A theoretical exploration of the pathways by which childhood adversity is linked with suicidality

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List of Abbreviations

3ST = Three step theory
ACEs = Adverse Childhood Experiences
BDNF = Brain-derived neurotrophic factor
CFA = Confirmatory factor analyses
CFI = Comparative Fit Index
COSLA = Convention of Scottish Local Authorities
CTDS = Critical thinking disposition Scale
DMAP = Dimensional Model of adversity and psychopathology
DS = The Defeat scale
DSM-5 = Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition
ERQ = Emotional regulation questionnaire
ERS = Emotional reactivity scale
HPA = Hypothalamic-pituitary-adrenal axis
IASP = International Association for Suicide Prevention
ICD-10 = International classification of diseases-10
IMV = Integrated Motivational Volitional model
IPT = Interpersonal theory of suicide
JVQ-R2 = Juvenile Victimization Questionnaire
MASQ = Multiple-ability self-report questionnaire
MCAR = Missing completely at random
MLR = Maximum likelihood robust
MNBS = Multidimensional neglectful behaviour scale – Adolescent and adult-recall version
NICE = National Institute of Care and Excellence
NSSI = Non-suicidal Self-Injury
PB = Perceived burdensomeness
PCEs = Positive childhood experiences
RMSEA = Root Mean Square Error of Approximation
SDES = Short defeat and Entrapment Scale
SEM = Structural equation modelling
SI-DAS = Suicidal ideation attributes scale
SRMR = Standardised Root Mean Square Residual
STB = Suicidal thoughts and behaviours
TB = Thwarted belongingness
TLI = Tucker-Lewis Index
TPB = The theory of planned behaviour
UK = United Kingdom
WLSMV = Weighted Least Squares Mean and Variance adjusted
OSF = Open Science Framework

Abstract

Research examining the aetiology of suicide suggests that suicidal thoughts and behaviours arise out of the interaction between a range of risk and protective variables. As a result, individual risk factors are limited in predictability of suicide. Emerging developments in the field of suicide have thus focussed on theoretical models that aim to explain the development of suicidal thoughts and behaviours. The Integrated Motivational-Volitional model (IMV) of suicide is a tri-partite model outlining the development of suicidal thoughts and behaviour. This model proposes that specific background factors within the pre-motivational phase increase the vulnerability to feelings of defeat; individuals feeling defeated can feel trapped within these feelings (internal entrapment) or situation (external entrapment); and that individuals feeling trapped may view suicide as a means of escape.

Adverse childhood experiences (ACEs) have been associated with a dose-response risk of suicide. From the perspective of the IMV model, ACEs are presented as pre-motivational phase variables that increase vulnerability to defeat. However, it is unclear why experiencing increased adversity in childhood could result in increased feelings of defeat. As a result, the current thesis draws from the dimensional model of adversity and psychopathology (DMAP) to address this gap and investigate the pathways by which ACEs are likely to affect feelings of defeat. Specifically, the DMAP proposes that different dimensions of adversity (i.e., threat and deprivation) affect development through distinct pathways. Consistent with this, threatening experiences in childhood are expected to impact emotional processing while deprivation is expected to impact executive functioning and language abilities. The overarching aim of the current thesis is thus to draw from the IMV model and the DMAP to investigate the pathways by which ACEs affect suicidal thoughts. This aim was addressed through a systematic review and 3 empirical studies among adults in the UK.

Firstly, a systematic review (Chapter 3) of 98 records (100 studies) testing the IMV model was conducted to examine the empirical support for the overall model and establish the role of ACEs from the perspective of the model. The findings indicated that the defeat-entrapment-suicidal ideation pathway was supported. However, there was limited research on the role of ACEs as a pre-motivational phase variable within the IMV model. Study 2 (Chapter 4) used secondary data from 502 participants to investigate whether defeat/entrapment mediated the relationship between ACEs and suicidal ideation. While defeat, internal entrapment, and external entrapment were initially hypothesised to be distinct, confirmatory factor analyses indicated very high covariances between these variables in the short defeat and entrapment scale and they were conceptualised as a single variable in this study. The findings indicated that defeat/entrapment mediated the relationship between ACEs and suicidal ideation.

Drawing from the DMAP, study 3 (Chapter 5) collected data from 251 adults in the UK recruited from Prolific Academic to investigate whether emotional processing, executive functioning, and language abilities mediate the relationship between ACEs (conceptualised as threat/deprivation) and defeat. The findings indicated that individuals with a history of physical violence (threat) are more likely to experience higher defeat through expressive suppression while individuals with a history of cognitive neglect (deprivation) were more likely to experience higher defeat due to heightened emotional reactivity, expressive suppression, and language difficulties. Finally, study 4 (Chapter 6) investigated whether positive childhood experiences buffered the pathways between adversities involving threat and deprivation in childhood and developmental factors (emotional processing, executive functioning, and language abilities) and the pathways between these developmental factors and defeat using multigroup analyses. The findings indicated that physical violence was

significantly associated with expressive suppression in the low PCEs group but not the high PCEs group. Similarly, supervision neglect was associated with attention/concentration difficulties in the low PCEs group alone. In contrast, sexual abuse was linked with language and verbal memory difficulties in the high PCEs group but not the low PCEs group. However, none of these group differences were statistically significant suggesting that PCEs may not moderate the pathways between threat/deprivation and developmental outcomes through these developmental factors. In contrast, likelihood ratio tests indicated that the effect of language abilities and verbal memory to defeat as well as direct effects of sexual abuse and cognitive neglect on defeat were moderated by PCEs. These findings may be limited by low sample size in each PCE group and thus require further investigation.

Taken together, the investigations presented in this thesis thus outline novel pathways that may explain the link between ACEs and suicidal thoughts and protective factors that may influence these relationships. Upon replication in prospective analyses, these findings regarding developmental mediators and the role of defeat and internal entrapment have implications for clinical practice and the development of interventions. Additionally, while these findings are exploratory, these have the potential to inform policy and practice.

Chapter 1 - Prevalence, terminology, and theoretical frameworks in suicide research

1.1. Overview

This chapter presents an overview of the research on suicidal thoughts and behaviours, prevalence and terminology, and the need for theory. Through this, the current chapter aims to present a clear context for understanding the theoretical and methodological influences on the investigations presented in this thesis. More specifically, this chapter will discuss terminology related to suicidal behaviour, the need for understanding the factors contributing to suicidal thoughts and behaviour, and the importance of theoretical models in suicide research. Finally, an overview of the theoretical models of suicide and the theoretical framework for this thesis will be presented.

1.2. Prevalence and impact of suicide

The World Health Organisation (WHO; World Health Organisation, 2023) estimates that suicide results in over 703,000 deaths worldwide each year. Approximately 1.3% of all deaths globally are caused by suicide. At the same time, research has suggested that this number may be substantially lower than the actual number of deaths by suicide due to differing definitions for suicide, classification of suicide deaths to other causes of death, and underreporting of suicide due to stigma or social reasons (Snowdon & Choi, 2020). The extent to which deaths by suicide are underreported varies across countries and regions. For instance, Rockett & Thomas (1999) report that the actual rates of suicide could range from 20% higher than the estimated rates to approximately 17 times higher than the estimated rates across countries. Additionally, differences in the legality of suicide across countries and

resulting implications to insurance decisions may motivate individuals to conceal the true cause of death (Mishara & Weisstub, 2016). This may be exacerbated in countries like India where suicide was illegal until recently, and China where only suicide deaths from approximately a third of the regions are included in the overall rates (Lew et al., 2022; Phillips & Cheng, 2012; Snowdon, 2019; Zhong et al., 2016). This is particularly alarming considering that over 40% of the deaths by suicide worldwide occur in these countries (Snowdon, 2019; World Health Organisation, 2014).

Despite the underreporting of suicide, the WHO (2022) found that suicide was the 17th leading cause of death in the world and the fourth leading cause of death between the ages of 15-29 years. For each person that dies from suicide, considerably more people report suicidal thoughts and behaviours (Nock et al., 2008a). However, recording the number of suicide attempts is even more challenging compared to suicide rates (Silverman & Leo, 2016). One cross-national research study in 17 countries estimated that approximately 2.7% of the population may attempt suicide in their lifetime (Nock et al., 2008a). Additionally, the estimated prevalence of lifetime suicidal thoughts (9.2%) was about three times higher than that of attempts. This study further pointed out that these reports may potentially be biased due to individuals of different cultural backgrounds being unwilling to report suicidal behaviours.

The total number of suicides in the United Kingdom (UK) in the year 2021 was 6,538 (Northern Ireland Statistics and Research Agency, 2022; Office of National Statistics, 2022; Public Health Scotland, 2022). While the UK generally has lower suicide rates than some other countries, these are still concerning (WHO, 2019). Firstly, these reports indicated that the overall age-standardised suicide rate for each country within the UK was higher than the global average of 9.0 per 100,000 population (WHO, 2022). For instance, Northern Ireland had the highest suicide rate of 14.3 followed by Scotland (13.9), and England and Wales

(10.7). The prevalence of self-harm and suicidal ideation within the UK was also high. For instance, results from the Adult Psychiatric Morbidity survey conducted among 7,546 participants in England indicated that the lifetime prevalence of self-harm and suicide attempts was 7.3% and 6.7% respectively (McManus, 2016). The findings of this survey also indicated that 1 in 5 participants (20.6%) reported suicidal ideation during their lifetime. This is comparable to estimates for suicidal thoughts observed in the Scottish Wellbeing study among young adults in Scotland (R. C. O'Connor et al., 2018). However, the latter study reported a higher prevalence of self-harm (16.2%) and suicide attempts (11.3%) overall.

With the goal of reducing suicide and self-harm, governments within the UK have prioritised suicide prevention strategies (Department of Health, 2019; The Scottish Government, 2022; UK Government, 2023). These prevention strategies have highlighted the importance of a range of risk and protective factors for suicide including broader societal factors such as poverty and individual-level risk factors such as childhood maltreatment or access to means. These strategies further highlight the importance of research focussed on understanding the interaction between risk and protective factors of suicide in informing evidence-based policy in the UK.

However, there are considerable challenges involved in conducting research on suicide mortality as an outcome. Primarily, while the effects of suicide can be devastating, the overall base rate of suicide is low with the most recent numbers reported to be 9.2 per 100,000 (WHO, 2021). This results in low-powered studies with methodological and ethical challenges in obtaining data prospectively from individuals that have died by suicide (Chu et al., 2017; Jobes & Joiner, 2019; R. C. O'Connor & Portzkey). Research has thus largely focused on self-harm and suicidal behaviour as a proxy for understanding suicide (Jobes & Joiner, 2019; R. C. O'Connor & Nock, 2014). This is because prior suicidal behaviour is one of the strongest predictors of dying by suicide and just over 40% of people that die by suicide

have previously attempted suicide (Bostwick et al., 2016; Franklin et al., 2017; Ribeiro et al., 2016). However, the terminology used to describe self-harming or suicidal behaviour consists of a range of overlapping terms with little consensus in the literature. Further complicating this, definitions of suicidal behaviour are often dependent on the definition of suicide, which is also not consistently defined (Silverman, 2016).

1.3. Terminology

1.3.1. Suicide

The WHO defines suicide as "the act of deliberately killing oneself". However, the term "deliberate" involves a level of ambiguity and may either imply that the individual intended to die as a result or that assumptions regarding intent were limited to the act itself (i.e., intended to engage in the specific behaviour). This distinction may further complicate things in cases where evidence of intent to die may not be available. For example, since only a minority of suicide decedents leave notes, it is challenging to determine whether the death was caused by an accident especially when less active methods are used (Callanan & Davis, 2009; Cerel et al., 2015; Stack & Rockett, 2018). Similarly, other researchers have described suicide as a "self-inflicted act resulting in death" (Kapur & Gask, 2009; Maris, 2002) or "the act of an individual intentionally ending their own life" (R. C. O'Connor & Nock, 2014) which are also ambiguous regarding assessing intent. The UK classifies suicides occurring after 2001 based on the international classification of diseases-10 (ICD-10) by the WHO under the codes for intentional self-harm (XE97V-XE2SF) (Office of National Statistics, 2019; WHO, 1993). It is important to note that the UK also includes deaths with undetermined intent as suicides. These codes include further classifications based on the presence of evidence of intent to die.

1.3.2. Self-harm and Suicidal Behaviour

As outlined in section 1.2, a range of terms including suicidality, parasuicide, deliberate self-harm, suicide attempt and non-suicidal self-injury have been used to describe overlapping behaviours. However, the definitions of these words have also not been used consistently across the literature. As Silverman (2016) notes, the term parasuicide, while originally characterised by self-injury with or without the presence of intent to die (Platt et al., 1992), has largely been used to refer to self-harm without the intent to die. More recent literature thus used the term deliberate self-harm to describe self-harm with or without the intent to die. However, similar to the WHO's definition of suicide mentioned in section 1.3.1, it is unclear if the term "deliberate" indicates the presence of intent to die. Consequently, the term "self-harm" has been more popular in Europe while "non-suicidal self-injury (NSSI)" is more widely used in the United States of America. Additionally, terms such as suicidality have been used to represent a range of suicide-related thoughts and behaviours, making it difficult to compare findings related to prevalence rates and research investigating epidemiology and risk factors.

Much of the discourse surrounding these terms has been centred around the evidence of intent. The inclusion of the term "non-suicidal self-injury" (NSSI) as a diagnostic category in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) sparked the debate on whether self-harm can be classified as non-suicidal (American Psychiatric Association, 2013). In relation to this, Kapur et al. (2013) argued that the term "non-suicidal" frames this form of self-harm as distinct from "suicidal" self-harm which may misrepresent the overlap between the two. This is especially pertinent given the overlap between self-harm and suicide attempts, and the fact that self-harm conceptualised as NSSI was found to be the strongest predictor for a suicide attempt (Duarte et al., 2020; Franklin et al., 2017). Secondly, the definition of NSSI requires that the behaviour is direct and results in the damage of bodily

tissue, necessarily excluding self-poisoning, despite evidence indicating that a proportion of people that self-harm using this method may report no intent to die (Hooley et al., 2020; R. C. O'Connor et al., 2006). Overall, the key concern highlighted throughout this discourse is the argument that intent is not binary i.e., individuals presenting with self-harm cannot be neatly classified into one of the categories based on the presence of intent to die (Kapur et al., 2013).

Proponents of distinguishing between "non-suicidal" and "suicidal" self-harm may argue that the purpose of the behaviour may differentiate between the two where self-harm without intent may serve as a strategy for emotional regulation rather than wanting to die (Chapman et al., 2006). For instance, one study among incarcerated women investigated their emotional experiences before and after self-harm with or without suicidal intent (Chapman & Dixon-Gordon, 2007). While "anger" was a common emotion preceding both self-harm and suicide attempts, individuals that did not report an intent to die were more likely to experience relief and other positive emotions as a result of self-harming behaviour. However, other research indicates that motivations may shift over time and individuals may report multiple motivations associated with self-harming behaviour (Kapur et al., 2013; Rasmussen et al., 2016; Scoliers et al., 2009). Additionally, motivations and risk factors may differ between episodes of self-harm. For instance, novel methods such as card sort tasks aimed at analysing sequences of thoughts, behaviours, and actions preceding self-harm have indicated differences in initial episodes of self-harm compared to more recent episodes (Lockwood et al., 2023; Townsend et al., 2016). Earlier episodes of self-harm were associated with feeling better after, while recent episodes were more linked to self-hate. In light of the fluctuating nature of intent and overlap between self-harming behaviour with and without intent to die, this thesis will use the definition provided by the National Institute of Care and Excellence (NICE, 2022) in the UK. According to NICE, self-harm is defined as "intentional self-poisoning or injury, irrespective of the apparent purpose". This thesis will use this definition

to refer to self-harm. Additionally, suicidal behaviour will refer to self-harm behaviour with evidence of some intent to die as a result (R. C. O'Connor et al., 2016).

1.3.3. Suicidal Ideation

Similar to other suicide-related terminology, the conceptualisation of suicidal thoughts or ideation has also been a subject of considerable debate (Reeves et al., 2022). Conceptualisations of suicidal ideation may include suicide-related thoughts of varying specificity (e.g. from general opinions about life to thoughts about ending one's life) and have different thresholds for active (thoughts about killing oneself) versus passive ideation (wishing one was dead; Silverman & Berman, 2014). At the forefront of this has been the role of intent in suicidal ideation (McAuliffe, 2002). While it is recognised as an important aspect of suicide risk assessment, there are several methodological barriers to including intent as a measure of suicidal ideation. More specifically, measuring suicidal intent results in the same issues as discussed earlier including that retrospective measures of suicidal intent are often less reliable over time, and there are often multiple motivations driving self-harming behaviours (House et al., 2020; Kapur et al., 2013). As a result, researchers have cautioned against operationalising intent as a static or dichotomous construct, especially considering the unreliability in the reporting of intent over time (House et al., 2020).

The distinction between active ideation and passive ideation is also one area that warrants attention (May et al., 2015; Wastler et al., 2023). While research has predominantly focussed on active suicidal ideation throughout most research, preliminary cross-sectional evidence has suggested that passive suicidal ideation may also be a clinically salient risk factor for suicide (Baca-Garcia et al., 2011; Barry et al., 2016; R. T. Liu et al., 2020; May et al., 2015; NICE, 2022; Szanto et al., 1996; Wastler et al., 2022). These studies primarily suggest that passive suicidal ideation may be as important as suicidal ideation in predicting risk for suicidal or self-harming behaviours. Some researchers have suggested that passive

suicidal thoughts of sufficient severity may lead to active suicidal thoughts (May et al., 2015). This view places suicidal thoughts and behaviours along a "continuum" such that passive suicidal thoughts (e.g. I wish I were dead) lead to active suicidal thoughts (e.g., I want to take my own life) to suicidal plans (e.g. I have a plan to take my life; O'Carroll et al., 1996). Alternatively, other research has proposed that passive suicidal thoughts may present a distinct pathway towards suicidal behaviour (Wastler et al., 2022). This is supported by a study conducting a factor analysis to investigate the dimensionality of active and passive suicidal thoughts also found that active and passive ideation are distinct but related constructs (Wastler et al., 2023). However, critics have argued that while passive suicidal ideation may be significantly associated with suicidal behaviour, suicidal ideation is specific to thoughts about suicide and passive thoughts may better represent other forms of negative thinking (House et al., 2020). Further prospective research is thus necessary to investigate whether passive thoughts about wishing to die are best conceptualised as an aspect of suicidal ideation.

With acknowledgement of the lack of consensus and key resulting issues related to the definition of suicidal ideation, the current thesis will refer to suicidal ideation as "Thinking of suicide with or without suicidal intent; hoping for death by killing oneself; and, stating the presence of suicidal intention without engaging in behaviour" provided by De Leo et al. (2021). This definition was developed based on the findings of an international consensus study surveying the members of the International Association for Suicide Prevention (IASP). Additionally, this thesis will also use suicidal thoughts and ideation interchangeably.

1.4. Risk and protective factors for suicidal ideation and behaviour

1.4.1. Sociodemographic factors

Finally, several social and demographic factors have been associated with suicidal ideation. A meta-analysis on demographic factors as predictors of suicidal ideation and behaviours indicated that sex, family types, employment status, and being single were associated with the presence of suicide-related outcomes (Huang et al., 2017). Suicidal ideation is also more prevalent among gay, lesbian and bisexual individuals with some reports indicating that suicidal ideation risk may be twice as high when compared to heterosexual individuals (King et al., 2008; Rasmussen et al., 2021; Zhao et al., 2010). Additionally, research has demonstrated that transgender individuals, especially those transitioning from female to different genders were more likely to report suicidal ideation (Perez-Brumer et al., 2017). Socioeconomic factors including unemployment or precarious employment (Dalglish et al., 2015; K. M. Han et al., 2017; Min et al., 2015), level of education, income, benefits, housing characteristics, debt (Aschan et al., 2013), homelessness (Ayano et al., 2019), and area-level deprivation (Pak & Choung, 2020; Xi et al., 2023) were also associated with an increased risk of STBs. Finally, social factors such as the presence of social and emotional support (Bryan et al., 2017; Kleiman, 2020; Park et al., 2010), social group identification (Power et al., 2023), and discrimination (Assari et al., 2017; Goodwill et al., 2021) may also be associated with increased STBs.

1.4.2 Biological factors

A number of biological factors including genetics, brain structure and function, and neurotransmitters have been associated with suicidal thoughts and behaviours (STB; Bokor et al., 2020; DiBlasi et al., 2021; Schmaal et al., 2020). In terms of genetic predispositions, the

heritability (i.e. the variation in the population) of suicidal thoughts and behaviour based on twin, adoption, and family studies has been estimated to range between 30% and 55% (Voracek & Loibl, 2007). Genome-wide association studies, which compare variances in extensive genetic data to identify genes associated with observable traits, have also attempted to identify genetic markers for suicidal thoughts and behaviours (DiBlasi et al., 2021; Uffelmann et al., 2021). Results from these studies have found preliminary evidence for specific genetic factors that might be associated with STBs (DiBlasi et al., 2021; Strawbridge et al., 2019). However, studies overall agree that STBs are likely polygenetic, meaning that suicide risk may arise from the interaction of a range of different genes as opposed to a single gene (DiBlasi et al., 2021).

A meta-analysis investigating 131 neuroimaging studies investigating brain structure and function associated with STBs over nearly 20 years also found key differences in suicidal individuals compared to controls (Schmaal et al., 2020). The findings suggested that differences in structure and connectivity of regions in the brain associated with emotion and reward processing (including the anterior cingulate cortex, insula & regions of the orbitofrontal and prefrontal cortex) may be associated with increased STBs. The serotogenic system, which is related to the neurotransmitter serotonin has also been implicated in the emergence of STBs. For instance, greater binding potential of serotonin in the raphe nuclei was predictive of increased suicidal ideation (Oquendo et al., 2016; Sullivan et al., 2015). Additionally, variants among genes associated with the production of serotonin have been associated with current suicidal ideation and reduction in suicidal ideation with treatment (Bokor et al., 2020; Nielsen et al., 2020).

