by name a specific volunteer, student, teacher (including you) or other individual in any report of research findings. I am also available after the session if you have thoughts you would like to share outside the group discussion. Also, it is fine not to share your thoughts on a particular topic you are not comfortable discussing.

All of this information about confidentiality as well as more information about the study is located on the consent form. Please read the consent form carefully and sign at the bottom if you would like to participate. If you have any questions, please ask me before signing the form. I will collect the form once you finish.

FACILITATOR SCRIPT:
Thank you for consenting to participate, we will now proceed with the discussions. I am going to lead our discussion with a series of questions. There are no right or wrong answers to the questions I will ask, only differing points of view. Please share with us your true feelings on the topics we will discuss even if your thoughts differ from others' opinions. There can be both positive and challenging aspects of most any activity we do in life and we can learn as much from the bad as the good, so please keep in mind that we are interested in learning about both the positive and the negative aspects of the Generation for Generation programme.

Before we begin our discussion, I want to share some ground rules. Please speak up so everyone can hear but only one person should be speaking at a time. As I noted earlier, I am tape-recording the session because I don't want to miss any of your comments. I will be on a first name basis for this discussion but as I noted previously, no names will be attached to your comments outside of this room. You may be assured of complete confidentiality. Also, even though the goal of this group discussion is to understand each other's' views, I also want to ask for your participation in making sure that we maintain confidentiality in terms of exactly who said what during our discussion within the group. In other words, please don't leave here today and tell someone outside the group that a particular person made a particular comment or shared a specific experience. You can tell others the thoughts and ideas that were expressed in the discussion, but please don't identify specific individuals who shared specific comments or thoughts.

Does anyone have any questions or concerns before we start?

INTRODUCTIONS:

OK, let's begin by going around the table and finding out more about each other. Let's start by introducing ourselves by first name and sharing what classroom or grade levels you work in.

KEY QUESTIONS:

The Gen4Gen Experience:

1. I would like to start by talking about implementing the programme in the school. *Could you please share with us your experiences of the process of setting the school up for hosting volunteers? What was required from you in terms of planning the implementation or providing resources for induction as well as hosting the volunteers over the year?*

   a. What type of initial training or induction were you asked to provide the volunteers with?
   b. What do you think about the volunteers' timetables? How did the hours of commitment fit your activities with the pupils and support needs of your class?
   c. What procedures that were involved in the programme were discussed with you? How much did you know about the programme and its purpose before you met the volunteers?

2. Now, I would like to talk about the activities that you, as a teacher, asked a volunteer to engage in. *I would like each of you to share with us what activities or roles a volunteer you worked with, was asked to perform. What types of activities did a volunteer do in your classroom?*

Additional probes:

a. How (or in what ways) were the activities you engaged a volunteer similar or different from what you would ask a trained Pupils Support Assistant?

b. What skills were important to the main volunteer activities? Could you please tell me more about skills of the volunteers you worked with and if they were sufficient for their role? How do you think additional training could improve their performance, if at all?

c. What resources or school procedures were most helpful to carry out the activities by the volunteer? What made it difficult to carry out the activities?

d. How was the support you were provided by volunteers enough or not enough considering school needs?

3. OK, I would like to talk in further detail about any good or bad aspects of having a volunteer in your classroom.

Let's start with the good and share what you found most positive and rewarding about Gen4Gen volunteering.

Additional probes:

a. Describe a positive experience (if there was any at all) that stands out in your memory? In other words, what have you enjoyed the most about working with a volunteer?

b. Do you feel that a volunteer learned something new from you or you learned something from a volunteer? If so, how?

c. Do you feel that the Gen4Gen volunteers' contributions have been meaningful? In what ways?

Now let's turn to sharing what we found challenging about having Gen4Gen volunteers in your classroom.

Additional probes:
a. What were the challenging aspects in working with the Gen4Gen volunteers?
b. Describe a challenging experience that stands out in your memory? In other words, what have you enjoyed the least of having a Gen4Gen volunteer in your classroom?

4. Thank you for sharing your thoughts on both the positive and challenging aspects of having volunteers in the school. I really appreciate your willingness to share your thoughts and feelings with me. Now, I would like to talk a bit more about the possible impact of the programme on the school climate and pupils' attainment and behaviour.

Can you think of any way the presence of volunteers impacted on the school environment as a whole?
Additional probes:
a. How (if at all) have volunteers impacted on school's teaching/ learning environment, educational values, school safety?
b. What impact (if any) have volunteers had on your classroom climate and your school satisfaction?
c. How would your school benefit from having OAs volunteers all year around?

Can you think of any way that volunteers impacted pupils' achievement and behaviour?
Additional probes:
a. How was volunteers' work helpful in improving pupils' reading, writing or numeracy skills?
b. What behavioural changes (if any) have you observed in pupils who worked with volunteers?