1.4.3 Psychological factors

A wide range of psychological risk and protective factors have also been associated with STBs. Hypothesised risk factors for suicidal ideation include loneliness (McClelland et

al., 2020), hopelessness (Ribeiro et al., 2018), sleep disturbances including insomnia and nightmares (Harris et al., 2020; R. T. Liu et al., 2020; Pigeon et al., 2012), perfectionism (Smith et al., 2018), rumination (Rogers & Joiner, 2017), psychological distress (Rasmussen et al., 2021), memory biases (Jiang et al., 2020), psychological pain (Ducasse et al., 2018), feelings of thwarted belongingness and burdensomeness (Chu et al., 2017), defeat and entrapment (Höller et al., 2021; Rasmussen et al., 2023; Rasmussen et al., 2010), insecure attachment (Zortea et al., 2020b), personality factors (McCallum et al., 2022; Wang et al., 2023), emotional regulation (Colmenero-Navarrete et al., 2022), and coping (B. Stanley et al., 2021). Additionally, variables such as mental wellbeing (Russell et al., 2020), purpose and satisfaction with life (Heisel & Flett, 2004), positive mental health (Teismann et al., 2018), self-esteem (Jang et al., 2014), resilience (Harris et al., 2020; Hirschtritt et al., 2015; Siegmann et al., 2018), reasons for living (Bakhiyi et al., 2016), and positive psychological functioning (E. C. Chang et al., 2004) have been hypothesised to be protective in the development of suicidal ideation and behaviours. Life experiences including adverse childhood experiences (Angelakis et al., 2020; Angelakis et al., 2019; Sahle et al., 2022), bullying (Holt et al., 2015), stressful life events (Howarth et al., 2020; R. T. Liu & Miller, 2014), and positive childhood experiences (Bunting et al., 2023; Hou et al., 2022) may also be linked to STBs. A history of self-harm thoughts and behaviours has also been associated with later suicidal outcomes (Ribeiro et al., 2016).

1.4.4 Mental health disorders

Several psychological disorders have also been linked with increased STBs. An extensive meta-analysis of five decades of research found that a diagnosis of depression and anxiety were the strongest predictors of suicidal ideation, but overall showed a weak ability to predict ideation (Franklin et al., 2017). Another meta-analysis also reported that depressive symptoms were predictive of suicidal ideation, behaviour, and death, although they were

weaker predictors after accounting for publication bias (Ribeiro et al., 2018). Similarly, a meta-analysis of 65 studies investigating the relationship between anxiety disorders and STBs further predicted that anxiety disorders were significant but weak predictors of suicidal ideation and behaviour (Bentley et al., 2016). Another meta-analysis has also indicated that anxiety disorders including panic disorder, generalised anxiety disorder, and post-traumatic stress disorder, but not obsessive-compulsive disorder were linked to heightened suicidal behaviours (Kanwar et al., 2013). Other psychological disorders including sleep disorders (Chellappa & Araújo, 2007), eating disorders (Ortiz & Smith, 2020), psychosis (Huang et al., 2018), and substance-use disorders (Poorolajal et al., 2016) have also been associated with STBs. Additionally, being diagnosed with more than one mental health condition has also been associated with increased suicidal ideation (Xiong et al., 2020).

1.5. Theoretical Advancements in suicide research

Section 1.4 outlined a non-exhaustive set of variables that have been associated with suicidal ideation and behaviour. Despite the identification of individual risk and protective factors for suicidal ideation and behaviour being immensely valuable in understanding underlying processes leading to suicide, the ability to predict suicidal thoughts or behaviours is currently not better than chance (Franklin et al., 2017). One reason for this is that the predictors for suicidal thoughts may be different to the predictors for suicidal behaviours (Klonsky et al., 2017). Recent research has demonstrated that some variables may be useful in predicting suicidal thoughts but may not predict which individuals with suicidal thoughts will act upon those thoughts (del Carpio et al., 2020; Wetherall et al., 2018a). Based on this, it has been argued that research designs investigating suicidal thoughts and behaviours should account for this distinction (Klonsky et al., 2017).

Another explanation for the limited predictive ability for suicide-related outcomes is that individual risk and protective factors are largely ineffective in predicting suicide-related outcomes (Franklin et al., 2017). This is because suicidal thoughts and behaviours are complex phenomena resulting from the interaction between a wide range of neurological, biological, and psychosocial factors (R. C. O'Connor & Nock, 2014). For instance, one study reported that increased feelings of entrapment were associated with reporting suicidal ideation (Moscardini et al., 2021). However, the findings indicated that the presence of protective factors such as a higher presence of life meaning (feeling engaged with one's beliefs and values) or reasons for living (beliefs about the future that motivate one to continue living) weakened the association between entrapment and suicidal ideation. Similar effects were found for resilience and social support as protective factors for suicide (Min et al., 2015; Siegmann et al., 2018). This indicates that accounting for multiple predictors and the interaction between these could provide a more comprehensive understanding of the development of suicide-related outcomes. As discussed in the previous section, this is also observed in studies investigating genetic risk factors for suicide which demonstrate that various genetic factors likely interact to result in suicidal thoughts.

The aforementioned limitations in examining individual risk factors for suicide have shifted the focus of suicide research to theoretical models (Barzilay & Apter, 2014; Keefner & Stenvig, 2020). Theoretical models go beyond identifying individual risk or protective factors and aim to explain the emergence of suicidal thoughts and behaviour as a result of the interactions between these factors. As noted by Barzilay & Apter (2014) it is important for theoretical models to investigate both distal factors that predispose individuals towards suicide-related outcomes; proximal factors that directly influence risk towards suicide-related outcomes; and the interaction between these. Additionally, theoretical models also present a framework to investigate why the interactions between specific predictors may increase

suicide risk and identify combinations of such predictors that may work together to increase suicide risk (R. C. O'Connor & Kirtley, 2018). Identifying such trajectories of risk could present useful insights into the development of suicidal thoughts and why a minority of individuals that think about suicide will act upon it. Understanding these pathways would also inform the development of effective interventions to reduce suicidal thoughts and behaviours.

A range of theories have been proposed to explain suicidal behaviour. Earlier works such as Baumeister's escape theory of suicide (Baumeister, 1990) presented suicidal thoughts and behaviours as resulting from a desire to escape unbearable pain. The cry of pain model (Williams, 1997, 2001) also described suicide as a result of feelings of defeat or humiliation characterised by a "failed struggle" that may result in feeling trapped and viewing suicide as a form of escape. The concepts of defeat and entrapment were drawn from a prior theory developed to explain depression (Gilbert & Allan, 1998; Price, 1972). More specifically, Gilbert & Allan (1998) observed that humans experiencing depression exhibited similar submissive behaviours to some animals that were defeated in conflict, suggesting that depression may arise out of a "failed struggle". Here, submissive behaviour as a response to defeat was described as a method of de-escalation in the face of conflict to avoid risking further harm by engaging in an unwinnable fight. Gilbert & Allan (1998) further posit that being unable to escape (arrested flight) upon being defeated may be more harmful. This is akin to an animal being trapped in an environment where one is experiencing the threat of harm, and has the motivation to escape, but has no means of escaping. Thus, it is argued that these responses to blocked escape, as seen in other animals, can also be observed in humans experiencing depression. This model further argues that suicidal behaviour can be considered as a "cry of pain" in response to an unescapable painful situation rather than an attempt at communicating as a "cry for help". Similarly, Schneidman's theory of suicide presented

psychological pain as necessary to the emergence of suicide, stating that the presence of unbearable pain accompanied by a perception of cessation of consciousness as the only escape from that pain resulted in suicide (Shneidman, 1993).

Other theories of psychopathology or behaviour in general have also been used to explain suicidal behaviour. For instance, the stress-diathesis model has been used to explain suicidal behaviour as arising out of an interaction between "stress" and "diathesis" (Schotte & Clum, 1987). Here, the stress component is characterised by stressful life events acting as precipitating events resulting in suicidal thoughts and behaviour. Diathesis, on the other hand, is described as vulnerability to suicidal behaviour, which relates to a wide range of predisposing factors including genetic or biological factors, childhood experiences, and social and environmental factors. Similarly, the differential activation hypothesis, which was originally proposed to describe how depressed mood can influence information processing over time may also explain the link between depressive moods and suicide-related outcomes (Teasdale, 1988; Teasdale & Dent, 1987). Specifically, it is theorised that early episodes of depressive moods may develop patterns of thinking involving suicidal thoughts and subsequent episodes may continue to strengthen the association between such affective states and suicidal thinking (Lau et al., 2004). This is hypothesised to result in easier progression to suicidal thoughts. This is also applicable to the transition from suicidal thoughts to behaviour, where acting upon suicidal thoughts occurs more rapidly with every subsequent suicidal behaviour. Finally, the theory of planned behaviour (TPB), which presents the behaviour as a result of intention and perceived behavioural control over the action has also been used to explain suicidal behaviour (Ajzen, 1991; Lewis et al., 2011; R. C. O'Connor & Armitage, 2003; R. C. O'Connor et al., 2006).

A key advancement of research on theoretical models of suicide has been the recognition that the processes resulting in suicidal ideation and intent are distinct from the processes leading to suicidal behaviour (Klonsky et al., 2021). While prior theories focussed on suicidal thoughts and behaviour as arising out of the same processes, contemporary models of suicide present predictors of suicidal ideation as distinct from those predicting suicidal behaviour. For instance, impulsivity may indicate an increased risk for suicidal behaviour while feelings of entrapment may predict suicidal ideation (Gvion et al., 2015; Rasmussen et al., 2023). Based on this, outlining whether specific variables are risk factors for suicidal ideation, behaviour, or both has been presented as a critical direction in suicide research (Klonsky et al., 2021). This distinction has also been observed in intervention studies, where interventions targeted at reducing suicidal behaviour have shown limited effectiveness in reducing suicidal ideation (Bryan et al., 2017; Gysin-Maillart et al., 2016; Chani Nuij et al., 2021). These contemporary theories focussing on the distinction between suicidal ideation and behaviour and the transition from ideation to behaviour are termed "ideation-to-action" models. The key ideation-to-action models include the Interpersonal theory of suicide (IPT; Joiner, 2005; Van Orden et al., 2010), the three-step theory (3ST; Klonsky & May, 2015), the fluid vulnerability theory (Rudd, 2006), and the integrated motivational-volitional (IMV) model of suicide (R. C. O'Connor, 2011a; 2011b; R. C. O'Connor & Kirtley, 2018).

The IPT was the first theory of suicide that presented the ideation-to-action framework and is one of the most widely used theories of suicide (Forkmann et al., 2020). This model proposes that suicidal behaviour depends on the presence of two components; suicidal desire and acquired capability. According to the IPT, suicidal desire is represented as an interaction between thwarted belongingness (TB; representing loneliness and lack of reciprocal care) and perceived burdensomeness (PB; perceiving oneself as a burden).

Capability for suicide, which is seen as the ability to engage in suicidal behaviour that requires an individual to overcome the core instinct to survive, is conceptualised as increased fearlessness about death and pain tolerance. While the predictions of this theory appear to be empirically supported overall, systematic reviews investigating the literature testing this model have raised concerns (Chu et al., 2017; Ma et al., 2016). Firstly, some research has suggested that PB appears to be a strong predictor for suicidal behaviour while the role of TB may not be as strong in explaining suicidal desire. Secondly, concerns regarding the operationalisation of PB and TB were considered, specifically in terms of heterogeneity in operationalisation across the literature and whether the measures commonly used are valid in capturing the underlying constructs. Finally, given that suicidal thoughts and behaviours are likely a result of interactions between a wide range of potentially hundreds of variables, researchers have discussed the possibility that the IPT may not account for key variables that may contribute to suicidal thoughts and behaviours (Franklin et al., 2017; Ma et al., 2016).

The 3ST describes three steps leading to suicidal behaviour. The first step outlines the development of suicidal desire. According to this theory, suicidal desire develops through the interaction between pain and hopelessness. As humans are inclined towards pain avoidance, it is theorised that physical or emotional pain drives a desire to escape that pain. However, experiencing pain alone is not sufficient, but pain in the presence of hopelessness is hypothesised to result in suicidal desire. In other words, experiencing pain alongside a lack of hope about the situation improving in the future is hypothesised to result in suicidal desire. The second step outlines the intensification of suicidal behaviour. The 3ST hypothesises that when pain is greater than connectedness (i.e. feeling a connection to something), it results in intensified suicidal desire. This could be due to having a low sense of connectedness to begin with, through increasing pain overcoming connection, or through pain reducing the ability to experience connection. Finally, the third step outlines the progression from suicidal desire to

behaviour. Similar to the IPT, the 3ST outlines the necessity of capability for suicide in the transition from desire to capability. However, the 3ST builds upon the concept of capability by introducing other aspects of capability such as dispositional capability, and practical capability. Dispositional capability refers to inherent aspects of capability that relate to genetics, personality or temperament. Practical capability, on the other hand, relates to practical aspects of ability to engage in suicidal behaviour such as access to means. Initial tests of this theory have shown support for the hypotheses of this model (Dhingra et al., 2019; Klonsky & May, 2015; L. Yang et al., 2019) with some evidence indicating that the full model may explain a higher variance in suicidal desire than the components of the IPT (Tsai et al., 2021). However, more prospective studies are needed to test the hypotheses of this model (Keefner & Stenvig, 2020).

The fluid vulnerability theory is another ideation-to-action theory that describes processes leading to suicidal behaviour as arising out of an acute "suicidal mode" or episode that may be triggered through various precipitators (e.g. job loss, relationship breakdown). Specifically, this theory proposes that individuals have a more stable baseline risk for suicide that sets the threshold to activate the suicidal mode. The suicidal mode thus relates to a period of high risk for suicide, the resolution of which brings the individual back to the baseline level of risk. Individuals with high baseline risk are therefore more likely to experience a suicidal episode in the presence of stressors. This vulnerability is a function of risk and protective factors across four domains: cognitive (i.e. core beliefs about suicide and oneself), affective (i.e. experiences of emotions and affect), physiological (i.e. physiological aspects of the suicidal mode such as activation of the stress-response system), and behavioural (i.e. behavioural skills related to emotional regulation or interpersonal skills). Additionally, interactions between these domains impact the vulnerability to subsequent activations of the suicidal mode. Within the context of this model, individuals with a history of multiple suicide

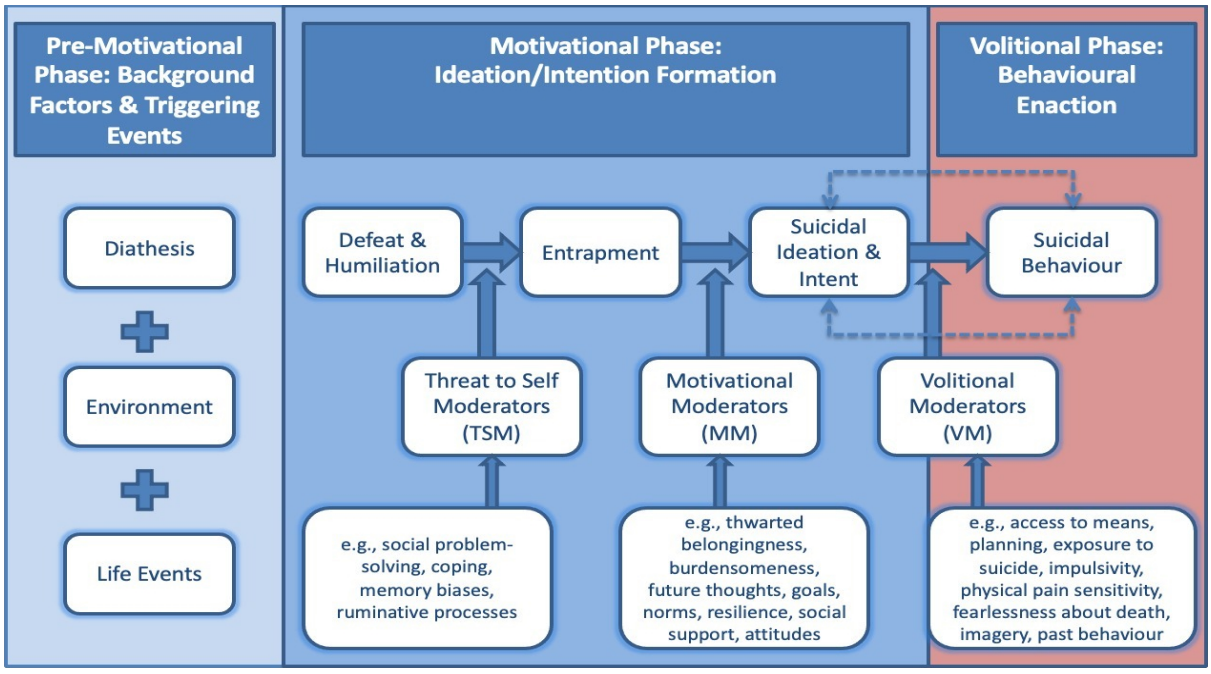
attempts are hypothesised to have higher baseline risk as well as increased severity of affective and physiological symptoms, poorer behavioural skills, and belief systems more susceptible to suicide. Effectively targeting these domains thus resolves acute risk for suicide. There is limited empirical research investigating the interactions between these domains of risk in predicting suicidal episodes (Barzilay & Apter, 2014; Hausmann-Stabile et al., 2021).

1.6. The IMV model of suicidal behaviour

The IMV model draws upon and integrates previously established models to present a comprehensive framework to explain the development of suicidal thoughts and behaviour (See Figure 1.1). These include the stress-diathesis model, the cry-of-pain model, the theory of planned behaviour, the interpersonal theory of suicide, and the differential activation hypothesis. By drawing from established theory and literature, the IMV model describes the processes leading to suicidal thoughts and behaviours in three phases; the pre-motivational phase, the motivational phase, and the volitional phase.

Figure 1.1

The integrated motivational-volitional (IMV) model (From O'Connor & Kirtley, 2018)



The Pre-motivational phase: Based on the Stress-diathesis model, the pre-motivational phase forms the context for the processes resulting in suicide to occur. Specifically, the pre-motivational phase outlines the diathesis or vulnerability factors that predispose individuals to suicide risk in the presence of stressors. These predisposing factors include genetic and biological factors (including differences in the serotonergic system; Mann et al., 2006), cognitive and individual factors (including personality variables and perfectionism; Rasmussen et al., 2021; Smith et al., 2018), environmental factors (including socioeconomic status; Platt, 2016), and previous life events (including adverse childhood experiences; Angelakis et al., 2019). The IMV model hypothesizes that variables in the pre-motivational phase increase vulnerability to suicide indirectly by increasing sensitivity to motivational phase variables.

The Motivational phase: The motivational phase describes the processes that result in suicidal ideation and intent. This phase primarily draws from the cry of pain theory and presents defeat and entrapment as proximal predictors of suicidal ideation, where defeat is hypothesised to indirectly result in suicidal ideation through feelings of entrapment. According to the IMV model, entrapment can be internal (feeling trapped by one's thoughts and feelings) or external (feeling trapped by external circumstances). Feelings of defeat are hypothesised to result in feelings of entrapment depending on the influence of specific variables called "threat-to-self moderators". Similarly, individuals experiencing entrapment are more likely to think about suicide as a form of escape in the presence of specific variables called "motivational moderators".

Threat to self-moderators: Threat-to-self moderators include social problem-solving, coping, memory biases, and ruminative processes. Social problem-solving is related to the development of solutions to problems (Chu et al., 2018). Coping relates to an individual's ability to manage stressful situations (Gooding et al., 2015). Autobiographical memory biases

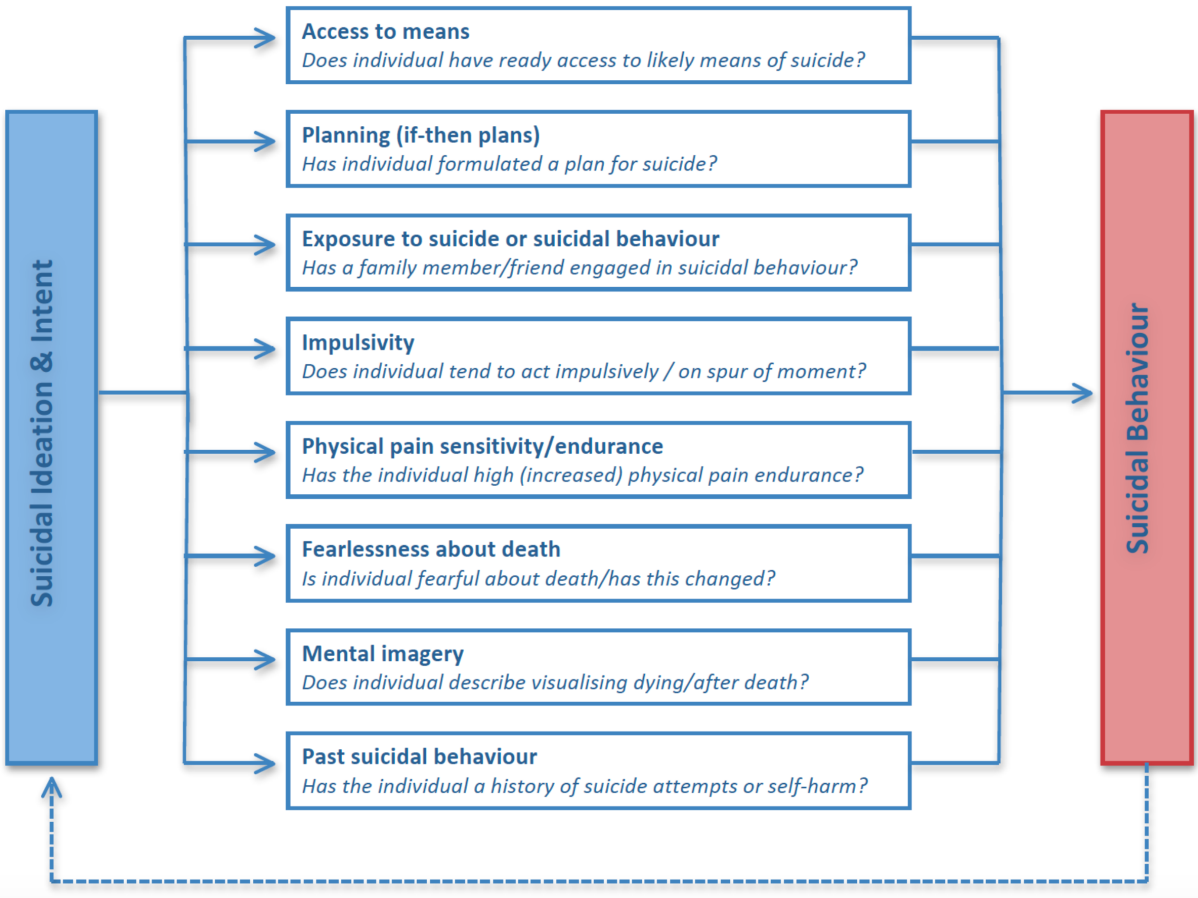
are associated with the inability to recall specific details of memories. Finally, ruminative processes refer to repetitive thinking about negative events without a solution-focussed approach (Morrison & O'Connor, 2008).

Motivational Moderators: Motivational moderators include thwarted belongingness (TB), perceived burdensomeness (PB), future thoughts, goals, attitudes, norms, resilience, and social support. TB and PB are drawn from the IPT and are related to a rejected need to belong and feelings of being a burden to others (Van Orden et al., 2010). Future thinking is characterised by the number and content of positive thoughts about the future (R. C. O'Connor et al., 2015). Ability to focus away from unrealistic goals (goal disengagement) and towards achievable goals (goal re-engagement) are also motivational moderators. Further, based on the TPB attitudes refer to the evaluation of a behaviour while norms refer to the subjective beliefs and motivations surrounding a behaviour. Resilience is an individual's ability to adapt and revert back in the presence of adversity (J. Johnson et al., 2010). Finally, social support relates to access to support from interpersonal relationships.