5. Given our discussion today, what else would you like to share, positive or challenging, about your experiences in the Gen4Gen programme? Once again, I will be available after this session and happy to discuss any additional comments you may want to contribute.

Concluding comments:

Thank you very much for sharing your thoughts and experiences with me today. Everything you have shared with me today will be very helpful in allowing us to better understand the experience of being part of Gen4Gen and to improve the programme in the future. Finally, we would like to thank you once again for all of the time and effort you have committed to the programme over the last 6 months. We and the volunteers really appreciate it.

Focus Group Script (Pupils)

WELCOME SCRIPT:

Hello everyone! I am so glad that you are here today! My name is Anna Krzeczkowska and I am a research student at the University of Strathclyde. I would like to talk with you today about how you feel about having older adult helpers in the school and what it was like to work together with them.

FACILITATOR SCRIPT:

I think you will really enjoy our discussion today because it is part of such an important national study. I think it will make you feel really special and important to know that you were a part of this study. If there is ever a time when you want to leave the classroom, just let me know and we can stop. You can also feel free to tell me if there is ever a question you don't want to answer. Before we get started, do you have any questions about what we are going to do today? *Answer questions*.

I will be using a tape recorder to record the things we talk about today, but everything you say will be private. Does anyone have any questions or concerns about that? *Answer questions*. If you do not have any/further questions, I would like to ask you to sign a form for me. I will now read to you what it says and if you agree with what you heard, please sign the form at the bottom. Please use your first and second name. I will collect the form once you finish.

Let me give you a few quick ground rules for the group. First, everyone's opinion is important, and we do not have to all have the same opinion. I am very interested in what you have to say. It is okay to talk to each other and not just to me. Everyone does not have to answer every single question, but I would like to hear from each of you today as the discussion continues. Since our time is limited I may need to ask you to stop so we can talk about something else from time to time. I will give you the "Time out" sign if we need to do that. If you need to go to the bathroom at any point, just raise your hand.

Does anyone have any questions or concerns before we start?

INTRODUCTIONS:

Now I would like to go around and let each one of you tell us your first name and one thing you did this week that was important or fun. I only need your first name and classroom you are in.

KEY QUESTIONS:

<u>The Experience of Gen4Gen</u>:

1. I would like to start by talking about the time when the volunteers started working with you last year. *Could you please tell me about the first days when you were asked to work with the volunteers?*

    Additional probes:

    a. How different was is from working with other adults in the school?

b. How long did that take you to get used to working with him/ her?

2. Now, I would like to talk about the activities you have done with the Generation for Generation volunteers.

Could you please share with me what did you do when the volunteer was working with you?

Additional probes:

a. How (or in what ways) were the activities you did with a volunteer similar or different from what you usually do in the classroom?

b. How (if at all) were the activities you did with the volunteers helpful?

2. OK, I would like to know a little bit more and talk about any positive and less enjoyable experiences you had when working with a volunteer.

So let's start with the positive things and share what you enjoyed most and least about working with the volunteers.

Additional probes:

a. Could you please tell me about something positive that happened when you worked with a volunteer? In other words, what have you enjoyed the most?

b. What were some of the most positive/fun things in working with a volunteer?

c. Describe something positive you learned from a volunteer? What about your reading and writing?

d. What positive did you learn about yourself or others?

e. Do you feel that it is a good thing to have volunteers in school? In what ways?

Now let's turn to sharing what was less enjoyable about working with the volunteers.

Additional probes:

a. What were some of the less fun things about working with a volunteer?

b. Can you describe a less enjoyable situation that stands out in your memory? In other words, what have you enjoyed the least?

3. Thank you for sharing with me your experiences of working with volunteers. I appreciate your honesty and help.

Now, I would like to find out, in what way have you or other children behaved differently around the volunteers as compared to when you were with the teacher?

Additional probes:

a. Have you listened to them carefully or maybe you have interrupted?

b. Have you learned from the volunteers any new rules how to behave, what to do or not to do? Could you please give me some examples?

c. Was working with the volunteers helpful for your concentration on your school work? In what way?

4. Now, I would like you to tell me more about volunteers who worked with you.

How would you describe in a few words the volunteer you worked with?

Additional probes:
a. What was the volunteer like as compared to other adults you know?
b. Tell me more about her/his skills, maybe things that you have learned from her/him.
c. Whom was the volunteer for you? (e.g., more like another teacher or a friend)
d. What do you think was the role of the volunteer in the school?

5. Is there anything we did not talk about so far that you think is important for me to know about how you feel about working with Generation for Generation volunteers?

6. Do you have any questions about this group or why we are all here today? Are there any comments you would like to make?

Concluding comments:

I am so glad you spent time with me today. I learned a lot and it was so much fun talking with all of you. Thank you for sharing your thoughts and for working with the older adult volunteers this year.