Volitional phase: Drawing upon the TPB, the volitional phase describes the presence of ideation and intent as the strongest proximal predictor of suicidal behaviour and outlines the variables that predict the transition from suicidal ideation to behaviour. Based on the differential activation hypothesis, the IMV model posits that the association between ideation and enactment strengthens with repeated activation so that suicidal thoughts translate to behaviour more rapidly over time. The IMV model thus highlights the positive feedback processes associated with ideation and enactment. Finally, the IMV model draws from and extends upon the construct of "acquired capability" from the IPT to outline the factors necessary for this transition. Crucially, the IMV model presents a wider range of variables influencing this transition which are termed "volitional moderators" (See Figure 1.2).

Figure 1.2

Volitional Moderators in the IMV model (From R. C. O'Connor & Kirtley, 2018)



Volitional Moderators: The volitional moderators include access to means, exposure to suicide, impulsivity, physical pain sensitivity, fearlessness about death, planning, mental imagery, and past behaviour (R. C. O'Connor & Kirtley, 2018). Access to means is the availability of methods to engage in suicidal behaviour (Hawton et al., 2012). An individual is exposed to suicide if individuals in their interpersonal relationships or surroundings show a history of suicidal behaviour and mental imagery is related to vivid images of one's death. Planning is associated with the extent to which an individual has prepared plans for suicide. Impulsivity is associated with control or inhibit behaviours (Gvion & Apter, 2011). Similar to the IPT, pain sensitivity relates to the ability to withstand pain while fearlessness about death

is associated with a lowered fear of dying by suicide (Van Orden et al., 2010). Past behaviour relates to previous engagement in suicidal behaviour.

1.7. Rationale for utilising the IMV model as the theoretical framework for this thesis

This model was utilised as the primary theoretical framework for this thesis for three reasons. Firstly, while prior theories of suicide have presented promising advancements in our understanding of suicidal behaviour, most of these have adopted a relatively narrow focus on predictors (R. C. O'Connor et al., 2016). As discussed in section 1.5, suicidal thoughts and behaviours arise from an interaction between a large number of variables. However, a majority of theoretical models on suicide have presented a relatively limited description of interactions between predictors to result in suicide risk. By drawing from the overall literature and previously established models of suicide, the IMV model explains the interaction between a wide range of genetic, biological, psychological and social factors resulting in the development of suicidal thoughts and behaviours (R. C. O'Connor & Kirtley, 2018). This presents a set of testable hypotheses that allows the investigation of a range of risk factors at different stages of the suicidal process. The comprehensive nature of this theory also allows for the identification of synergistic interactions between specific risk factors that might explain heightened risk.

Secondly, while other theories of suicide primarily focus on proximal risk factors for suicide, the IMV model describes the emergence of suicidal ideation and behaviour as developing over different stages. Through this, the IMV model describes how environmental or distal factors may increase vulnerability to suicide as well as the conditions within which this vulnerability can be translated into suicidal outcomes. This allows for the examination of interactions between risk and protective factors for suicide at different stages in the development of suicidal behaviour. This is particularly useful for research focussing on distal

risk factors such as the role of childhood experiences, which primarily act as predisposing factors.

Finally, the focus on differentiating between specific suicide-related outcomes is limited in many earlier theories of suicide. However, the IMV model adopts the ideation-to-action framework and presents a clear distinction between processes leading to suicidal ideation and behaviour. Additionally, ideation-to-action theories have been found to outperform other theories of suicide in predicting both suicidal ideation and attempts (Schafer et al., 2021). As noted in section 1.5, the distinction between suicidal ideation and behaviour is crucial in informing and implementing effective interventions. As a result, research needs to account for the differences in processes resulting in suicidal thoughts and behaviours.

Taken together, the IMV model presents a comprehensive framework to investigate the interactions between both proximal and distal variables in the development of suicidal ideation and behaviour. This makes the IMV model especially useful in understanding the pathways by which risk factors such as childhood experiences may be associated with suicidal ideation and behaviour. Considering that a substantial population of individuals across countries have experienced at least one form of adversity in childhood and the strong association between adversity in childhood and suicidal outcomes, understanding the underlying pathways by which ACEs affect suicide risk could present key modifiable targets for intervention (Angelakis et al., 2019; Bellis et al., 2014). However, despite a clear description of the processes involved in the development of suicidal ideation, it is not clear how factors in the pre-motivational phase of the IMV model increase vulnerability for motivational phase variables (e.g., defeat).

Within the context of the IMV model, ACEs have been hypothesised to act as pre-motivational phase variables, increasing the vulnerability to more proximal factors such as defeat and entrapment (R. C. O'Connor & Kirtley, 2018). This is likely because ACEs

occurring at sensitive ages are likely to have physiological and psychological developmental impacts, subsequently affecting health-related outcomes (Webster, 2022). ACEs are also associated with an increased risk of a range of physical and mental health outcomes, suggesting that they may act as transdiagnostic factors (McLaughlin, 2016). In addition to this, studies employing ecological momentary analyses to investigate the temporal stability of more proximal factors of defeat and entrapment indicate that defeat and entrapment fluctuate over hours, with one study indicating that these variables were predictive of suicidal ideation over 3 hours (Stenzel et al., 2020; van Ballegooijen et al., 2022). In contrast, reports of ACEs are stable over time (Pereira da Silva & da Costa Maia, 2013). The relative stability of ACEs and the fluctuation of motivational phase variables consistent with the fluctuations in suicidal ideation as well as the established developmental influences of ACEs indicate that ACEs are likely pre-motivational phase variables within the context of the IMV model. Understanding how ACEs increase vulnerability to defeat could be useful in informing interventions targeted at reducing the impact of ACEs.

1.8. Conclusion

Based on the overview of the literature on suicide, this chapter highlighted the importance of understanding the processes leading to suicidal ideation from the perspective of theory. The overall comprehensive nature of the IMV model as well as its focus on the interactions between both proximal and distal variables predicting suicide indicate that this model presents a promising framework for investigating the pathways by which adversity in childhood results in suicidal behaviour. However, as a broader framework outlining the development of suicidal thoughts and behaviour, the role of childhood experiences from the perspective of this model is not clear. Literature on ACES and their effects on development could provide insights into how such experiences could be linked to risk and protective

factors outlined by the IMV model. Chapter 2 will thus describe the literature on ACES including definitions, prevailing conceptualisation and understanding of developmental impacts, limitations of the literature, and recent theoretical developments in the field. Additionally, Chapter 2 will outline the overall aims and the structure of this thesis.

Chapter 2 - Current understanding of the association between adverse childhood experiences and suicidal ideation

2.1. Overview

Chapter 1 described the literature regarding prevalence, risk factors and the importance of theory in understanding suicidal thoughts and behaviour. Additionally, chapter 1 the IMV model could present a promising theoretical framework to understand the mechanisms by which ACEs affect suicidal thoughts and behaviour. This chapter discusses the current knowledge of ACEs and their relationship with suicidal ideation and behaviours. The chapter thus aims to establish the rationale for investigating the effects of adversity in childhood while highlighting the limitations and gaps in the literature and proposing ways to address these. First, the chapter will discuss the terminology, definitions, and conceptualisation of ACEs and the literature on the association between ACEs and suicide-related outcomes. The current understanding of the mechanisms by which ACEs may affect suicide risk and theoretical developments in the field will then be discussed. A conceptual framework based on theory from the fields of ACEs and suicidal behaviour will also be presented. Finally, this chapter will present an overview of the aims and structure of this thesis.

2.2. What are adverse childhood experiences?

ACEs were originally coined by the CDC-Kaiser Permanente in their landmark study that demonstrated their impact on various health outcomes among 17,337 participants (Dong et al., 2004; Felitti et al., 1998). This study investigated the cumulative effects of co-occurring adversities over two waves. The first wave of the study included seven types of

ACEs including physical, sexual, and psychological abuse, violent treatment of the mother, household substance abuse, household mental illness, and incarceration of a member of the household. The later waves of the study assessed ten ACEs by adding physical and emotional neglect, and parental marital discord to the previous seven ACEs (Anda et al., 1999; Dong et al., 2004). These ten adversities as proposed by the original ACE study have been widely used in research and indicate strong associations with negative health outcomes (Petruccelli et al., 2019).

More recently, researchers have suggested that this conceptualisation includes a limited set of adversities and may be missing key adversities in childhood including bullying, deprivation, or peer victimisation (Finkelhor et al., 2015). A key consideration in the definition of ACEs has thus been regarding how inclusive the definition should be. Portwood et al. (2021) highlight that a broad definition would include key ACEs that may be relevant to predicting and preventing negative outcomes but may risk misrepresenting the impact of specific ACEs and reducing the effectiveness of interventions and policy implementations. On the other hand, employing an overly restrictive inclusion of ACEs may reduce opportunities to effectively target and reduce important types of adversities that may have strong impacts on outcomes. Striking a balance between an inclusive and restrictive definition for ACEs may be crucial to inform further research on ACEs and their associated outcomes.

Much of the discourse surrounding the definition and conceptualisation has been focussed on which experiences should be considered ACEs (Angelakis et al., 2020; Karatekin & Hill, 2019; Karatekin et al., 2023; Ports et al., 2020). While researchers have accumulated many examples of ACEs, there is no clear definition of ACEs utilised across the literature which has resulted in a limitation in the understanding of ACEs (Kalmakis & Chandler, 2014). Terms such as childhood maltreatment, childhood violence, early childhood adversity,

and childhood trauma are often used interchangeably, resulting in inconsistency in the literature. Some studies that use the term "adverse childhood experiences" may only measure maltreatment or may include additional adversities such as socioeconomic issues, peer victimization, etc. (Afifi et al., 2008; Finkelhor et al., 2013). Some of these discrepancies likely result from the inductive approach used in defining ACEs. Specifically, ACEs have often been defined following decision-making regarding which experiences are classified as ACEs as opposed to a definition that is formulated first and subsequently guides the decisions regarding whether an experience is considered an ACE or not. Additionally, most of the experiences that qualify as ACEs have not followed a systematic approach or presented a clear rationale guiding the selection of these, further exacerbating the lack of consistency in the operationalisation of ACEs across the literature (Lacey & Minnis, 2020).

However, more recent work has worked towards formulating a clear definition for ACEs. One definition provided by Kalmakis and Chandler (2014) considers ACEs as “childhood events, varying in severity and often chronic, occurring within a child's family or social environment that cause harm or distress, thereby disrupting the child's physical and psychological health and development”. While this definition presents one starting point for conceptualising ACEs, it is a circular definition. Including the outcomes associated with ACEs (i.e. impacts to physical and psychological health and development) as part of the definition of ACEs may do little to further research aiming to understand ACEs as predictors of specific developmental and health outcomes. This definition may also imply that experiences would only be classified as ACEs at an individual level if they resulted in developmental or negative health outcomes in that child. Measuring ACEs based on this definition would thus require the establishment of causality between the experience in question and specific outcomes. Additionally, this definition blurs the boundaries between similar constructs such as stress, which includes an individual's response to environmental

factors rather than the presence of specific environmental stressors alone (McLaughlin, 2016; Monroe, 2008). This definition would thus only include ACEs based on how they were experienced by, and affected the outcomes of, an individual.

An alternative definition for ACEs is provided by McLaughlin (2016). Specifically, they define ACEs as “Exposure during childhood or adolescence to environmental circumstances that are likely to require significant psychological, social, or neuro-biological adaptation by an average child and that represent a deviation from the expectable environment” (p. 4). These events can either be prolonged events that occur over time or acute but severe events. Here, an expectable environment consists of typical environmental inputs necessary for development. Mclaughlin et al. (2016) further explain that deviation from this environment may either be due to the existence of unexpected inputs such as threatening environmental cues or the lack of expected inputs, including the absence of typical interactions with a caregiver. Additionally, “exposures that are likely to require significant psychological, social, or neuro-biological adaptation” (p. 4) indicate that an individual's subjective response to the experiences is not necessary for the experience to be considered an ACE (Compton et al., 2023). This definition further distinguishes ACEs from similar constructs such as stress, which includes the individuals’ responses to stressors in the environment; toxic stress, which is characterised by a more chronic stress response to environmental factors; and trauma which represents the presence of threatening inputs but not the lack of expected inputs such as neglect (American Psychiatric Association, 2013; McLaughlin, 2016). Furthermore, this excludes minor or temporary typical stressors such as examinations or relocation unless accompanied by changes in interactions with caregivers. Thus, the consideration of whether the stressor is likely to meaningfully affect development could be used to guide whether a stressor qualifies as an ACE. Finally, this definition clearly describes the timing for ACEs to occur. Specifically, “childhood or adolescence” includes

experiences occurring before adulthood. While this can be an arbitrary age, based on the legal age of adulthood in the UK, this thesis will consider experiences occurring before the age of 18 as childhood experiences. As the definition provided by Mclaughlin et al. (2016) follows a deductive approach in defining ACEs based on characteristics of experiences regardless of their impact, this definition will be used in this thesis to refer to ACEs.

2.3. Rationale for investigating mechanisms by which ACEs affect suicide risk

Negative life events including abuse in general have been strongly associated with suicidal ideation, with one meta-analysis reporting that experiencing abuse was one of the strongest predictors of suicidal ideation (Franklin et al., 2017). Given the developmental effect of early experiences on the brain, it is expected that adversity in childhood may result in suicidal ideation in adulthood (Hays-Grudo & Morris, 2020; Tierney & Nelson, 2009). Consistent with this, ACEs have been demonstrated to significantly increase the likelihood of engaging in suicidal ideation, self-harm, and suicide attempts (Choi et al., 2017; Cleare et al., 2018; M. P. Thompson et al., 2019). Multiple studies have thus demonstrated strong connections between specific ACEs and suicidal ideation. These include physical, sexual, and emotional abuse (Afifi et al., 2008; Brezo et al., 2008; Bruwer et al., 2014; Bryan et al., 2013; Dworkin et al., 2022; Fuller-Thomson & Dalton, 2011; Jeon et al., 2014; Kwok et al., 2019; X. Li et al., 2019), physical and emotional neglect (Kwok & Gu, 2019; Stickley et al., 2020), parental psychopathology or suicidal behaviour (Geulayov et al., 2012; Goodday et al., 2019; Hammerton et al., 2015), parental incarceration (Forster et al., 2019; Heard-Garris et al., 2019), bullying (Holt et al., 2015; Klomek et al., 2015), domestic violence (Rajalin et al., 2013), parental death (Guldin et al., 2015; Rostila et al., 2016), family breakdown (Fuller-Thomson & Dalton, 2011), and parental substance abuse (Quinn et al., 2022). Meta-analyses

have also demonstrated dose-response associations between ACEs or childhood maltreatment and suicidal ideation (Angelakis et al., 2019; Sahle et al., 2022).

While the relationship between several health outcomes and the co-occurrence of adversity had been presented before (Rutter, 1978), prior to Felitti et al. (1998)'s seminal study on ACEs, much of the literature on ACEs and suicidal ideation focussed on individual ACEs (Briggs et al., 2021; Lacey & Minnis, 2020). This focus on each ACE as an individual predictor is termed the individual risk approach (Henry et al., 2021). However, research has demonstrated that ACEs often co-occur, such that individuals experiencing one form of ACEs are more likely to have experienced other types of ACEs (Finkelhor et al., 2007; McLaughlin et al., 2012). Additionally, experiencing multiple types of ACEs has been demonstrated to be associated with increased risk of a range of health outcomes including early mortality. Briggs et al. (2021) propose that specific combinations of ACEs demonstrate "synergistic interactions" such that the overall risk of the combination of these ACEs is greater than the sum of their parts. As the number of ACEs increases, the number of synergistic interactions between these combinations of ACEs increases. This is evidenced in reports of the original ACE study, which found that each additional ACE has the potential to at least double the risk of attempting suicide and four or more ACEs could increase the risk of suicide attempts by twelvefold (Dube et al., 2001; Felitti et al., 1998).

Thus, examining specific ACEs in isolation may be limited in accounting for other types of ACEs that may also play a role in shaping developmental outcomes. The recognition that individual ACEs may not account for the effects of the co-occurrence of adversity has resulted in research increasingly focussing on the cumulative risk associated with the presence of multiple types of adversities in childhood. This conceptualisation of ACEs as a summation of a set of different types of co-occurring adversities in childhood is termed the cumulative risk model. A clear graded relationship between this co-occurrence of ACEs and

suicidal ideation has consistently been demonstrated throughout the literature. However, establishing the existence of this relationship alone does little to inform interventions other than through the prevention of adversity in childhood. This is because the mechanisms by which ACEs affect suicidal thoughts are not clear (McLaughlin, 2016). Additionally, many individuals that have experienced ACEs often do not report suicidal thoughts, indicating that other risk or protective factors may be involved in the development of suicidal thoughts (Fuller-Thomson et al., 2020; Marriott et al., 2014). Understanding the pathways and conditions through which ACEs result in suicidal thoughts could thus present modifiable factors that could be targeted in intervention and prevention strategies at various stages of the suicidal pathway.

2.4. Prevailing understanding of pathways of risk

Several explanations have been proposed to explain the outcomes associated with the co-occurrence of adversity. These explanations largely focus on the physiological effects of prolonged or intense acute stressors. Given that these mechanisms have been until recently widely regarded as central to the effects of ACEs on a range of outcomes (McLaughlin & Sheridan, 2016), it is important to outline these and understand their strengths and limitations. This section thus briefly outlines the prevailing understanding of the mechanisms by which ACEs increase the risk of physical and mental health issues.

2.4.1. HPA-axis dysregulation

Research focussing on the explanatory pathways between ACEs and suicidal outcomes has primarily focussed on the effects of ACEs on the stress response system (McLaughlin, 2016). The hypothalamic-pituitary-adrenal (HPA) axis is the primary stress response system responsible for the production and regulation of the stress hormone cortisol (Stephens & Wand, 2012; van Heeringen, 2018). While the functioning of the HPA axis can

be really useful in managing external stress, repeated activation of the HPA axis can result in its dysregulation. This dysregulation can be evident through a blunted cortisol response, where lower levels of cortisol are released in the presence of stress (HPA-axis hypo-reactivity) or an increased amount of cortisol produced (HPA-axis hyperreactivity; Bunea et al., 2017).

Studies investigating HPA-axis functioning often examine the cortisol reactivity in response to pharmacological substances such as dexamethasone (D. B. O'Connor et al., 2017). Exposure to different types of ACEs during sensitive periods of development, including childhood and adolescence, is thus hypothesised to result in a dysregulated stress response system (Lupien et al., 2009; D. B. O'Connor et al., 2017). A meta-analysis using 30 datasets to investigate the cortisol reactivity to stress reported that exposure to childhood adversity was associated with a reduced cortisol response (Bunea et al., 2017; D. B. O'Connor et al., 2018). Similar trends have been observed in suicidal individuals. Both reduced cortisol suppression and increased suppression after the administration of dexamethasone have been associated with increased risk of suicide among individuals (Beauchaine et al., 2015; Mann et al., 2006). Overall cortisol levels and cortisol reactivity have also shown mixed results in association with suicidal ideation (D. B. O'Connor et al., 2017; Shalev et al., 2019).

One explanation for this discrepancy in the direction of effect has been that persistent incidence of stressors initially results in increased production of cortisol. This increased cortisol is then attenuated, resulting in a blunted response, as an adaptation by the HPA axis to long periods of increased HPA axis activity (Fries et al., 2005; G. E. Miller et al., 2007; Trickett et al., 2010). This was further evidenced by a meta-analysis that reported that age moderated the association between cortisol reactivity and suicidal behaviour (D. B. O'Connor et al., 2016). According to this study, a heightened HPA-axis response was positively

associated with suicidal behaviour among individuals aged below 40 on average while a negative association was observed among individuals aged above 40. Consistent with the "attenuation hypothesis", the authors theorised that a more prolonged experience of stressors may have contributed to this blunted response.

2.4.2. Allostatic load

Allostatic load has also been presented as one of the possible pathways that may link ACEs to suicide-related outcomes (McEwen, 1998, 2000). Allostatic load is a result of "allostasis", which involves the processes related to the maintenance of homeostasis. More specifically, homeostasis refers to the state of equilibrium maintained across a range of physiological parameters within the body (McEwen, 2000). This can include the internal pH levels, heart rate, temperature, and blood oxygenation which the body maintains at specific "set points" (e.g., the set point for temperature being just below 38°C; Geneva et al., 2019). While the HPA axis is the central system involved in responding to external stressors, a range of systems within the human body are involved in maintaining homeostasis. In this context, the presence of external stressors may require the body to move away from the set points reflecting homeostasis to meet environmental demands (e.g., increase in heart rate). This movement away from the set points is termed as "allostasis". McEwen (1998) explains that frequent adaptation to these physiological changes between homeostasis and allostasis can result in an increased load on the body which is termed allostatic load. Allostatic load is thus defined as "*the wear and tear on the body and brain resulting from chronic overactivity or inactivity of physiological systems that are normally involved in adaptation to environmental challenge*" (p. 37).

As dysregulation of the HPA-axis is one of the key indicators of allostatic load, much of the literature investigating the relationships between ACEs, suicide, and allostatic load has focussed on this system (Stacy & Schulkin, 2022). Additionally, increased levels of cortisol

are also hypothesised to adversely affect the growth and development of neurons. Consistent with this, both ACEs and suicide have been associated with lower brain-derived neurotrophic factor (BDNF), which is a protein involved in the growth of neurons in the brain (Dwivedi et al., 2003; Theleritis et al., 2014). Similarly, other indicators of allostatic load have also been investigated with both ACEs and suicide-related outcomes. For instance, Evans (2003) found that cumulative risk (i.e. co-occurrence of exposure to different forms of adversity) in rural children measured by aspects of living conditions and adversity was linked to increased blood pressure, overnight neuroendocrine measures (including cortisol and norepinephrine), and body mass index. Similarly, a prospective study spanning 30 years also reported that abuse and neglect were associated with a range of allostatic load indicators associated with cardiovascular, respiratory, and excretory functions (Widom et al., 2015).

Inflammation, which is affected by the stress response system, has also been found to be a mediator between ACEs and suicidal ideation (G. Yang et al., 2020). One study further aimed to investigate differences in life trajectories accounting for allostatic load among individuals that died from suicide before and after 30 years of age (Notredame et al., 2020). Here, allostatic load was conceptualised as the "burden of adversity" characterised by the incidence, severity, and other characteristics of adversity experienced throughout life. The results indicated that dying by suicide at younger ages was often characterised by progressive increases in the burden of adversity while those that died at later ages experienced temporary plateauing of adversity amidst the increase. This may indicate that prior adversity in the latter cases may predict the presence of and responses to more recent adversities.

2.4.3. Attachment styles

Attachment styles may also explain the effects of childhood adversity on suicidal behaviour. Attachment relates to the bond between children and their caregivers to seek

comfort (Fearon & Roisman, 2017; Maydom et al., 2024). According to attachment theory (Bowlby, 1973; 1982), attachment styles can be secure, which is associated with viewing oneself as worthy and others as responsive, or insecure, which are either associated with viewing oneself as unworthy or others as non-responsive (Zortea et al., 2019). Insecure attachment may be anxious (characterised by higher need for responsiveness from others), avoidant (characterised by independence and detachment from others), or disorganised (including both anxious and avoidant traits; Kim et al., 2021; Maydom et al., 2024). Attachment styles are thus theorised to be resultant from the internalisation of early experiences of attachment and interactions with caregivers that inform ones perception of themselves and others (Zortea et al., 2020b; Kim et al., 2021). Adam (1994) thus proposed that these internal perceptions of oneself and others associated with one's attachment style may influence an individual's self-esteem and interpersonal relationships, thus resulting in a higher vulnerability to suicide. This model thus represents suicidal behaviour as an attachment-related behaviour in the presence of perceived rejection or loss. Consistent with this, a systematic review of fifty-two studies investigating the link between attachment styles and suicidal thoughts and behaviour reported that a secure attachment style was protective while insecure attachment styles were linked to heightened suicide risk (Zortea et al., 2019). Given that attachment style is heavily influenced by early relationships with caregivers, it is hypothesised that adversity in childhood, especially when involving caregiver abuse or neglect, may serve as a pathway by which childhood adversity may link to suicide. Consistent with this, research has supported the relationship between childhood maltreatment and attachment (Lo et al., 2017), as well as the role of attachment style as a mediator between childhood adversity and suicidal thoughts and behaviours (Christoforou & Ferreira, 2022; Ihme et al., 2022; Stagaki et al., 2022).

2.5. Limitations of the existing research

The cumulative risk model of adversity has thus presented an explanation of how the experience of environmental stressors in general can predispose individuals to risks as well as established a clear link between ACEs and a range of outcome measures (Lacey & Minnis, 2020). However, recent research has pointed to various limitations in the extant literature on ACEs. At the forefront of this have been two assumptions underlying the cumulative risk model. The first is that each form of adversity confers an equal amount of risk for outcomes (Lacey & Minnis, 2020). More specifically, the cumulative risk model treats all forms of ACEs as equally important in predicting outcomes (Briggs et al., 2021; Lacey & Minnis, 2020). For example, this assumes that parental separation confers a similar risk as physical violence, which is unlikely to be the case. Thompson et al. (2012) argue that certain adversities may be "high impact" compared to others, and what appears to be cumulative risk might just be largely attributable to these high-impact adversities. Similarly, Briggs et al. (2021) argue that different combinations of ACEs result in synergistic outcomes (such that the overall risk is greater than the sum of the risk posed by individual ACEs) which may not be accounted for by the traditional conceptualisation of the cumulative risk model of ACEs.

The second assumption is that each form of adversity affects outcomes through similar mechanisms (McLaughlin et al., 2021; McLaughlin et al., 2014). This is also unlikely as research has demonstrated different pathways through which psychopathology might arise (A. B. Miller et al., 2018). As outlined in section 2.4, much of the research on these mechanisms focuses on the stress response systems as pathways explaining the outcomes associated with ACEs. Additionally, research on these prevailing approaches alone does little to explain other emotional, cognitive, and verbal differences observed in children with a history of different types of adversity which are not related to stress-response systems (Bos et al., 2009; McLaughlin, 2016; McLaughlin & Lambert, 2017; McLaughlin et al., 2019; S. D.

Pollak et al., 2010). Given the broad effects of early experience on developmental outcomes (including brain plasticity and structure and associated cognitive and emotional outcomes), a focus on global mechanisms in explaining the outcomes associated with adversity risks ignores distinct developmental effects of adversity (Machlin et al., 2023; McLaughlin et al., 2014; McLaughlin et al., 2019). This could also risk assuming that similar interventions may benefit all individuals that experience ACEs regardless of the types of adversity experienced (Lacey & Minnis, 2020). Finally, focussing on these approaches presents limited directions in terms of informing interventions other than the prevention of adversity in the first place (McLaughlin, 2016).

Additionally, some researchers have argued that much of the literature focusses on the presence or absence of adversity across childhood, without considering the role of other protective factors that may affect outcomes (Lacey & Minnis, 2020). While a dose-response effect for ACEs have been observed with a range of outcomes, research has indicated that many individuals with a history of ACEs may be protected from negative outcomes in the presence of positive experiences including social and community support, enjoyment of school, predictable routines, and comforting beliefs (Crandall et al., 2021; Gunay-Oge et al., 2020). Additionally, a growing body of research has also found support for considering the effects of protective factors such as positive childhood experiences on outcomes (Baglivio & Wolff, 2021; Bethell et al., 2019; Crandall et al., 2019; Kosterman et al., 2011; Narayan et al., 2018). Considering the role of such protective factors could thus add to the knowledge regarding specific conditions that increase or reduce the effects of ACEs. However, there has been limited research on the role of PCEs as a protective factor against ACEs in the context of suicide research.

As a result of these limitations, calls have been made to move away from establishing the associations between ACEs and various outcomes to a stronger focus on developmental

pathways by which ACEs affect outcomes (Briggs et al., 2021; Kelly-Irving & Delpierre, 2019; Lacey & Minnis, 2020). This has led to recent research focussing on theoretical models of adversity that focus on the developmental mechanisms by which ACEs may affect various outcomes. One such model is the dimensional model of adversity and psychopathology (McLaughlin et al., 2014; Sheridan & McLaughlin, 2014).

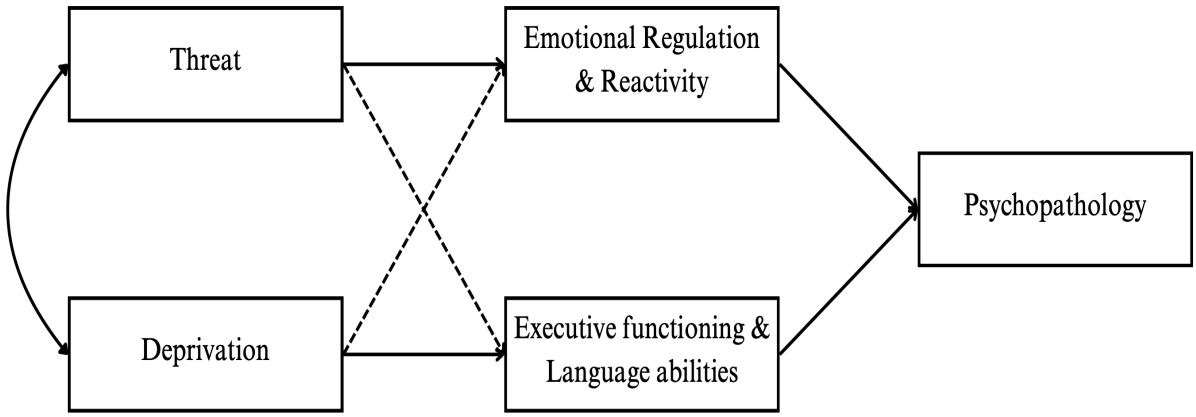
2.6. The dimensional model of adversity and psychopathology

The Dimensional Model of Adversity and Psychopathology (DMAP; McLaughlin et al., 2014) is a theoretical model that explains the relationship between ACEs and psychopathology (See Figure 2.1). The underlying premise of the DMAP is that different types of ACEs share common features that influence developmental outcomes, resulting in increased vulnerability to other outcomes associated with ACEs including suicidal thoughts. These underlying dimensions are hypothesised to affect developmental outcomes through partially distinct mechanisms (McLaughlin et al., 2014). Two such dimensions are described by the DMAP: *threat* and *deprivation.* It is important to note that the adversities related to threat and deprivation may frequently co-occur and some experiences might have partial elements of either.

Additionally, Mclaughlin et al. (2014) note that threat and deprivation are likely not the only dimensions underlying adversity in childhood. This model also presumes that adversities such as parental mental illness, lower socioeconomic status, and substance abuse are risk factors for the presence of ACEs rather than ACEs themselves (Henry et al., 2021). Furthermore, this model views ACEs as existing on a spectrum in terms of threat and deprivation where some adversities might not neatly align within one dimension. Experiences involving both deprivation and threat are termed "complex exposures".

Figure 2.1.

Predictions of the DMAP



Note: The dotted lines represent partially distinct mechanisms

2.6.1 Threats

Threats are defined as "the presence of an atypical experience characterised by actual or threatened death, injury, sexual violation, or other harm to one's physical integrity" (Sheridan & McLaughlin, 2014, p.13). Threats are thus related to the presence of agents that might cause harm to individuals. This includes physical abuse, sexual abuse, exposure to violence or victimization, and emotional abuse involving threats of harm (McLaughlin, 2016). According to the DMAP, threat-based adversities are hypothesised to affect outcomes through emotional processing difficulties characterised by heightened emotional reactivity and reduced emotional regulation abilities (McLaughlin et al., 2014; Stein et al., 2022). Emotional reactivity refers to the intensity and extent of emotion experienced in response to an event while emotional regulation is associated with the ability to manage or influence emotions (Gross, 2015; Nock et al., 2008b). Specifically, exposure to threatening experiences at developmentally sensitive ages is likely to optimise efficient identification and response to threats. While this may be adaptive in an environment consisting of threats, it is likely to

result in heightened detection and sensitivity to threatening cues due to fear learning, and a higher likelihood of viewing neutral or ambiguous cues as threatening due to fear generalisation.

Consistent with this, individuals with a history of threatening experiences have exhibited differences in threat detection and fear learning (Machlin et al., 2019; McLaughlin, 2016; Weissman et al., 2022). Exposure to threatening experiences has also been associated with increased emotional reactivity and difficulties in emotional regulation (Lambert et al., 2017; Lavi et al., 2019; McCrory et al., 2011; McLaughlin & Lambert, 2017). Attentional biases towards anger and threatening stimuli have also consistently been associated with threatening or violent experiences (S. D. Pollak et al., 2000; Schäfer et al., 2023; Shackman & Pollak, 2014; Shin & Brunton, 2024). Furthermore, various studies of brain structure and function have reported findings consistent with the hypotheses of the DMAP. A systematic review of the studies investigating the effects of childhood experiences on brain development found that experiencing threat but not deprivation was consistently negatively associated with emotional reactivity and regulation such as the amygdala, hippocampal and medial prefrontal cortex volumes (McLaughlin et al., 2019).

The DMAP attributes these adaptations to enhance the detection of threatening cues to synaptic pruning (removal of neural connections and synapses that are not frequently used) of brain regions involved in emotional processing, resulting in increased emotional reactivity, and reduced emotional regulation.

2.6.2. Deprivation

Deprivation is defined as the absence of expected environmental inputs in cognitive (e.g., language) and social domains as well as the absence of age-typical complexity in the environment (Sheridan & McLaughlin, 2014). Adversities related to deprivation are those where the expected and appropriately complex stimulation from the environment of

individuals is absent or reduced. This may be due to neglect, institutionalisation, lack of access to toys, or learning materials or absence of complex social interactions, especially with caregivers (McLaughlin et al., 2014). Importantly, deprivation in the context of the DMAP is conceptualised as distinct from socioeconomic deprivation, which is associated with socioeconomic status and access to education.

According to the DMAP, deprivation is hypothesised to affect psychological outcomes through deficits in language abilities and executive functioning. Executive functioning is the use of skills and learning to facilitate improvement in performance at tasks (Sheridan et al., 2017). This can include working memory, inhibitory control, and cognitive flexibility (Diamond, 2013; Sheridan et al., 2017). Inhibitory control is the ability to control one's behavioural impulses, attention to distracting stimuli, and avoidance of irrelevant internal thoughts. Working memory is related to the mental manipulation of information that is perceptually absent (Sheridan et al., 2017). Finally, cognitive flexibility is the ability to switch tasks or attention from tasks easily based on environmental demand (Diamond, 2013).

Consistent with this, several studies including a systematic review have reported that deprivation is associated with worse cognitive control, executive functioning, and language abilities (Johnson et al., 2021; Kirke-Smith et al., 2016; Machlin et al., 2019; A. B. Miller et al., 2018; Weissman et al., 2022). Socioeconomic factors used as a proxy for socio-cognitive deprivation have also been associated with worse executive functioning (Lambert et al., 2017; McNeilly et al., 2021; Sheridan et al., 2017). One study also reported that deprivation, but not threat mediated the relationship between socioeconomic status and executive functioning (Vogel et al., 2021). However, it should be noted that low socioeconomic status is presented as a risk factor for both threats and deprivation according to the DMAP.

The DMAP attributes the differences resulting from deprivation to the same mechanisms underlying synaptic pruning (McLaughlin et al., 2014). Mclaughlin et al. (2014) argue that in the absence of a cognitively stimulating environment, individuals may adapt to an environment of low complexity. This is hypothesised to affect associative learning processes such as reward learning among individuals with experience of deprivation (Sheridan et al., 2018). As a result, performance in more challenging cognitive tasks may be inhibited, leading to reduced executive functioning and language abilities among individuals raised in deprived environments.

2.7. Dimensional model of adversity and suicidal thoughts and behaviour

There has been limited investigation of the relationship between dimensions of adversity and suicide-related outcomes. Preliminary analyses have indicated that threat is associated with suicide attempts while deprivation has shown mixed results (Brown et al., 2023; Sosnowski et al., 2023). However, hypothesised developmental outcomes of threat and deprivation (i.e., emotional processing and executive functioning) have been associated with suicidality. Nock et al. (2008b) argued that a common reason individuals engage in suicidal behaviour is to escape aversive emotions, which they may be experiencing due to heightened emotional reactivity. Consistent with this, emotional reactivity has been associated with suicidal ideation (S. Liu et al., 2020; Polanco-Roman et al., 2018). Similarly, 70 out of 76 papers in a systematic review investigating the relationship between emotional regulation and suicidal thoughts and behaviours found that lower emotional regulation was associated with both suicidal ideation and behaviour (Colmenero-Navarrete et al., 2022).

Executive functioning has also been associated with suicidality, although the findings related to this may depend on other population-related characteristics such as psychiatric diagnosis (Bredemeier & Miller, 2015). Additionally, one study reported that executive

functioning mediated the relationship between childhood trauma and suicidal ideation (Rogerson et al., 2024). However, this study did not distinguish between threat and deprivation. Given the DMAP's focus on mechanisms by which ACEs affect outcomes, and the recent evidence supporting its premises, this model has been recommended as a theoretical framework to investigate the mechanisms by which childhood experiences may result in suicidal thoughts and behaviour (Ortin-Peralta et al., 2021).

2.8 Overview of the current thesis

The current chapter highlighted the importance of understanding these mechanisms in improving the understanding of suicide and developing effective prevention strategies. The literature reviewed in this chapter also indicates that ACEs may be linked to suicide risk through developmental impacts on the stress response system and synaptic pruning. However, despite establishing a strong dose-response association between ACEs and suicidal ideation and behaviours, the mechanisms by which ACEs confer increased risk are not well understood. As highlighted in Chapter 1 (Section 1.5), one reason for this is that individual risk factors are limited in explaining the processes resulting in STBs. The IMV model was thus presented as a promising theoretical framework for understanding the role of childhood experiences in the development of suicidal ideation and behaviour (See Figure 1.1).

However, it is unclear how pre-motivational phase variables such as ACEs increase vulnerability to defeat from the context of the IMV model. This is likely due to a large number of pre-motivational phase variables that each increase vulnerability through distinct mechanisms. It is thus important to consider the literature on pre-motivational phase variables of interest to better understand their association with defeat. Consequently, having a clearer understanding of the impacts of ACEs, and the mechanisms by which they increase vulnerability for various negative outcomes, could provide key insights into the hypothesised

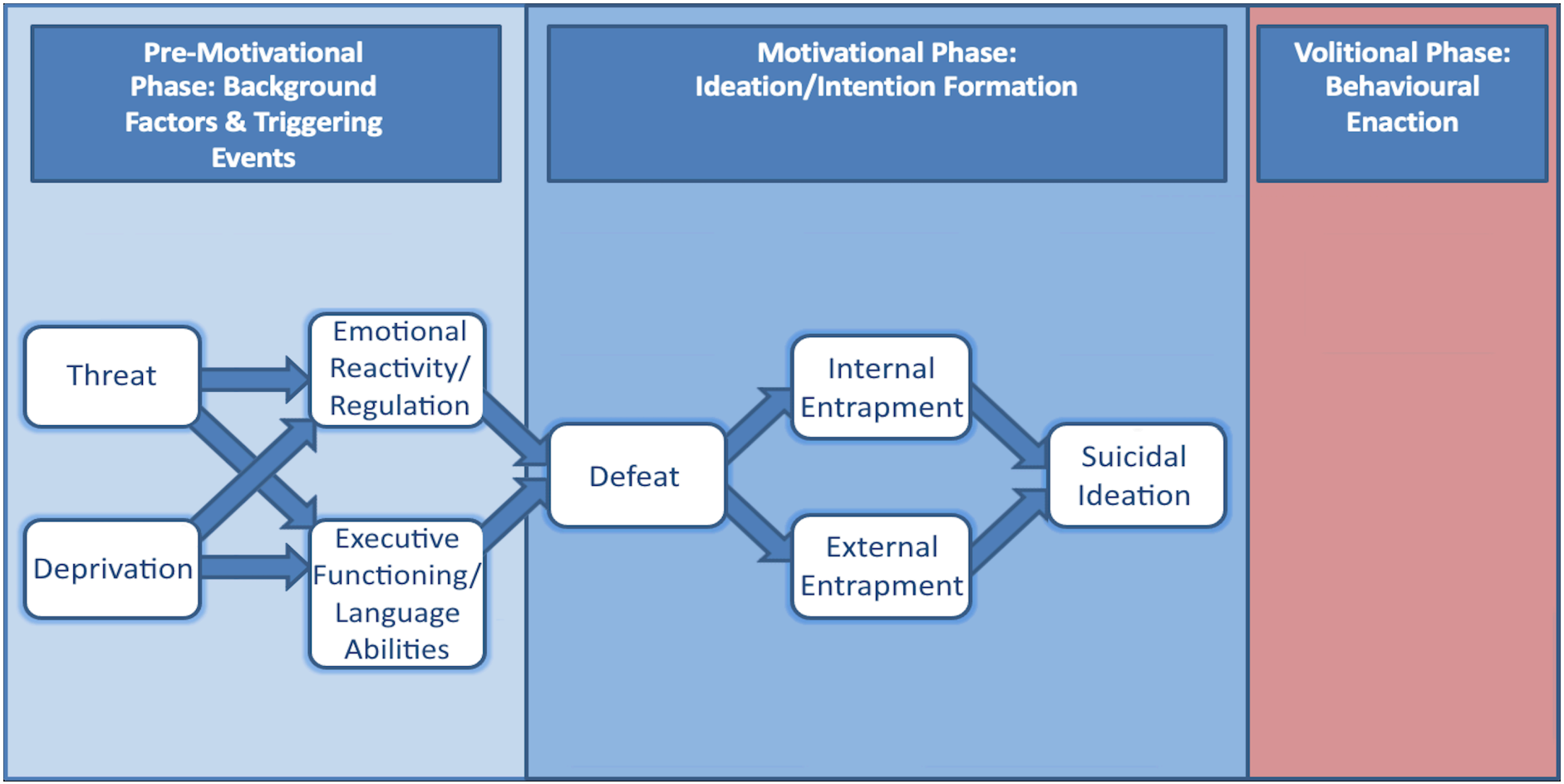
associations between ACEs and motivational phase variables in the IMV model. The developmental influences of ACEs as outlined by the DMAP could thus be useful in explaining why experiencing ACEs may result in heightened sensitivity to defeat.

The conceptual model for this thesis outlining the integration of the IMV model and the DMAP is thus presented in Figure 2.3. As described in section 2.6.1, the DMAP proposes that threatening experiences in childhood facilitate efficient detection of threatening cues. As a result, children exposed to violent or threatening experiences indicate heightened emotional reactivity to threats and difficulty in regulating emotions. As outlined in section 1.5, early models of defeat and entrapment (Gilbert & Allan, 1998; Price, 1972), are based on animal models of social defeat, characterised by threats from an aggressor. It is thus likely that enhanced detection of threatening cues would also result in enhanced sensitivity to and difficulties regulating defeat cues.

Furthermore, deprivation is described as a lack of complex environmental stimuli such as complex interactions with caregivers, learning materials or complex language by the DMAP (see section 2.6.2). Deprivation of such learning opportunities is hypothesised to hinder the development of executive functioning and verbal abilities. Difficulties in executive functioning and verbal abilities have also been associated with poorer academic achievement (Ahmed et al., 2019; Booth et al., 2010; Pascual et al., 2019; Young et al., 2002), social (Mulvey & Jenkins, 2021; Rinsky & Hinshaw, 2011; Vogan et al., 2018), and labour market outcomes (Bailey, 2007; Lin et al., 2018), and other outcomes (Diamond, 2013; C. J. Johnson et al., 2010). Consistent with this, a recent study on the relationship between childhood trauma and defeat found that executive functioning mediated this relationship (Rogerson et al., 2024). As a result, it is likely that difficulties in these areas may result in increased feelings of defeat and failure.

Figure 2.2.

Conceptual model informing this thesis



Consistent with the DMAP, it is hypothesised here that these dimensions of adversity affect emotional processing variables and executive functioning/verbal abilities in partially distinct ways (as represented by dashed lines). In other words, threatening experiences are hypothesised to primarily affect defeat through emotional reactivity and regulation but may be partially explained through executive functioning and verbal deficits and vice versa. In line with the IMV model, it is hypothesised that internal and external entrapment will mediate the association between defeat and suicidal ideation. Additionally, based on empirical evidence, contemporary models of suicide such as the IMV model distinguish between the processes resulting in suicidal thoughts and those resulting in suicidal behaviours. As a result, it is important for research investigating these outcomes to account for this distinction. Given that the factors involved in the development of suicidal ideation are distinct from the factors predicting suicidal behaviour, and that distal risk factors such as childhood experiences form pre-motivational phase variables, the current thesis will primarily focus on the development of suicidal ideation.

The conceptual model further hypothesises that PCEs will moderate the effect of threat and deprivation on emotional processing and executive functioning/language abilities. This is based on emerging literature that highlights the role of protective factors such as positive childhood experiences (PCEs) including supportive relationships, traditions, and routines as buffers of the effects of ACEs on negative health outcomes (Hawes & Allen, 2023; Ports et al., 2020). Indeed, despite the strong link between ACEs and suicide and a range of negative health outcomes, research has indicated that PCEs may buffer the effects of ACEs (Gunay-Oge et al., 2020; Nguyen et al., 2024). Growing evidence investigating the effects of PCEs and ACEs has found that PCEs also show a negative dose-response relationship with depression and poor mental health (Bethell et al., 2019), adult physical health and mental health (Crandall et al., 2019), future stressful life experiences and post-

traumatic stress disorder symptoms (Narayan et al., 2018). Various protective and promotive experiences in childhood including family or school connectedness (Areba et al., 2021; Lensch et al., 2021), and social support (Wan et al., 2019) have also been demonstrated to alleviate the negative impacts of ACEs on suicidal thoughts and behaviours. A study on PCEs as a moderator between threat and deprivation and post-traumatic stress symptoms also found that PCEs moderated the effects of both threats and deprivation on post-traumatic stress (Narayan et al., 2023b). However, it should be noted that the authors report that the buffering effect of PCEs on threat was attributable to a subsample of cases. Based on these preliminary findings, future research on the developmental effects of childhood adversity would benefit from examining the role of contextual factors such as developmental timing, duration, frequency, and positive experiences.

2.8.1 Aims of the Current Thesis

The overarching aim of this thesis is to investigate the mechanisms by which ACEs affect suicidal ideation from the perspective of the IMV model. However, despite growing empirical support for the overall IMV model (del Carpio et al., 2020; Dhingra et al., 2016; Dhingra et al., 2015; Russell et al., 2020), the literature testing this model is yet to be systematically reviewed. This is especially relevant as most studies investigating the IMV model have focussed on specific aspects of the model. Additionally, there is substantial heterogeneity in the study designs, participants, and operationalisation of the constructs. For instance, some papers investigate study group differences based on suicide-related outcome measures while others investigate mediation or moderation effects of specific variables (Branley-Bell et al., 2019; del Carpio et al., 2020). Additionally, there are differences in the location recruitment of participants, inclusion criteria (Hong & Shin, 2021; Nukala et al., 2021; Rasmussen et al., 2021; Ren et al., 2019). Measures used also vary with some studies conceptualising defeat and entrapment as one variable (O. H. Pollak et al., 2021) while other

studies conceptualise defeat, internal entrapment, and external entrapment as distinct (Moscardini et al., 2021; Wetherall et al., 2021). Systematically reviewing the existing empirical literature could provide insights and identify the literature on the role of ACEs from the perspective of the IMV model and highlight "risk trajectories" or pathways involving specific interactions between variables that may explain increased suicide risk (R. C. O'Connor & Kirtley, 2018). The first aim of this thesis is thus to systematically review and synthesise the literature on the IMV model.

Upon investigating the empirical support for the predictions of the IMV model, this thesis aims to further investigate the role of ACES from the perspective of the IMV model. The findings of the systematic review will inform the following study. Thus, based on the findings of the systematic review, this thesis aims to investigate the role of theory-based variables informed by the IMV model in explaining the relationship between the co-occurrence of ACEs and suicidal ideation.

Finally, this thesis aims to investigate the developmental outcomes associated with dimensions of adversity (i.e. threat and deprivation) in explaining the link between adversity in childhood and motivational phase variables outlined by the IMV model (i.e. defeat and entrapment). Additionally, despite preliminary evidence (see section 2.5), there is little focus in the literature on the role of positive experiences in childhood that affect outcomes. This thesis further aims to investigate the influence of these PCEs on the developmental outcomes as a result of childhood adversity. The specific aims of this thesis are thus presented below.

1. To systematically review and synthesise the literature describing the IMV model of suicide (Chapter 3).
2. To investigate the role of motivational phase variables of the IMV model (defeat/entrapment) in the association between ACEs and suicidal ideation (Chapter 4).

3. To examine the role of developmental outcomes outlined by the DMAP (i.e., emotional processing and executive functioning) in explaining the link between dimensions of adversity (threat and deprivation) and defeat (Chapter 5).
4. To examine the role of PCEs in moderating the relationship between dimensions of adversity (threat and deprivation) and defeat within the context of the IMV model (Chapter 6).

2.8.2. Structure of the thesis

Based on the aims outlined in section 2.8.1, the following study (chapter 3) will report the findings of a systematic review of the IMV model. Chapters 4 and 5 will then present empirical investigations of the aforementioned aims to improve the understanding of the relationship between ACEs and suicidal ideation. Specifically, Study 2 (chapter 4) will examine defeat and entrapment as mediators between overall ACEs and suicidal ideation. Based on the findings of the systematic review and study 2, study 3 (chapter 5) will investigate theory-based mediators of the relationship between dimensions of adversity (threat and deprivation) and defeat based on the hypotheses of the DMAP and the IMV model. Study 4 (Chapter 6) will then investigate positive childhood experiences moderate the relationship between dimensions of adversity (threat and deprivation) and emotional processing/executive functioning from the perspective of the IMV model and the DMAP. Chapter 7 will then present a general discussion of the overall findings of the thesis.

2.9. Conclusion

This chapter discussed the definition and conceptualisation of ACEs, the prevailing understanding of mechanisms by which ACEs affect outcomes, and recent theoretical developments in this field. Based on the literature discussed in Chapter 1, this section further presented an overview of the aims and structure of this thesis. Specifically, the overarching

aim of this thesis is to investigate the association between ACEs and suicidal ideation from the perspective of the IMV model. This chapter further outlined that studies investigating the IMV model generally focus on specific aspects of the model with substantial heterogeneity in methodology and populations. This poses challenges to drawing conclusions regarding empirical support for the premises of the theory based on individual studies, identifying gaps in the literature, and examining the role of ACEs from the perspective of this model. In order to address this, chapter 3 will systematically review and synthesise the literature on the IMV model and identify pathways that may explain this association.

Chapter 3 - A Systematic Review of the studies testing the Integrated Motivational-Volitional Model of Suicidal Behaviour.

This is the version of the paper published in Health Psychology Review. Appendix names and subheadings have been edited to be consistent with this thesis.

Reference: Souza, K., Sosu, E. M., Thomson, S., & Rasmussen, S. (2024). A systematic review of the studies testing the integrated motivational-volitional model of suicidal behaviour. Health Psychology Review, 1–25. https://doi.org/10.1080/17437199.2024.2336013

3.1. Abstract

Background: Despite the influence of the integrated motivational-volitional (IMV) model on research and practice, the supporting literature has not been systematically synthesised. **Aims:** This systematic review aims to synthesise the literature testing the IMV model of suicidal behaviour. **Methods:** Using citation and database searching, PsycINFO, EMBASE, PubMed, Web of Science, and Google Scholar were searched for studies referencing the IMV model. These sources were last searched on 28th March 2023. Included studies empirically tested the hypotheses of the model. Quality assessment was conducted using the National Institute of Health tool. **Results:** Findings from 98 records (100 studies, 138,365 participants) were narratively synthesised. Results from studies directly testing the hypothesised pathways outlined by the model supported the defeat-entrapment-suicidal ideation pathway of the IMV model. Case-control studies comparing differences between control groups with no history of suicidal thoughts or behaviours versus ideation and enactment groups were consistent with the hypotheses of the IMV model in univariate and cross-sectional analyses. However, support for the model was mixed for case-control

multivariate and prospective studies. Due to low overlap in variables studied, the role of specific pre-motivational phase variables (e.g., perfectionism) and stage-specific moderators was inconclusive. The studies received overall good quality ratings. **Conclusions:** The IMV model presents a promising framework for understanding and preventing suicide. However, there is limited evidence on the role of pre-motivational variables and stage-specific moderators. Defeat, entrapment, and key variables may be useful in informing suicide prevention measures.

Keywords: Defeat, Entrapment, Suicidal ideation, Suicidal behaviour, Integrated motivational-volitional (IMV) model, ideation-to-action

3.2. Introduction

Suicide results in 703,000 deaths every year globally and is the sixth leading cause of death worldwide between the ages of 15-49 (Ritchie, 2018; World Health Organisation, 2021). Despite significant improvements in preventing other leading causes of death, our ability to predict and prevent suicide has shown little improvement over the past five decades (Franklin et al., 2017; Naghavi et al., 2017). This is largely due to individual risk factors being limited in explaining the processes giving rise to suicidal ideation (thoughts about taking one's life), and how they result in suicidal behaviours (any self-directed harm irrespective of intent to die as a result) (Franklin et al., 2017; Millner et al., 2020). Recent research on suicide has highlighted that suicidal behaviours are likely influenced by interrelationships between hundreds of biological, psychological, social, and cultural factors (Chu et al., 2017; R. C. O'Connor & Nock, 2014; Levi-Belz et al., 2019). Understanding how different risk factors interact to give rise to suicidal thoughts and behaviours using theoretical frameworks is key to the effective identification and prevention of suicide (Klonsky et al., 2018; I. H. Stanley et al., 2016). Thus, it is important that theoretical frameworks aiming to

explain suicide account for a range of distal and proximal, contextual, and individual factors. It is also crucial that suicide theories explain the processes that influence individuals with suicidal thoughts to act upon those thoughts (Klonsky et al., 2018; Nock et al., 2016).

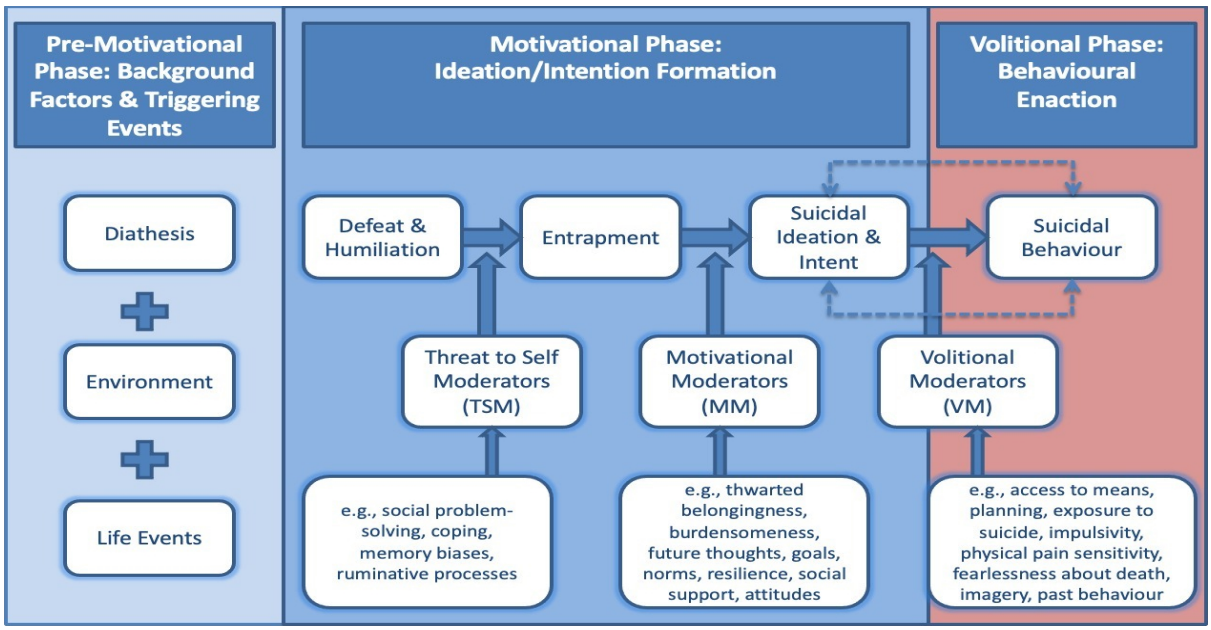
The integrated motivational-volitional (IMV) model of suicidal behaviour (R. C. O'Connor, 2011a; R. C. O'Connor & Kirtley, 2018) draws from a range of established theoretical models in suicide, health psychology literature, and empirical evidence to identify a common modifiable pathway giving rise to suicidal thoughts and behaviour (Barzilay & Apter, 2014; Gilbert & Allan, 1998; Joiner, 2005; Schotte & Clum, 1987; Van Orden et al., 2010; Williams, 2001). It highlights biological, psychological, and environmental variables at each stage of this pathway, illuminating potential targets for intervention. The IMV model also extends variables facilitating the transition from suicidal ideation to behaviour to include a more comprehensive set of variables consistent with the empirical literature (Klonsky et al., 2018).

Fundamentally, the IMV model describes suicidal behaviour as arising out of three distinct phases (Figure 3.1). First, the *pre-motivational phase* consists of the distal predisposing factors characterised by biological vulnerabilities (e.g., genetics), psychological vulnerabilities (e.g., perfectionism), life events (e.g., childhood experiences) and environmental or contextual variables (e.g., socio-economic status) (R. C. O'Connor & Kirtley, 2018). Such vulnerabilities confer an increased likelihood of feeling defeated or humiliated in the presence of stressors. Second, the *motivational phase* outlines the process by which suicidal ideation develops. Here, defeat and humiliation are feelings of failure and rejection while entrapment entails an inescapable sense of being trapped either within oneself (internal entrapment) or within circumstance (external entrapment). It is hypothesised that feelings of defeat and humiliation result in increased feelings of entrapment (Gilbert & Allan, 1998; Williams, 2001). Furthermore, individuals are more or less likely to experience

entrapment depending on the presence of specific threat-to-self moderators (e.g., problem-solving, memory biases, coping). As such, the defeat-entrapment association is moderated by threat-to-self moderators. Individuals that are feeling trapped could thus begin to view suicide as way to escape. The likelihood of this may depend on the presence or absence of specific motivational moderators (e.g., thwarted belongingness, perceived burdensomeness, resilience). As such, the IMV model hypothesises that defeat indirectly leads to suicidal ideation through entrapment and the entrapment-suicidal ideation link is moderated by motivational moderators. Finally, the *volitional phase* describes the association between suicidal ideation and intent and suicidal behaviour. Specifically, it is hypothesised that thinking about suicide may lead to suicidal behaviour. Volitional moderators (e.g., access to means, past behaviour) determine whether the transition from thinking about suicide to acting upon these thoughts could occur (R. C. O'Connor & Kirtley, 2018).

Figure 3.1.

The integrated motivational-volitional model of suicidal behaviour (R. C. O'Connor, 2011; R. C. O'Connor & Kirtley, 2018)



Since the IMV model was first proposed (R. C. O'Connor, 2011a), a growing body of literature has aimed to test its predictions (e.g., del Carpio et al., 2020; Dhingra et al., 2016b; Dhingra et al., 2015c; Forkmann & Teismann, 2017; Ordóñez-Carrasco et al., 2020, 2021; Russell et al., 2020c; Tucker et al., 2016). The IMV model has also played a key role in informing local and national suicide prevention policy (e.g., The Scottish Government, 2022), risk screening (de Sousa et al., 2020; Sandford et al., 2022), and intervention development (Nuij et al., 2018; R. C. O'Connor et al., 2017).

Despite its influence on research, practice and policy, the extent to which the hypotheses of the IMV model are empirically supported is unclear. For instance, the list of pre-motivational phase variables, motivational phase moderators (threat-to-self and motivational moderators), and volitional phase moderators (volitional moderators) are not exhaustive. As a result, individual studies often test a sub-set of these variables. For example, a majority of studies have tested components of the model such as the motivational or volitional phase alone (Lucht et al., 2020; McClelland et al., 2021; Ribeiro et al., 2021). While these studies have provided useful results for specific aspects and variables in the model, they provide limited evidence regarding the interplay of different variables across the entire model. Additionally, individual studies are conducted among certain populations, with specific methodological characteristics such as design and measures used. For example, studies conducted among school children may not generalize to other populations. Similarly, some studies examined the hypothesised pathways in the IMV model while others compared differences in IMV model variables among groups of individuals with no history of suicidal thoughts or behaviours (control group), individuals with a history of suicidal thoughts but no behaviours (ideation group), and individuals with a history of behaviours (enactment group). Comparing the findings of studies in different populations and study designs would be useful

in understanding the applicability of the IMV model. However, these studies testing the hypotheses of the IMV model have yet to be systematically reviewed.

The present review aims to systematically review and synthesize the evidence for the hypothesized relationships in the Integrated Motivational - Volitional model of suicidal behaviour. Specifically, we aim to address the following research questions: 1. To what extent have all components in the IMV model been tested in a single study?, 2. What is the evidence for the association between pre-motivational phase variables (diathesis, environment, and life events) and variables in the motivational phase (defeat and humiliation, entrapment, and suicidal ideation)?, 3. What is the evidence for associations between defeat, entrapment, and suicidal ideation?, 4. To what extent is the association between defeat and entrapment moderated by threat-to-self moderators?, 5. To what extent is the association between entrapment and suicidal ideation/intent moderated by motivational moderators?, 6. What is the evidence for the association between suicidal ideation and suicidal behaviour and how is this association influenced by volitional moderators?, 7. Do the associations in the IMV model vary across study characteristics?

Systematically reviewing the studies testing the IMV model would provide an understanding of which variables and pathways of the model are well supported by evidence. It would also highlight the generalisability of the findings, identify gaps in research, and present directions for future research. This would also be useful in advancing theory and inform evidence-based policy and interventions (Impellizzeri & Bizzini, 2012).

3.3. Methods

3.3.1. Screening and inclusion

The current systematic review adopted forward citation mining as the primary method used to find documents that reference the article that proposed this model (R. C. O'Connor,

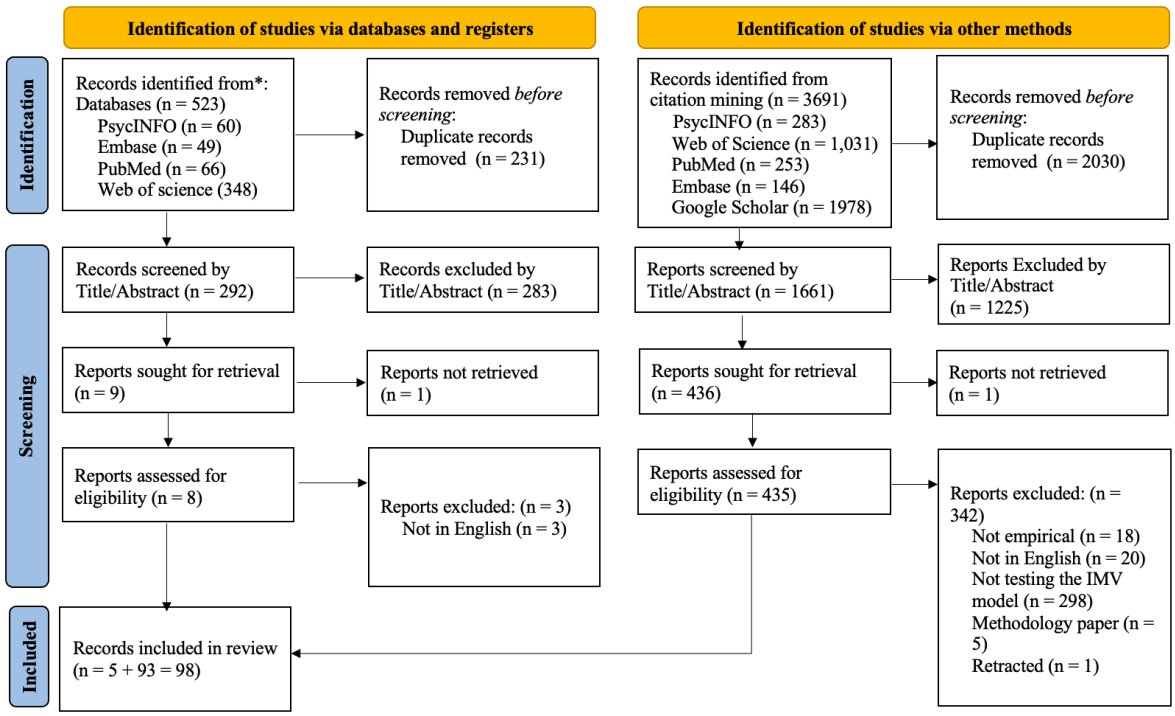
2011a) and the updated the model (R. C. O'Connor & Kirtley, 2018). As studies aiming to test the IMV model will be expected to reference the articles that proposed the original and updated the model, forward citation mining was determined as the best strategy to identify these studies. The following sources were searched using citation mining: PsycINFO, EMBASE, PubMed, Web of Science, and google scholar (https://scholar.google.com/), between 8th July 2021 to 6th August 2021. The searches were last updated on March 28th, 2023. Based on feedback during the peer-review process, additional forward citation mining was undertaken using the same databases specified above to identify any studies citing the book chapter on the IMV model published in the International Handbook of suicide prevention (R. C. O'Connor, 2011a) on 20th July 2023. Four papers were identified and included as a result.

The updates were conducted by executing the original searches again and manually comparing the new set of records to the original set of records and including newly identified records. As recommended by Bramer and Bain (2017), the total number of unique records identified from each search are reported in a flow diagram in Figure 3.2. An additional search strategy was also included in an update using the same databases: PsycINFO, EMBASE, PubMed, and Web of Science (Core collection, Current Contents connect, BIOSIS Previews, BIOSIS Citation Index, Data Citation Index, SciELO Citation Index). For this, all searches were filtered by language (English) and year of publication (After 2011). The following search strings were used for each database: PsycINFO: “Integrated Motivational-Volitional Model OR (integrated N2 motivational N2 volitional) OR IMV model”, Embase: “Integrated Motivational-Volitional Model OR (integrated adj2 motivational adj2 volitional) OR IMV model”, Web of Science: “Integrated Motivational-Volitional Model OR (integrated NEAR/2 motivational Near/2 volitional) OR IMV model”, Pubmed: “Integrated Motivational-Volitional Model OR (integrated AND motivational AND volitional) OR IMV model”.

Duplicate removal and screening were conducted manually using the Endnote referencing software by the first reviewer. Based on previous literature (Moore et al., 2022), 10% (n=29) of the papers were originally randomly selected using an online random sequence generator (https://www.random.org/) and independently screened by a second reviewer. However, due to the addition of papers during updates to the original search and during the peer review process, this proportion is 6.54% (n = 29) of all records selected for full-text screening. The interrater reliability was (78.79%; Kappa = 0.53). Any disagreements were resolved by discussion with the review team and did not result in changes to the review protocol.

Figure 3.2.

PRISMA Flowchart illustrating the screening and inclusion process



Studies were included or excluded based on the following eligibility criteria:

1. Studies empirically testing at least one of the following associations within the IMV model were included:

- The association between pre-motivational phase variables including diathesis, environment, life events and vulnerability to defeat and humiliation.
- The association between defeat and humiliation and entrapment, or entrapment and suicidal ideation, or suicidal ideation and behaviour.
- Moderators influencing the relationship between defeat and entrapment, entrapment and suicidal ideation, or suicidal ideation and action.
- Differences in theoretically relevant variables between individuals with no history of suicidal ideation or behaviour on the one hand, versus individuals with a history of suicidal ideation but not behaviour, and individuals with suicidal behaviour.

2. Studies published in English were included.

3. Review articles and book chapters only providing overviews of literature and/or recommendations for practice were excluded.

A total of 98 records (100 studies as two doctoral theses reported 2 eligible studies each) that met the inclusion criteria were included in the systematic review (See Appendix 1 & B for included studies and study characteristics). Several papers appeared to meet the inclusion criteria but were excluded on closer inspection. In four of these papers, the writing suggested that suicide-related outcomes were being investigated. However, the measures used were not valid measures of suicidal thoughts or behaviours. Studies were also excluded if none of the associations outlined in the inclusion criteria (such as pre-motivational phase variables and defeat, or defeat and entrapment) were being tested. Three cited the IMV model in the introduction but were primarily informed by other models, two studies observed suicidal thoughts as covariates while examining associations between other variables and suicidal behaviour, and one study tested the ability of various psychometric measures in predicting suicidal behaviour. Finally, one study observed entrapment as a mediator of the relationship between attachment styles and suicidal behaviour and one observed the

relationship between defeat and suicidal ideation directly. As this does not meet the conditions set out in the inclusion criteria, it was excluded.

3.3.2. Data Extraction and Synthesis

A piloted data extraction form was used to collect data manually from the records by the first reviewer. The data extracted included the following information specific to analyses aimed at testing the IMV model: Publication details (title, type of document, authors, and year of publication), study characteristics (research question/aims, hypotheses, study design, length of follow up, attrition rate, risk/protective factors and outcomes, moderators/mediators, covariates/confounding variables, and conclusions), data collection (sample size, demographic data, time frames, population, eligibility criteria, method of recruitment, participant grouping, measures used), method of analysis (descriptive statistics, statistical analyses used including missing data analyses), results related to presence and direction of effects. All information relevant to the outcome variables within the IMV model were collected. Specifically, data were sought for the following outcome variables: Defeat and humiliation, internal and external entrapment, suicidal/self-harm ideation (thoughts about harming oneself), suicidal behaviour including self-harm, non-suicidal, self-injury, parasuicide, or suicide attempts (any acts of intentionally harming oneself whether intent to die was present or not).

Studies and analyses were included in each synthesis if the evidence on the relevant association was being tested. Upon careful consideration, a narrative synthesis reported according to the PRISMA guidelines (Page et al., 2021) was deemed most appropriate for this review (See Appendix 3 & 4 for PRISMA Checklists). This was because the theoretical model under review is a comprehensive integrated model accounting for the role of a wide range of contextual factors, risk and protective factors, outcome variables, and moderators. Due to this nature of the model, studies testing the theory often test various aspects of it with

a range of study designs and variables. The studies meeting the eligibility criteria also show large clinical and methodological heterogeneity arising from participants (various countries, populations, age groups), independent and dependant variables, measures, study designs, and moderators. Thus, the findings were narratively synthesised with a focus on the IMV model associations being tested.

3.3.3. Quality Assessment

Quality Assessment was conducted using the National Institutes of Health (NIH[4]) tool for observational cohort and cross-sectional studies as well as the NIH tool for case-control studies by the first reviewer (NIH, 2014). These quality assessment tools can be consistently applied to a range of different study designs and ask specific questions regarding the methodology of the study. The questions included in both tools also required little subjectivity to assess. These tools have the following possible ratings for each question (Yes, No, Not reported, Not applicable, and Can't determine). The quality assessment tool for cross-sectional and cohort studies considered research aims, participant characteristics, sampling, time frame, characteristics and consistency of measures, blinding, attrition, statistical power, and confounding variables. For case-control studies, the quality assessment tool considered clarity of research aims, recruitment and participant characteristics, statistical power, sampling, measurement, use of concurrent controls, time frame and confounding variables. Studies were considered to account for relevant confounding variables if an adequate description of methods employed to select control variables was provided. The percentage of affirmative ratings was used to assess quality as follows (Maass et al., 2015): Poor (0–24.99%), fair (25–49.99%), good (50–74.99%) or excellent (75–100%).

3.4. Results

In order to aid readability, the references to the included studies are numbered in the results section (See Appendix 1 for the reference list of included studies). A total of 98 records (reporting 100 studies) with 138,365 (M = 1471.97; SD = 4332.06) participants were included in the current systematic review after accounting for overlap. As represented in Table 3.1, the included studies were primarily cross-sectional and conducted in the United Kingdom, Germany, and the United States of America. The location of data collection was not reported for four studies (Studies: 1, 2, 3, 4) and three studies were conducted online with international samples (Studies: 5, 6, 7). Nearly half the participants (45.45%) were recruited from the general population followed by university/college students (17%), hospitals (17%), school students (10%), and military (2%).

Table 3.1

Design, location, and sample characteristics of included studies

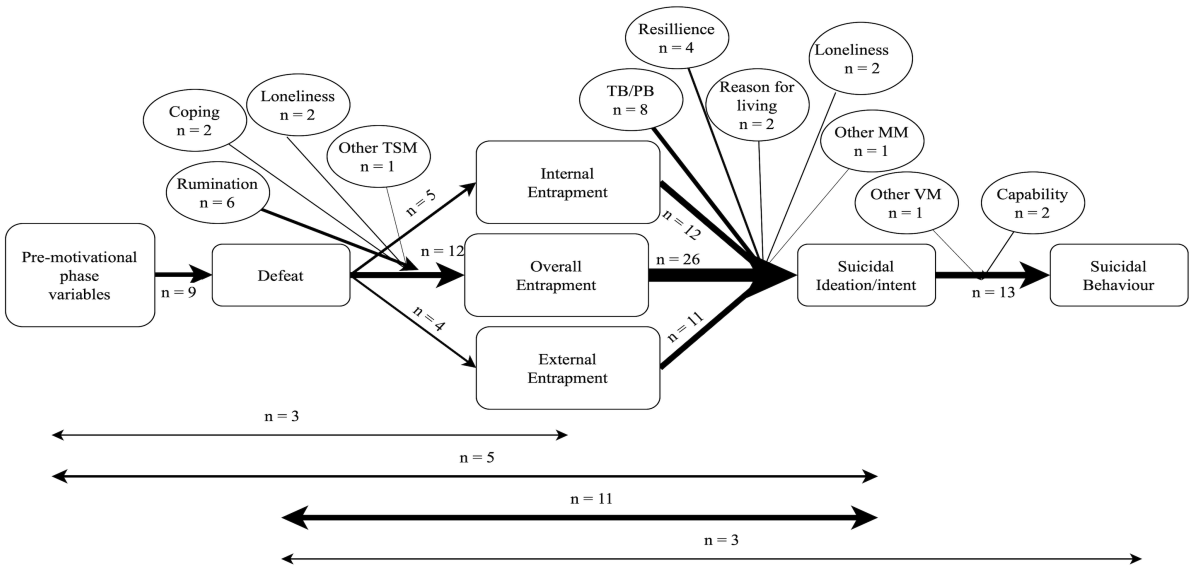
Study Design Number of studies (%)		Country Number of studies (%)		Recruited from Number of studies (%)	
Cross-sectional	44 (44%)	United Kingdom	39 (39%)	General population	45 (45%)
Retrospective Case-Control	25 (25%)	United states of America	16 (16%)	Universities & Colleges	17 (17%)
Prospective Case-control	6 (6%)	Germany	11 (11%)	Schools	10 (10%)
Experimental Case-control	2 (2%)	China	6 (6%)	Hospitals	17 (17%)
Cohort	18 (18%)	Spain	5 (5%)	Prisons	4 (4%)
Ecological Momentary Assessment	5 (5%)	Not reported and Online	7 (7%)	Military	2 (2%)
		Australia	3 (3%)	General population/ Hospitals	2 (2%)
		Korea/Iran/Canada	2 (2%)	Healthcare staff/ Online	1 (1%)
		Other	1 (1%)		

Note. Other countries include Israel, India, Netherlands, Hong Kong, Belgium, Taiwan, and France.

Only two studies tested all three phases of the IMV model (Studies: 7, 8) and one of these was a network analysis that included variables derived from the IMV model. The remaining included studies only tested specific aspects of the IMV model. Figure 3.3 illustrates the associations within the IMV model that were most frequently tested (Studies testing each pathway are outlined in Appendix 5). These included studies testing multiple pathways of the model separately. However, this does not include studies investigating group differences as they were not testing these pathways within the model. Among studies testing longer pathways in the model, three studies investigated defeat as a mediator between pre-motivational phase variables and entrapment (Studies: 2, 9, 10). Five studies reported on defeat and entrapment as mediators between pre-motivational phase variables (impulsivity, stress, childhood trauma, nightmares, insomnia, and wellbeing) and suicidal ideation (Studies: 8, 11, 12, 13, 14). Eleven studies reported on entrapment (overall, internal, or external) as a mediator between defeat and suicidal ideation (9, 10, 15, 16, 17, 18, 19, 20, 21, 22, 23). Finally, three studies examined entrapment and suicidal ideation as mediators between defeat and suicidal behaviour (Studies: 24, 25, 26).

Figure 3.3.

Frequency of IMV model pathways tested in included studies



Note. TSM = Threat-to-self moderators, TB = Thwarted Belongingness, PB = Perceived Burdensomeness, MM = Motivational moderators, VM = Volitional Moderators. This figure demonstrates the pathways in the IMV model that were investigated within the included studies. The thickness of the arrows represents the number of studies that tested the relevant association. Similarly, the arrows at the bottom represent the number of studies that tested pathways using mediation models. N provides the actual number of studies testing the pathway.

3.4.1. Evidence for associations between pre-motivational phase variables and motivational phase variables

Fourteen studies tested the association between pre-motivational variables and defeat (Studies: 2, 8, 9, 10, 11, 12, 13, 14a&b, 27, 28, 29, 30) or defeat/entrapment as one variable (Study: 7). Nine out of these studies were cross-sectional (64.29%), three were prospective studies (21.43%), and two were ecological momentary assessments (14.29%). A majority of

these studies were conducted among students or the general population. Table 3.2 illustrates the pre-motivational phase variables, mediators, and direction of effects for these variables.

Table 3.2

Relationship between pre-motivational variables and mediators and defeat

Authors & year	Pre-motivational Variable (s)	Mediator (s)	Direction of Effect, Mediation
Study: 9	Paternal Overprotection	Avoidant attachment	Positive Effect, Mediation present
	Paternal Overprotection	Anxious attachment	Positive Effect, No Mediation
	Maternal Overprotection	Avoidant attachment	Positive Effect, No Mediation
	Maternal Overprotection	Anxious attachment	Positive Effect, Mediation present
	Maternal/Paternal care	Avoidant attachment, Anxious attachment	Negative Effect, Mediation present
Study: 11	Impulsivity	--	Positive Effect
	Stress	--	Positive Effect
	Childhood Trauma	--	No Effect
Study: 7 (Network analysis)	Physical/Emotional/ Sexual abuse trauma	--	Not directly linked
	Coping strain	--	Directly linked
	Value strain	--	Not directly linked
Study: 27	Psychological distress	--	Positive
	Emotional stability/ Extraversion/ Conscientiousness	--	Negative
	Openness/ Agreeableness	--	No Effect
Study: 29	Self-compassion subscales (Mindfulness)	--	Negative (Cross-sectional only)

	Self-compassion subscales (Self-judgement, isolation)	--	Positive (except in prospective analysis controlling for depression)
	Self-compassion subscales (Overidentification)	--	Positive (Reduced to non-significance after accounting for depression)
	Self-compassion subscales (Self-kindness, Common Humanity)	--	No Effect
Study: 8	Mental Wellbeing	--	Negative Effect
Study: 12, 13, 14	Insomnia	--	Positive Effect
Study: 14	Sleep Quality	--	Negative Effect
	Sleep disturbances [a]	--	No Effect
Study: 13	Nightmares	--	Positive Effect
Study: 28	Time spent on social media	Social comparison on social media	Positive Effect, Mediation at within-person level
Study: 2, 10	Socially prescribed perfectionism	Social comparison	Positive Effect, Mediation present
Study: 2	Socially prescribed perfectionism	Rejection sensitivity	Positive Effect, Mediation present
Study: 30	Workplace Bullying	--	Positive Effect

Note. -- = No mediators, a = e.g. sleep onset/time/efficiency/quality, wake up after sleep onset, nightmare presence/vividness/intensity.

Two studies investigated the role of childhood experiences and parenting on motivational phase variables. After controlling for depressive symptoms, one study found that the presence of parental care in the first 16 years of life was associated with lower defeat scores in a general population sample and this association was partially mediated by insecure attachment (Study: 9). They also reported that paternal overprotection was indirectly related

to increased feelings of defeat through attachment avoidance while maternal overprotection was indirectly linked to defeat through attachment anxiety. Attachment anxiety and avoidance was subsequently associated with increased entrapment indirectly through defeat. In contrast, one study reported that childhood trauma was not significantly related to defeat among a group of men with alcohol use disorder (Study: 11). A network analysis of IMV model variables also found that physical, emotional, and sexual abuse trauma and value strain was indirectly positively associated with defeat/entrapment conceptualised as one variable through thwarted belongingness and coping strain was directly associated with defeat (Study: 7).

Various psychological factors were also related to motivational phase variables. For instance, higher psychological distress (Study: 27) and poorer sleep quality (Study: 14) was associated with higher feelings of defeat. In contrast, individuals reporting greater mental wellbeing were more likely to report lower suicidal ideation (Study: 8). This association was also mediated by defeat and internal and external entrapment. Self-compassion subscales (self-judgement and isolation) were positively linked to defeat cross-sectionally and prospectively (Study: 29). However, this effect did not remain significant in the prospective analysis after accounting for depressive symptoms. In contrast, the mindfulness subscale was cross-sectionally negatively associated with defeat. Finally, the self-kindness and common humanity subscales were not significantly associated with defeat. Additionally, variables including nightmares and insomnia (Studies: 12, 13, 14), and stress and impulsivity (Study: 11) were also associated with increased suicidal ideation through defeat and entrapment.

Studies have also demonstrated the role of social and personality factors as pre-motivational phase variables. Two studies reported that higher levels of perfectionism were linked to higher defeat scores and this effect was mediated by social comparison (Studies: 2, 10). Negative social comparison and rejection sensitivity were also positively related to

increased feelings of defeat and subsequently entrapment. Furthermore, social comparison in the online context was also associated with defeat and mediated the effect of time on social media on defeat (Study: 2). This effect was further heightened in the presence of problematic social media use. A cross-sectional study also reported that workplace bullying was associated with greater feelings of defeat. This association was moderated by rumination. However, personality variables such as extraversion and conscientiousness were related to lower defeat scores while lower emotional stability was related to higher defeat (Study: 27). Finally, openness and agreeableness were not significantly associated with defeat.

3.4.2. Evidence for hypothesised associations within the motivational phase

3.4.2.1. Defeat-Entrapment association

Sixteen studies examined the association between defeat and either entrapment or it's subcomponents, internal and external entrapment (see Appendix 6; Studies: 24, 26, 29, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43). Eleven of these studies were cross-sectional in design (68.75%), while the remaining were cohort (n = 3, 18.75%) and ecological momentary assessment (n = 2, 12.50%). Among these, twelve studies investigated the relationship between defeat and overall entrapment among 5,021 participants (M = 418.42, SD = 348.64). All studies reported that higher defeat was significantly associated with higher entrapment in the cross-sectional analyses in both univariate and multivariate analyses (Studies: 26, 29, 31, 32, 33, 34, 35, 36, 37, 38, 41). One study further reported that baseline defeat prospectively predicted entrapment over 2.5 months (Study: 29). However, an ecological momentary assessment study over 7 days reported that defeat did not prospectively predict entrapment when accounting for autocorrelative effects (Study: 32) while another found bidirectional effects between defeat and entrapment at 3 hours but not 6, 9, or 12 hours (Study: 42).

Five studies examined the relationship between defeat and internal or external entrapment. Two cross-sectional studies (Study: 24, 38) reported that defeat was significantly associated with both internal and external entrapment. Similarly, defeat was directly connected to internal and external entrapment in a network analysis (Study: 43). A 1-year cohort study also reported that defeat was associated with internal and external entrapment and change in internal and external entrapment cross-sectionally among a sample of inpatients admitted to a psychiatric ward following a suicide attempt or suicidal crisis (Study: 39). However, defeat also prospectively predicted change in internal entrapment but not internal/external entrapment or change in external entrapment. One study did not report results on external entrapment and overall entrapment due to non-significant findings but reported a positive association between defeat and internal entrapment in cross-sectional analyses when rumination and problem-solving were accounted for (Study: 40).

Threat-to-self moderators. Threat-to-self moderators are variables that may enhance or buffer the relationship between defeat and entrapment. A number of variables were investigated as threat-to-self moderators. The findings are presented below.

Rumination. Investigations of the influence of rumination on the relationship between defeat and entrapment yielded mixed results. Six studies tested rumination as a moderator between defeat and entrapment among adolescent and adult students, general population, and prison populations (Studies: 20, 21, 24, 26, 34, 40). Among these, two studies found that the association between defeat and overall entrapment was stronger among individuals scoring higher in rumination (Studies: 24, 34) while another reported that brooding but not the reflection components of rumination strengthened the defeat-entrapment relationship (Study: 20). The remaining studies did not report a significant influence of rumination (brooding or reflection) on the relationship between defeat and entrapment or internal entrapment (Studies: 21, 26, 40).

Coping. There was limited evidence for the role of coping as a threat-to-self moderator. Two cross-sectional studies investigated the role of maladaptive coping (Study: 9) and coping flexibility (Study: 34) on the relationship between defeat and entrapment. Maladaptive coping was not found to significantly affect the defeat-entrapment relationship (Study: 9) while coping flexibility significantly buffered this relationship.

Loneliness. Two studies investigated the effects of loneliness on the defeat-entrapment relationship and found mixed results. One study reported that loneliness strengthened the relationship between defeat and entrapment (Study: 31) while another found that loneliness and its sub-facets (global, romantic, social or family) did not moderate this relationship (Study: 41).

Other moderators. The effects of a wide range of other variables on the defeat-entrapment relationship were also investigated. None of the moderators in this section were included in more than one study, limiting the ability to draw conclusions. Among these, resilience (Study: 10), experiential avoidance (Study: 35), and rational problem solving (Study: 40) moderated the defeat-entrapment association. In these models, rational problem-solving and experiential avoidance (tendency to avoid internal experiences) strengthened these associations while resilience was protective against entrapment in the presence of defeat. Other variables including desire for control sub-facets – leadership and destiny control (Study: 33), gender role conflict and androgyny (Study: 34), race-based rejection sensitivity (Study: 16), problem-solving variables (positive, negative, impulsive-careless, avoidance style; (Study: 40) and post-traumatic growth (Study: 37) did not affect the defeat-entrapment relationship. Finally, one study reported that a variable comprised of items from threat-to-self moderator scales including rumination, catastrophising, self-blame, and other-blame weakened the relationship between defeat and entrapment (Study: 22).

3.4.2.2. Entrapment-Suicidal ideation association

Thirty-three papers aimed to investigate the relationship between entrapment or its subcomponents and suicidal ideation (See Appendix 7). These studies included data from 24, 244 participants (M = 738.06, SD = 775.88). Twenty-four (72.73%) out of these studies were cross-sectional, eight (24.24%) were prospective analyses, and one was an ecological momentary assessment (3.03%). The association between overall entrapment and suicidal ideation was investigated by twenty-three studies among 13,020 participants (M = 542.5, SD = 383.93; Studies: 17, 18, 23, 26, 29, 30, 31, 33, 36, 37, 38, 42, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54). Eighteen of these studies reported a positive association between entrapment and suicidal ideation among 9,143 participants from the student, clinical, military, and the general populations while controlling for a range of suicide risk factors (M = 507.94, SD = 347.60; Studies: 17, 18, 23, 26, 29, 30, 37, 38, 42, 46, 47, 48, 49, 50, 51, 53, 54, 55). Four cross-sectional studies (2,463 participants, M = 615.75, SD = 511.20) from the general population (Studies: 31, 33, 36, 52) reported that overall entrapment was not significantly related to suicidal ideation in multivariate analyses. Two studies showed mixed results. One reported that entrapment was cross-sectionally linked to suicidal ideation in female students but not males while controlling for demographic variables (Study: 45). Entrapment also prospectively predicted suicidal intent but not ideation among a sample of students (Study: 44).

Eleven studies reported on the sub-facets of entrapment and suicidal ideation (Studies: 1, 14, 15, 17, 24, 38, 39, 40, 43, 56, 57). Both internal and external entrapment were significantly related to suicidal ideation in five cross-sectional studies in 1,780 participants among students, general, clinical and prison populations (M = 356, SD = 281.43; Studies: 1, 17, 24, 30, 38, 55, 56). The remaining studies indicated that internal but not external entrapment were associated with suicidal ideation cross-sectionally among 9,468 participants

(M = 1,893.60; SD = 1388.48) from general, military, student and clinical samples (Studies: 40, 43, 57) and prospectively (Studies: 14, 15, 39). In addition, one of these reported that internal but not external entrapment was associated with an increase in suicidal ideation cross-sectionally but a decrease prospectively when accounting for defeat as participants scored lower on all IMV model variables over the course of the study (Study: 39). Four studies further investigated the predictive ability of defeat/entrapment characterised as one variable among the general population and students (Studies: 7, 58, 59, 60). One of these reported that defeat/entrapment predicted suicidal ideation at three months but not six months follow up and this effect was non-significant after controlling for depressive symptoms (Study: 60). The remainder reported that defeat/entrapment was cross-sectionally associated with suicidal ideation. Finally, based on a network analysis of qualitative data from online posts, one study reported that defeat/entrapment was not directly linked to suicide plans in the network (Study: 7).

Motivational moderators. Motivational moderators are hypothesized to influence the relationship between entrapment and suicidal ideation. The findings with relation to motivational moderators are presented below.

Thwarted belongingness (TB). TB alone was generally not found to enhance or buffer the relationship between entrapment and suicidal ideation. Four studies examined thwarted belongingness as a moderator of the entrapment-suicidal ideation relationship. TB was found to enhance the entrapment-suicidal ideation relationship in two of these (Studies: 26, 47). However, one of these only found a significant effect after including the three-way interaction effect between Entrapment, Perceived Burdensomeness, and TB (Study: 47). The remaining studies did not report a significant effect (Studies: 15, 46).

Perceived burdensomeness (PB). The included studies generally supported the effects of PB on the entrapment-suicidal ideation relationship. Seven studies investigated the moderating role of perceived burdensomeness on Entrapment-SI (Studies: 15, 17, 21, 24, 26, 46, 47). Four of these reported that perceived burdensomeness enhanced the relationship between entrapment and suicidal ideation (Studies: 21, 26, 47) and internal entrapment (Study: 24). Interestingly, one of these reported that perceived burdensomeness weakened the relationship between entrapment and suicidal ideation among a sample of African American students (Study: 21). Furthermore, two studies reported significant three-way interactions between TB, PB and entrapment with suicidal ideation as outcome. One study reported that TB*PB strengthened this association (Study: 47) while the other found that it decreased the effect of entrapment on suicidal ideation (Study: 17). This three-way interaction remained significant for internal and external entrapment as well (Study: 17). Finally, one study conceptualised interpersonal variables (TB and PB) as a single variable and reported that it increased the effect of entrapment on suicidal ideation (Study: 22).

Resilience. The role of resilience as a motivational moderator in the IMV model was supported by the evidence. The effect of resilience on the relationship between entrapment/internal entrapment and suicidal ideation was examined by four studies (Studies: 9, 10, 24, 26). All 4 of these studies found that resilience was protective against suicidal ideation in the presence of entrapment.

Reasons for living. Studies reporting on the moderating role of reasons for living found promising results. The results of two studies that included reasons for living as a motivational moderator indicated a significant attenuating effect of reasons for living with overall entrapment (Study: 50) and internalized and externalized entrapment (Study: 1). This paper further reported that presence of life meaning influenced the effects of both internalised and externalised entrapment on suicide, and the three-way interactions of both internal and

external entrapment with ReasonsForLiving*PresenceOfLifeMeaning and ReasonsForLiving*SearchforLifeMeaning were significantly associated with suicidal ideation.

Loneliness. Two studies investigated loneliness as a motivational moderator in the entrapment-suicidal ideation relationship. Both studies found that individuals with higher entrapment and higher loneliness were likely to have higher suicidal ideation scores (Studies: 31, 41). Additionally, one of these reported that this was only true for family, romantic, and global loneliness but not social loneliness (Study: 41).

Other moderators. Various other potential moderators were identified as motivational moderators. As with threat-to-self moderators, the variables included in different studies were diverse. Individuals with high entrapment were more likely to report suicidal ideation in the presence of higher psychological pain (Study: 23, 48), and attitude to suicide i.e., feeling like suicide is an option for them (Study: 24). Alternatively, individuals with high entrapment were less likely to report suicidal ideation if they reported goal re-engagement (Study: 40), positive mental health, overall positive wellbeing, and the positive wellbeing subfacet – self-acceptance (Study: 61), better sleep quality (Study: 62), hope (Study: 20), and desire for control subscale – decision avoidance (Study: 33). Positive wellbeing sub-facets (autonomy, environmental mastery, personal growth, positive relations, and purpose in life; Study: 61), sub-facets of desire for control (destiny control and leadership; Study: 33), race-based rejection sensitivity (Study: 16), Rumination, post-traumatic growth (Study: 37) and wellbeing (Study: 8) did not moderate this relationship. Additionally, fearlessness about death increased the relationship between internal and external entrapment and self-rated likelihood of attempt but not past month suicidal ideation or plan (Study: 57). Furthermore, a study among sexual minority adults found that family belongingness but not belongingness

with sexual minority friends or community or straight friends buffered the relationship between entrapment and suicidal ideation (Study: 49).

When defeat/entrapment was conceptualised as one variable, ethnic identity subfacet – exploration and commitment (Study: 58) buffered the effect of defeat/entrapment on suicidal ideation while positive future thinking (Study: 60) strengthened it. However, the subfacets of ethnic identity (belonging and affirmation) did not moderate this relationship. Further, positive future thinking moderated this relationship at three months follow up but not at baseline or six months.

3.4.2.3. Entrapment as mediator between defeat and suicidal ideation

Eleven studies investigated the indirect effects of defeat on suicidal ideation through overall entrapment (See Appendix 8). Five of these reported a significant mediating role of entrapment in the cross-sectional analyses among 1,919 participants (M = 383.80, SD = 151.36) from the general population, student, and clinical samples between defeat and suicidal ideation after accounting for a range of variables including depressive symptoms, racial rejection sensitivity, and demographic characteristics (Studies: 9, 10, 16, 17, 18). One study did not find a significant effect cross-sectionally or prospectively (23). Two studies also reported that entrapment mediated the relationship between defeat and suicidal ideation prospectively at 1 month and 4 months respectively among participants from general and clinical populations (Studies: 18, 19). However, one of these did not find this effect at 6-month follow-up (Study: 18). Three studies reported that defeat was positively linked to entrapment cross-sectionally but the association between entrapment and suicidal ideation was not significant in the general population and university students (Studies: 20, 21, 22). No trends were observed across studies with relation to the inclusion of additional covariates in these models.

Additionally, three studies operationalised entrapment into internal/external entrapment. Internal entrapment was found to mediate the relationship between defeat and suicidal ideation in two of these among 2,758 participants both cross-sectionally (Study: 17) and prospectively over 4 and 12 months upon accounting for depression and other variables (Studies: 15, 19). Only one study found that external entrapment mediated the relationship between defeat and entrapment cross-sectionally (Study: 17).

3.4.3. Evidence for hypothesised associations within the volitional phase

3.4.3.1. Suicidal ideation-Suicidal behaviour association

Twelve studies investigated the relationship between suicidal ideation and behaviour among 13,324 participants (M = 1332.4, SD = 2414.06; See Appendix 9). Nine reported a positive association between suicidal ideation or plan and behaviour in the cross sectional (Studies: 24, 26, 59, 63, 64) and prospective analyses (Studies: 5, 6, 65, 66). One of these reported that detailed suicide plan and past week plan were univariately associated with suicidal behaviour while plan involving methods and lifetime plan were not (Study: 5). Additionally, one study reported that suicidal ideation was predictive of suicidal behaviour during a four-year follow up in the univariate but not multivariate analyses (Study: 67). Two network analyses investigated the relationship between duration and frequency of suicidal ideation or plans on suicidal behaviour. One of these investigated this association over 15 months (Study: 68) while the other qualitatively coded online posts based on themes associated with IMV model variables (Study: 7). The resulting networks indicated that these independent variables were not directly linked to suicidal behaviour.

Volitional moderators. Volitional moderators are variables that facilitate the transition from suicidal ideation to behaviour. This section presents findings of studies investigating volitional phase variables.

Acquired Capability. Acquired capability, consisting of fearlessness about death and pain tolerance were not supported by the included studies as volitional moderators. Two studies reported the role of acquired capability in the transition from suicidal ideation to behaviour. Both fear of dying and pain tolerance did not significantly influence the suicidal ideation-attempts relationship cross-sectionally (Study: 26), or prospectively (Study: 6).

Exposure to suicide. One study reported the role of exposure to suicide in facilitating the transition from suicidal ideation to behaviour. Exposure variables including familial suicide attempts, number of familial attempts, non-familial attempts, number of non-familial suicide attempts were also not found to influence the suicidal ideation-attempts relationship (Study: 68).

Other moderators. One study reported that disinhibition enhanced the relationship between suicidal thoughts and behaviours while academic grades buffered the relationship between suicidal thoughts and behaviour (Study: 64).

3.4.4. Evidence for the central pathway of the IMV model

Three studies also investigated the relationship between defeat and suicidal behaviour with entrapment and suicidal ideation as mediators in schools, universities, and prisons. Two of these studies reported that entrapment and suicidal ideation mediated the relationship between defeat and suicidal behaviour among 3,048 participants (Studies: 25, 26). The remaining study found that internal but not external entrapment and suicidal ideation mediated this association after controlling for hopelessness (Study: 24).

3.4.5. Case-control studies investigating group differences based on suicide-related outcome group

Thirty-six studies investigated a range of theoretically relevant variables in distinguishing between individuals reporting no suicidal ideation or behaviour (control group), suicidal ideation but not behaviour (ideation group), and the presence of suicidal behaviour (enactment group). Based on the hypotheses of the IMV model, it is expected that pre-motivational and motivational phase variables would differentiate between control and ideation groups while volitional phase variables would differentiate between ideation and enactment groups. Given the wide range of variables, their sub-facets investigated, and the heterogeneity in conceptualising and measuring these, only findings relevant to the variables explicitly described by the IMV model are discussed here. Additionally, the findings presented here are focussed on the group differences based on the predictions of the IMV model. More specifically, differences between control and ideation groups in pre-motivational and motivational phase variables are presented and differences between ideation and enactment groups in volitional phase variables are presented. The findings are synthesised based on whether the analysis was univariate (examining differences in one variable) or multivariate (examining differences in one construct while accounting for other IMV model variables) and the timeframe (cross-sectional or prospective). However, the full table of results alongside information about statistical analyses and controlled variables for all model comparisons and analyses is presented in Appendix 14.

3.4.5.1. Premotivational phase variables

Socially Prescribed Perfectionism. Two cross-sectional studies investigating whether socially prescribed perfectionism differentiated between control, ideation, and enactment groups reported that individuals in the control group reported lower perfectionism

compared to the ideation and enactment groups in univariate analyses (Study: 18, 70). However, the individuals in the ideation and enactment groups did not differ in perfectionism scores.

Childhood adversity. Overall adversity was significantly higher in the enactment compared to the ideation group in multivariate analyses in a cross-sectional study controlling for demographic and health-related factors (Study: 71) but not in a univariate prospective study (Study: 72). Emotional abuse, physical abuse, and physical neglect were higher in the enactment compared to the ideation group in the cross-sectional multivariate analyses accounting for other forms of childhood abuse (Study: 4) However, emotional neglect and sexual abuse did not significantly differentiate these groups. A longitudinal study also reported that sexual abuse did not differentiate between the ideation and enactment groups (Study: 73). This study also reported that individuals from the control group were less likely to report experiencing bullying and household cruelty compared to ideation and enactment groups while controlling for sex and socioeconomic status (Study: 73).

3.4.5.2. Motivational phase variables

Defeat/humiliation. Eight out of nine studies found that individuals in the ideation group were more likely to report defeat compared to the control group in cross-sectional univariate analyses (Study: 18, 29, 23, 60, 74, 75, 76, 77a). Findings were mixed in the multivariate analyses where multiple suicide risk factors were compared in a single analysis. Specifically, two out of four studies found that the control group scored lower in defeat than the ideation group accounting for a range of motivational and volitional phase variables (Study: 74, 76). However, study 74 only found a significant difference after including volitional phase variables in the model.

Two studies out of three also reported that defeat was lower in the ideation compared to the control groups prospectively over several weeks in the univariate analyses accounting for baseline suicidal ideation (Study: 23, 29). This difference was non-significant in the multivariate analysis with baseline suicidal ideation, depressive symptoms, self-compassion, mindfulness stress, and resilience in the model (Study: 29). One study did not report any differences in defeat between control and ideation groups both cross-sectionally or prospectively (Study:79). Only two studies reported that defeat was higher in the enactment groups compared to the ideation group in the cross-sectional univariate analyses. This effect was not significant in the multivariate analyses after including demographic variables and motivational and volitional variables in the IMV model (Study: 74, 76). Studies examining humiliation reported that humiliation did not differentiate the control and ideation groups or ideation and enactment groups in cross-sectional univariate analyses (Study: 77a, 78).

Entrapment. Seven out of ten studies reported that individuals in the control group reported lower overall entrapment than the ideation group cross-sectionally (Study: 23, 29, 60, 74, 75, 76, 79). Among five studies that conducted multivariate analyses, only two of these were significant (Study: 29, 74). Specifically, study 29 reported that the control group reported lower entrapment than the ideation group after accounting for depressive symptoms, sexual orientation, self-compassion and self-criticism, defeat, and mindfulness and resilience. Study 74 also reported that the control group had lower entrapment after accounting for mood variables, demographic variables, and a range of motivational and volitional risk factors. Three studies that examined these differences prospectively reported mixed results. Specifically, one of these reported that entrapment was significantly lower in the control group in the univariate analyses (Study: 23, 29) while the other reported no significant differences (79). This difference did not remain significant in the multivariate analyses after

controlling for baseline suicidal ideation, depressive symptoms, defeat, stress, and self-compassion and self-criticism, mindfulness, and resilience (29).

Additionally, two out of three studies reported that internal and external entrapment were higher in the ideation compared to the control groups in the univariate cross-sectional (Study: 18, 29) and prospective analyses (Study: 29). Study 77a did not report any differences. Additionally, both internal and external entrapment did not differentiate the ideation and enactment groups.

Rumination. Two cross-sectional studies reported that rumination was higher in the ideation compared to the control group in the univariate analyses (Study: 70, 74) while one study reported no differences (Study: 80). This difference remained significant in study 74 in multivariate analyses after accounting for a range of motivational and volitional phase variables. Rumination was also higher in the enactment group in two out of three studies (Study: 74, 80). This difference was not significant in the multivariate analyses in study 74.

Coping. One study reported that maladaptive but not adaptive coping was higher in the ideation group cross-sectionally in the univariate and multivariate analyses but not prospectively over 6 months (Study: 79). This was after accounting for demographic, mood, and other motivational/volitional phase variables. Both adaptive and maladaptive coping did not differentiate the ideation and enactment groups. Two studies investigated further sub-facets of coping including active, avoidant, passive, problem-focussed, and emotion-focussed coping (Study: 81, 82).

Study 81 reported that in the sexual minority population, active coping was significantly higher in the control group compared to the ideation group, but this difference did not remain significant after including passive coping in the model. However, active coping remained significant when examining past-year ideation only. Similarly, in the gender minority group, active coping was only significantly higher in the control group than in the

ideation group before including avoidant and passive coping. However, for past-year suicidal ideation, active coping in this sample was significantly higher after including avoidant coping but reduced to non-significance after including passive coping. In terms of avoidant coping, the control group reported lower avoidant coping than those reporting lifetime and past-year suicidal ideation in the sexual minority population. The control group also scored lower than the ideation group in avoidant coping in the gender minority population, only while accounting for past year ideation.

After including passive coping in the models, the ideation group in the sexual minority sample reported higher avoidant coping than the control group for lifetime ideation but no significant differences when compared to past year ideation. There were no significant differences in the gender minority population. In contrast, study 82 found that avoidant coping was higher in the ideation group in the univariate and multivariate analyses which accounted for demographic factors, interpersonal factors, coping factors, and resilience. In terms of passive coping, study 81 reported that passive coping was higher in the ideation compared to the control groups for both sexual and gender minority samples after the inclusion of avoidant and active coping. Finally, emotion-focussed coping but not problem focussed coping was significantly higher in the ideation group compared to the control group in both univariate and multivariate analyses (Study: 82).

Social support. Four out of six cross-sectional studies reported that individuals in the control groups reported higher social support than those in the ideation group (Study: 18, 76, 83, 84) while one reported that the ideation group scored higher (Study: 80) in the univariate analyses. Additionally, two of three studies also reported that the control group scored higher than the ideation group in multivariate analyses (Study: 84, 85). Here, study 84 accounted for variables including demographics, life events, alcohol or substance use, social support, wish to live, sleep quantity, aggression, and prior self-harm. This difference remained significant

in the prospective multivariate analyses over 2 years upon accounting for demographic variables, mood, past ideation and behaviour, and exposure to suicidal behaviour (Study: 85).

Two studies also examined sub-facets of social support including family support, friend support, and significant other support. In the univariate cross-sectional analyses, family support was significantly higher in the control groups (79, 82). However, only one of these reported that friend and significant other support was significantly higher in the control group (82). These differences were not significant in the multivariate analyses upon accounting for demographic, interpersonal and motivational phase variables. None of these differences were significant in the prospective analyses.

Goal disengagement and re-engagement. Additionally, two cross-sectional studies examined differences in both goal disengagement and re-engagement among the control and ideation groups, in the univariate analyses (Study: 74, 76). Both studies found that goal disengagement was lower in the control group compared to the ideation group, but the ideation and enactment groups did not differ. Interestingly, study 74 reported that goal reengagement was highest in the control followed by the ideation and enactment groups, while study 76 reported that goal reengagement was the highest in the enactment group followed by the ideation and control groups. These differences were not significant in the multivariate analyses accounting for motivational and volitional phase variables (74, 76).

Burdensomeness and belongingness. Three cross-sectional studies examined group differences TB and PB between control and ideation groups. In the univariate analyses, PB was significantly lower in the control group compared to the ideation group in all studies (18, 74, 76). Two of these conducted multivariate analyses accounting for a range of motivational and volitional variables (74, 76). The results indicated that PB was significantly lower in the control group compared to the ideation group in both studies. With regard to TB, two studies

found that control groups scored lower in belongingness in the univariate analyses (Study: 18, 76) while one study reported that control groups scored higher (Study: 74). Among the two studies that conducted multivariate analyses accounting for other motivational and volitional phase variables, one found that TB was higher in the control group while the other reported no differences (Study: 74, 76).

Resilience. Six out of seven studies comparing resilience among control and ideation groups reported that resilience was higher in the control group both cross-sectionally (Study: 18, 29, 76, 82, 86, 87) and prospectively (Study: 29). Two of the three studies that conducted cross-sectional multivariate analyses reported that resilience differentiated the control and ideation groups. One of these found that resilience was higher in the control group after accounting for demographic, interpersonal, and coping factors (82). The other study reported that resilience was higher in the control group after accounting for demographic, interpersonal, and self-compassion/criticism, mindfulness, resilience, and other motivational phase variables (29). The third study did not find significant differences between the groups (76). Additionally, one study examining the sub-facets of resilience reported that emotional control, family support, and interpersonal assistance but not goal focus or positive cognition were higher in the control group in the cross-sectional univariate analyses (86).

Norms. In terms of stigmatisation and norms, one study examining sub-facets of suicide stigmatisation (stigmatisation, isolation/depression, glorification/normalisation) reported largely no significant differences between control and ideation groups (79). However, glorification/normalisation alone was significantly higher in the ideation compared to the control group in the prospective multivariate analyses accounting for social support, stigmatisation, and baseline suicidal ideation. Additionally, a study on norms reported that the ideation and enactment groups were more likely to believe that their peers engaged in suicidal behaviour compared to the control group (70).

3.4.5.3. Volitional Phase variables

Impulsivity. Consistent with the IMV model's predictions, five cross-sectional studies reported that impulsivity was higher in the enactment group compared to the ideation group in the univariate analyses (Study: 18, 70, 74, 76, 77a). Three of these further reported that the differences remained significant in the multivariate analyses where two of these accounted for motivational and volitional variables (Study: 74, 76) and the remaining study accounted for social modelling of suicide (77a).

Of the three prospective studies investigating group differences in impulsivity using univariate analyses, only one reported that the enactment group scored higher in impulsivity compared to the ideation group over 6 years (Study: 73). A range of sub-facets of impulsivity were also compared between the ideation and enactment groups (Study: 83, 89, 90). This included response inhibition, positive urgency, negative urgency, and behavioural measures of impulsivity. Negative urgency was higher in the enactment group compared to the ideation group in univariate analyses in two out of three studies (83, 89). One of these further reported that the enactment group scored higher in negative urgency in the multivariate analyses controlling for demographic variables, alcohol-related volitional factors, and self-harm (83). One study further reported that lack of premeditation and lack of perseverance but not positive urgency were significantly higher in the enactment group compared to the ideation group in univariate cross-sectional analyses (90). This study further examined group differences in behavioural measures of impulsivity in but did not find any significant differences.

Acquired Capability for Suicide. Two out of three cross-sectional studies reported that the acquired capability of suicide was higher in the enactment group compared to the ideation group in the univariate analyses (Study: 18, 76). Study 76 further conducted multivariate analyses upon controlling for a range of motivational and volitional phase

variables outlined by the IMV model and reported that the differences remained significant. Additionally, of the three cross-sectional studies investigating fearlessness about death, only one reported that the enactment group scored significantly higher than the ideation group in both univariate and multivariate analyses which accounted for motivational and volitional phase variables (Study: 74). Six studies compared differences in pain or discomfort tolerance among individuals reporting suicidal ideation and enactment using a range of measures including self-report questionnaires, algometer, cold and heat pressors, etc. (Study: 3, 74, 77a&c, 80, 91). Self-report measures largely showed mixed results with emotional pain sensitivity and physical pain distress being higher in the enactment group in univariate analyses (Study: 77c, 91). However, overall discomfort tolerance did not differentiate between the groups (74, 80). Among the behavioural measures, pain tolerance tasks generally showed non-significant results except for a cold pressor task (3) and physical pain tolerance under stress (77a).

Exposure to suicide. For overall exposure to suicide, enactment group reported higher exposure to suicide cross-sectionally compared to ideation group in four studies (Study: 18, 73, 76, 77a) while one reported no differences (Study: 79) in the univariate analyses. However, study 77a did not find significant differences in a subset of the original sample that were invited to the laboratory portion of the study. One out of two studies also reported that enactment was significantly higher in the multivariate analyses accounting for impulsivity (77a). However, no differences were found prospectively in both univariate (79) and multivariate analyses (69).

In terms of types of exposure, four out of five studies reported that individuals in the enactment group were more likely to report exposure to family suicidal behaviour compared to the ideation group in the cross-sectional univariate analyses (Study: 70, 73, 76, 79). However, studies investigating exposure to family behaviour in multivariate models

accounting for a range of variables including past behaviour, motivational/volitional phase variables, life events, aggression, loneliness and other variables (Study: 74, 76, 84, 85) generally reported no significant differences with the exception of one study that found higher exposure in the enactment group (74). Additionally, prospective investigations of these studies also resulted in non-significant differences (Study: 72, 73, 79, 85). Finally, three cross-sectional studies reported that the enactment group reported higher exposure to friend suicidal behaviour in the univariate analyses (Study: 70, 73, 76), while one study reported no differences (Study: 79). Two studies also reported significant differences in multivariate analyses accounting for a range of motivational and volitional phase variables (Study: 74, 76), while one reported no differences (Study: 85). These findings were not significant prospectively (Study: 72, 79, 85).

Past self-harm. Two cross-sectional studies compared differences in self-harm and non-suicidal self-injury between individuals that thought about suicide and attempted suicide. One of these reported that self-harm while in prison was higher in the suicide attempt group (Study: 84), but only in the univariate analysis before adding variables including demographics, life events, aggression, substance abuse, wish to live, self-harm, sleep quantity, and aggression. The other study found that the presence of non-suicidal self-injury did not differentiate the groups. However, having more than five episodes was of self-harm was associated with past-year suicide attempts after accounting for hopelessness, prior self-harm, emotional regulation, borderline symptoms, and purpose in life (Study: 92). Among prospective studies, two studies reported that the presence of lifetime suicide was associated with suicide attempts prospectively over 6 weeks and 2 years respectively (Study: 85, 88). These findings were significant in the multivariate analyses as well, which accounted for clinical variables (e.g. treatment medication), mental & mood disorder symptoms, and

insomnia. However, study 88 reported that the number of attempts did not predict the occurrence of suicide attempts during the 6-week follow-up period.

Mental Imagery. One cross-sectional study compared the group differences in mental imagery and found that mental imagery about suicide was higher in the ideation group compared to the control and enactment group compared to ideation in the univariate analyses (Study: 76). These effects remained significant in the multivariate analyses after accounting for other motivational and volitional phase variables. Another study reported that the ideation group alone reported suicidal flash-forwards compared to the control group. However, this was not compared between ideation and enactment groups (Study: 23).

3.4.6. Quality assessment and publication bias

3.4.6.1. Cross-sectional/Cohort studies

Sixty-seven of the included studies were included in this analysis. Four papers were rated excellent (n = 4, 5.97%) and nearly half were rated good quality (n = 33, 49.25%). The rest were fair (n = 25, 37.31%), and poor (n = 5; 7.46%). The decisions for each judgement according to the NIH quality assessment tool for observational cohort and cross-sectional studies are provided in Appendices J and K. Quality ratings were generally similar for studies investigating different pathways within the IMV model compared to studies testing single associations. Over half the studies testing longer pathways of the model were rated good (n = 10; 52.63%), and the remaining were rated fair (n = 6; 31.58%), and poor (n =3; 15.79%). The study that investigated all three phases of the IMV model was also rated good (Study: 8). Among studies testing single associations of IMV model variables, ratings were excellent (n = 4; 8.33%), good (n = 23; 47.92%), fair (n = 19; 39.58%), and poor (n = 2; 4.17%). The reasons for lower quality ratings were primarily due to lack of blinding due to self-report instruments, low follow-up rates/cross-sectional design, participation rate not being reported,

unclear approach for selecting confounding variables, and not measuring predictor variables more than once.

3.4.6.2. Case-control Studies

Of the thirty-three case-control studies, one study was rated excellent (n = 1, 3.03%), over half were rated good (n = 17, 51.52%), followed by those rated fair (n = 15, 45.45%). Decisions for each judgement based on the NIH tool for case-control studies are presented in appendices L and M. Reasons for lower quality ratings were lack of blinding due to self-report measures, not using concurrent controls, non-random sampling, retrospective design, no justification for approach to selection of confounding factors, and non-reporting of power analysis or sample size justification.

3.5. Discussion

3.5.1. Main findings

The current review systematically selected, synthesized, and reviewed the evidence for the predictions of the IMV model of suicide. The included studies generally tested different parts of the IMV model compared to the whole model. Only two investigated all three phases of the model, however, the entire pathway was not investigated in the same model. In addition to this, studies that investigated the motivational and volitional phase (i.e. the defeat-entrapment-suicidal ideation-suicidal behaviour pathway) and the pre-motivational and motivational phase also found support for the hypotheses of the IMV model.

Consistent with the IMV model, the results support the role of psychological, social, personality, and parental factors in conferring vulnerability to defeat. Specifically, specific pre-motivational phase variables (including past parenting, insecure attachment, and perfectionism) were found to be associated with defeat and entrapment within the included

studies. These results are consistent with the summary provided by Zortea (2021) which also found support for the association between pre-motivational variables and suicide risk overall. Variables like ACEs, insecure attachment, and perfectionism have also displayed strong associations with suicide risk in other reviews (Angelakis et al., 2020; Angelakis et al., 2019; R. C. O'Connor, 2007; Zortea et al., 2021). However, due to limited overlap between the variables included across studies, it is not possible to draw conclusive results on the effects of specific variables. Studies conducted in specific populations also raised concerns regarding generalizability to other populations (e.g., Hong & Shin, 2021). Furthermore, the mechanisms by which these variables increase feelings of defeat are also unclear. As such, evidence on the pre-motivational phase remains largely inconclusive.

The motivational phase of the IMV model was the most widely investigated. The results overwhelmingly supported the proposed defeat-entrapment-suicidal ideation pathway consistent with the IMV model in the cross-sectional analyses. Interestingly, although the IMV model proposes defeat and humiliation as predictors of entrapment, none of the included studies investigated the role of humiliation within the IMV model. Results also generally indicated that total entrapment and internal entrapment were found to significantly mediate the relationship between defeat and suicidal ideation. The results for external entrapment were largely not significant. These results are consistent with other literature and reviews discussing the IMV model (Barzilay & Apter, 2014; Klonsky et al., 2017; Zortea et al., 2021).

A wide range of threat-to-self and motivational moderators were also tested within the included studies. The findings on the effects of threat-to-self moderators on the association between defeat and entrapment were largely inconclusive. However, motivational moderators including resilience (Branley-Bell et al., 2019; Cleare, 2019; Wetherall et al., 2018b), PB, and its interaction with TB (Hollingsworth, 2018; X. Li et al., 2020; Lucht et al., 2020; Ordóñez-

Carrasco et al., 2020; Scowcroft et al., 2019) found support as a motivational moderator in multiple studies. There was little overlap between other stage-specific moderators being tested resulting in inconclusive findings. Thus, examining the role of the moderators with the central pathway would be useful to present a clearer understanding of the suicidal process.

With regard to the volitional phase, the included studies presented mixed results. While suicidal ideation was generally associated with suicidal behaviour, the evidence for the prospective association between these variables was limited. A small number of studies examined specific volitional moderators and reported non-significant findings. As with threat-to-self and motivational moderators, there was limited overlap in the moderators studied. Thus, it is not possible to draw conclusions from the literature.

In terms of study characteristics, studies whose findings were consistent with the IMV model were generally cross-sectional. Prospective analyses yielded mixed results. As a majority of included studies were cross-sectional, it was not possible to determine if the time period between measurements impacted the results. Studies that found support for the IMV model also recruited participants from different populations including general, student, and clinical samples. Additionally, studies that investigated different pathways within the model (i.e mediation) also found support for the model. Finally, the included analyses accounted for a wide range of demographic and psychosocial variables. However, there were no clear trends observed when comparing univariate and multivariate analyses.

With regard to studies comparing control, ideation and enactment groups, the included studies investigated group differences in a large set of variables at different stages of the IMV model. As a result, there was limited overlap in the variables investigated and differences in the conceptualisation and measurement of these variables. Among variables outlined by the IMV model, some evidence suggested that pre-motivational and motivational variables, including perfectionism, defeat, entrapment, rumination, social support, goal

disengagement, goal re-engagement and resilience, may differentiate the control and ideation groups. However, these findings were not observed in multivariate and prospective analyses. Similarly, volitional phase variables including impulsivity, acquired capability, and exposure to suicide may be higher in enactment groups compared to ideation groups, but findings were mixed in multivariate or prospective analyses. Thus, the limited overlap in the variables measured and the heterogeneity in conceptualisation, measurement, control variables, analysis, and time frames limit our ability to draw conclusions. These results contrast with review literature on theories of suicide that supported the role of the motivational and volitional phase moderators (I. H. Stanley et al., 2016; Wetherall et al., 2020). It is possible that this may be due to prior reviews reporting on a limited number of studies or on studies conducted prior to the introduction of the IMV model. Further clarity on this is required in order to appropriately inform intervention strategies.

3.5.2. Directions for future research

The findings of the current review generally support the main assumptions of the IMV model. The findings indicated that certain aspects of the IMV model (e.g., the central pathway) are abundantly examined within the literature while other areas are less empirically evidenced. However, the current review identified several directions for future research based on the gaps in the current literature. Firstly, few studies conducted aimed to test all aspects of the model within the same analysis. Testing different phases of the model together would be useful in determining if there are specific combinations of predictors or 'risk trajectories' from different areas of the model that may significantly increase suicide risk (R. C. O'Connor & Kirtley, 2018). While this is understandable considering the methodological challenges of incorporating a complex model, it is important that wherever possible, future research aim to test different aspects of the model together in order to obtain a deeper understanding of how these variables are connected.

In addition, although there is considerable research aimed at testing the IMV model, conclusive results can be drawn only from select aspects. This is expected due to the large number of variables accounted for by the model. This is also expected as the IMV model provides a framework for understanding the emergence of suicidal thoughts and behaviour but does not provide an exhaustive set of pre-motivational phase variables or stage-specific moderators. While studies aimed at identifying other potential targets for intervention are very useful, further clarity and evidence is also required on variables already outlined and identified by the IMV model.

Another key limitation of the literature is the cross-sectional retrospective nature of the studies. Cross-sectional retrospective studies often limit the ability to identify causal relationships and results and may be limited by recall bias (Talari & Goyal, 2020). Establishing causal relationships could be key to identifying modifiable risk factors and targets for interventions. This is especially relevant since despite overwhelming support for the central pathway of the IMV model, the limited studies investigating the same prospectively found mixed results. One possible explanation for this could be that more accurate predictions could be achieved at certain timeframes rather than others. Indeed, it has been suggested that prospective studies of theoretical constructs over shorter periods of time such as weeks, days or hours may be particularly useful (Klonsky et al., 2018). Some authors have also suggested that ecological momentary assessments may be a method to address the issue with retrospective reporting (de Beurs et al., 2015). Thus, future work should employ prospective and ecological momentary analyses to measure real-time measures of theoretical variables.

Studies also often used single-item unvalidated measures for predictor or outcome variables. This was often the case where using a validated measure was not feasible or unavailable (e.g. exposure to suicide). Single-item dichotomized measures may not account for the differences in frequency, recency, or intensity of suicidal thoughts or behaviours and may misrepresent the strength of associations (Bernert et al., 2015; Russell et al., 2019). Thus, future research should aim to develop and utilize validated measures for measuring theoretical constructs.

3.5.3. Clinical Implications

The implications of this review are limited by the disparity in the specific parts of the model that have been tested. Despite this, the key findings of this review can be useful in informing risk assessment and reduction strategies. For instance, clinical assessments should include feelings of perfectionism, defeat, internal entrapment, resilience, and perceived burdensomeness. As risk assessment tools have been largely inadequate (Carter et al., 2017), self-report measures should ideally be used in conjunction with clinical interviews. This would allow for a more nuanced understanding of the risk trajectories specific to the individual as well as information regarding their vulnerabilities, triggers, and resources.

This is also crucial in devising tailored treatment or safety plans. Specifically, a comprehensive understanding of not only how suicidal thoughts develop and result in behaviour but also the mechanisms by which an intervention is expected to impact these outcomes is key to effective intervention development (R. C. O'Connor et al., 2011). As such, intervention development should be informed by theory and supported by empirical evidence. For instance, based on the findings of this review, interventions addressing and reducing negative social comparisons through therapy among highly perfectionistic individuals may be useful in reducing feelings of defeat. Similarly, treatment for insecure attachment could also be useful in reducing defeat, especially among individuals that

received parenting characterized by high overprotection and low care. Theoretical models such as the IMV model are also useful in developing interventions specific to the stage of suicidal thoughts or behaviour (R. C. O'Connor & Kirtley, 2018; Zortea et al., 2020a). For instance, interventions addressing defeat and entrapment could be targeted at individuals not experiencing suicidal thoughts, while interventions addressing volitional variables and safety planning could be developed in addition to reducing defeat and entrapment in individuals with active suicidal thoughts. A range of cognitive behavioral therapy techniques specific to addressing these risk factors could also be employed to address core beliefs that may be contributing to feelings of defeat and entrapment by understanding the events that trigger and maintain these feelings on an individual level and addressing them (Sandford et al., 2022).

3.5.4. Strengths and limitations of the present review

An important strength of the current review is that this is the first review to systematically select and synthesize the findings on the hypotheses of all aspects of the IMV model among a wide range of countries, settings, samples, and study designs. The current review further included a broad range of search strategies by traditionally searching databases as well as employing forward citation mining via databases and a search engine. Furthermore, empirical investigations of the IMV model were not restricted by quality or publication status.

It is important to consider the findings presented within the context of its limitations. Firstly, it should be noted that a subset of the papers was identified from Google Scholar. Several authors have suggested potential reproducibility issues on account of results dropping in and out of relevance (Bramer & Bain, 2017; Gusenbauer & Haddaway, 2020). However, the current review conducted multiple search updates to include potentially relevant results at different times and used the search engine primarily for forward citation mining alone. This may result in fewer changes in the results retrieved over time. The search engine was also

employed alongside other search strategies from traditional databases which offer more consistent results over time. It is also important to note that the screening and inclusion of records were primarily conducted by the first reviewer while some authors have recommended having multiple reviewers screen all records to reduce potential selection bias. However, based on other papers (Moore et al., 2022) a percentage of the papers at full text screening stage were screened by a second reviewer to account for this. Another limitation of the current review due to clinical and methodological heterogeneity within the included studies was that a meta-analysis was not appropriate. Additionally, we conducted a systematic review rather than a scoping review as our primary aim was to synthesise the evidence supporting clinically pertinent hypotheses with an aim to inform practice (Arksey & O'Malley, 2005; Munn et al., 2018). Finally, the included studies were limited to studies reported in English which might have resulted in missing relevant studies published in different languages.

3.6. Conclusion

The evidence on the IMV model lend support to the associations between defeat, entrapment, and suicidal ideation as predicted in the model. However, there are key limitations in the literature. Firstly, only two studies have investigated all three phases of the IMV model in the same analysis. Additionally, even the two studies testing all phases of the model did not test the full pathway within the same analysis. There is also minimal overlap in the pre-motivational phase variables and motivational moderators tested, as well as variables compared between suicide-related outcome groups, resulting in inconclusive findings. Furthermore, the research conducted is primarily cross-sectional analyses. Future research should aim to address these concerns to further the theoretical understanding of suicidal behaviour and the clinical and policy implications of the IMV model.

Chapter 4 - Exploring Pathways from Adversity in Childhood to Adult Suicidal Ideation

4.1 Overview

Chapter 2 outlined the literature demonstrating that ACEs have consistently shown a graded relationship with suicidal thoughts and behaviour. The IMV model posits that ACEs within the pre-motivational phase may increase vulnerability to defeat and entrapment which could subsequently lead to suicidal ideation. However, as outlined in the systematic review in Chapter 3, there is limited research investigating the pathways by which ACEs could be linked to suicidal ideation from the perspective of the IMV model. This chapter reports a cross-sectional study aiming to investigate the measurement models and empirically test the pathway from ACEs to suicidal ideation with defeat and entrapment as a mediator.

The current study used secondary data from 502 adults living in the UK that were aged 18 years or above. Participants were recruited through advertisements at the university campus and on social media and invited to answer an online survey on Qualtrics. Information about demographic characteristics, ACEs, and IMV model variables including defeat, entrapment, and suicidal ideation was collected. Initial confirmatory factor analyses (CFA) of items measuring ACEs, defeat/entrapment (Short Defeat and Entrapment scale), and suicidal ideation (suicidal ideation attributes scale) were undertaken to evaluate factor loadings and fit for the measurement model. Structural equation modelling (SEM) was used to analyse the hypotheses. Findings from the CFA indicated that defeat and entrapment were best conceptualised as a single construct for the included measures (Covariances > 0.93). One item was dropped from the ACEs scale due to low factor loading. The resulting CFA and SEM models demonstrated acceptable-to-good fit. Results of the SEM indicated that

defeat/entrapment mediated the effects of ACEs on suicidal ideation after controlling for age and gender. This study provides preliminary results for the pathways by which ACEs may lead to suicidal ideation.

4.2. Introduction

As described in section 2.2, ACEs are widely conceptualised as a combination of childhood maltreatment (including different forms of abuse and neglect), and dysfunction (including domestic violence, mental illness, incarceration, parental separation, substance abuse etc.) in the household (X. Chang et al., 2019; Dube et al., 2001; Felitti et al., 1998; Liming & Grube, 2018). ACEs have also consistently shown a strong dose-response association with suicide risk across different cultures (Afifi et al., 2008; Choi et al., 2017; Dube et al., 2001; Felitti et al., 1998; Perez-Brumer et al., 2017; M. P. Thompson et al., 2019). An umbrella systematic review investigating 33 meta-analyses and 16 narrative systematic reviews on the effects of ACEs on suicidality reported a two-fold increase in suicide risk (including suicidal ideation and behaviour) associated with ACEs (Sahle et al., 2022). In addition, 14 out of the 16 systematic reviews reported that ACEs were associated with a significant increase in suicide risk across study designs and quality.

While there is a clearly established link between ACEs and suicidal ideation, the mechanisms explaining these associations are less clear (See section 2.3). In addition, individual predictive variables for suicidal ideation have shown limited predictive ability for suicide-related outcomes due to the complex interaction of a large number of variables involved (Franklin et al., 2017; R. C. O'Connor & Nock, 2014). Theoretical models address these concerns by identifying interactions between specific risk factors that might have a stronger effect on suicide-related outcomes (R. C. O'Connor & Kirtley, 2018). As a result, research has increasingly focused on theoretical models of suicide in order to overcome the

limited predictability of individual risk factors of suicide (Franklin et al., 2017; Klonsky et al., 2018; R. C. O'Connor & Nock, 2014; I. H. Stanley et al., 2016). Establishing the pathways by which ACEs are linked to suicidal ideation through the use of theoretical models could present useful targets for intervention.

Section 1.7 outlined the rationale for using the IMV model of suicidal behaviour as a theoretical framework to examine the associations between ACEs and suicide-related outcomes. The systematic review in Chapter 3 highlighted that the IMV model provides a promising framework for understanding the effect of ACEs on suicidal ideation. The findings of the systematic review further identified that only one study has examined the effects of childhood trauma on suicidal ideation from the perspective of the IMV model. However, this study was specific to men diagnosed with alcohol use disorder in South Korea and might not be generalisable to other populations (Hong & Shin, 2021). A more recent ecological momentary analysis study published after the completion of the systematic review has investigated mediators of the relationship between childhood trauma and defeat (Rogerson et al., 2024). However, defeat and entrapment were not investigated as mediators between childhood trauma and suicidal ideation. Thus, the current study used secondary data to investigate the relationship between ACEs and suicidal ideation from the perspective of the IMV model.

A key consideration in this study was the conceptualisation of defeat and entrapment. The findings of the systematic review also highlighted the disparity in the conceptualisation of defeat and entrapment across the literature. Some studies treated defeat, internal entrapment, and external entrapment as three distinct constructs (Höller et al., 2021; Oakey-Frost et al., 2021; Owen et al., 2018), others conceptualised defeat and entrapment as two constructs (Teismann et al., 2018; van Ballegooijen et al., 2022), and some papers conceptualised defeat/entrapment as a single construct (Hollingsworth & Polanco-Roman,

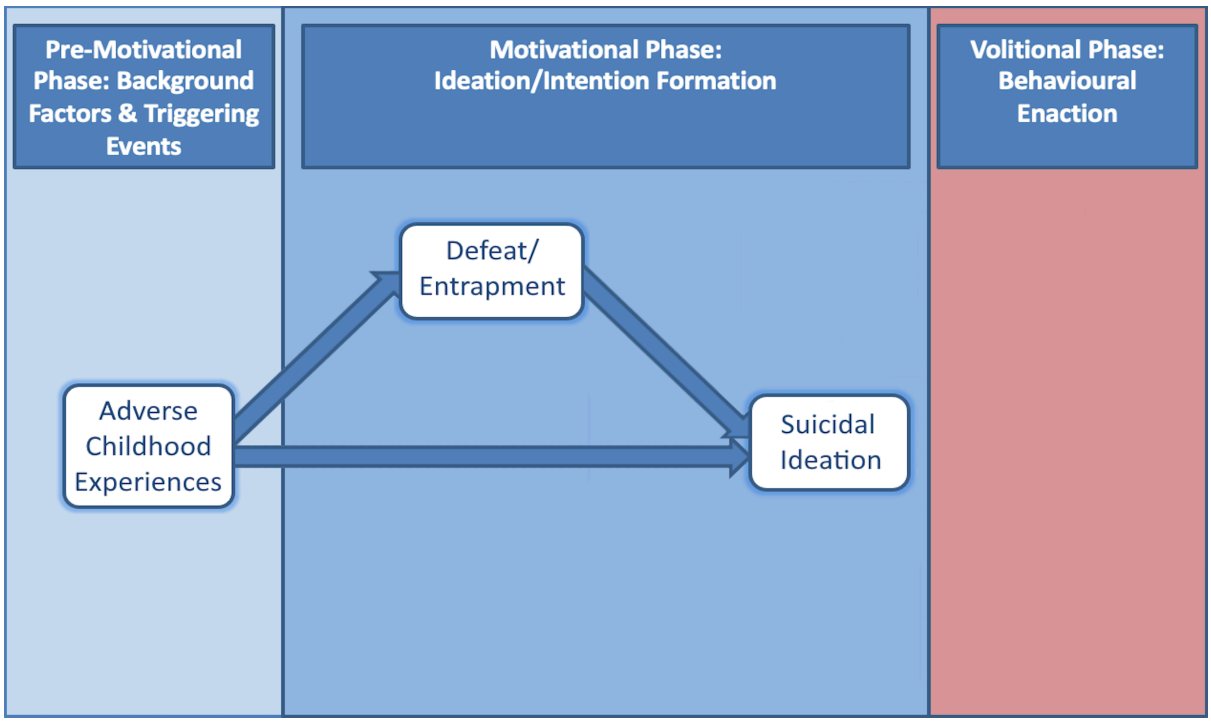
2022; O. H. Pollak et al., 2021). Indeed, several researchers have argued that defeat and entrapment should be conceptualised as a single construct defined by feelings of failure without an escape (Rooke & Birchwood, 1998; Taylor et al., 2009). This resulted in the development of the short defeat and entrapment scales (SDES) which was aimed at measuring defeat and entrapment as a single factor by selecting the items with the highest factor loadings from the longer defeat scale and entrapment scale (Griffiths et al., 2015).

Studies utilising the SDES also vary in the conceptualisation of defeat and total entrapment (internal and external; Holler & Forkmann, 2022; Höller et al., 2020; O. H. Pollak et al., 2021). For instance, Holler et al. (2020) compared the factor structure for the German version of the short defeat and entrapment scale among different populations and concluded that a two-factor solution (with defeat and total entrapment) better represented the scale based on improved fit. However, this study found marginally improved or equivalent fit between the two-factor and one-factor models, depending on the sample. Similarly, Griffiths et al. (2015) also found that the CFA showed an improved fit for the two-factor model. However, this paper concluded that a the high-correlations between defeat and total entrapment suggested that a one-factor model was more appropriate. Regardless of the conceptualisation of these constructs, researchers generally agree that defeat and total entrapment are highly correlated (Forkmann et al., 2018; Höller et al., 2020). Based on the findings of the systematic review, this study originally conceptualised defeat, internal, and external entrapment as three distinct constructs. However, given the high covariances between defeat, internal entrapment, and external entrapment (0.93-0.98) for the SDES in the current sample, and considering that this measure was developed to measure defeat/entrapment as a single variable, the current study conceptualised defeat/entrapment as a single construct.

Given the inconsistencies in the conceptualisation of defeat and entrapment across the literature and since the ACEs questionnaire was developed to measure the co-occurrence of a set of ACEs rather than a single construct (Lacey & Minnis, 2020), the first aim of the study was to investigate the measurement model of the scales included in the study. Additionally, the second aim of this study was to examine defeat/entrapment as a mediator of the pathway between ACEs and suicidal ideation in line with the IMV model (See Figure 4.1 for path diagram). Based on this, it was hypothesised that ACEs would positively predict suicidal ideation, and this relationship would be mediated by defeat/entrapment.

Figure 4.1.

Path diagram of hypothesised associations



4.3. Methods

4.3.1. Participants

This study used secondary data collected online on Qualtrics from adult participants resident in the UK. Initially, 503 participants completed the survey. Based on demographic information provided, one participant was excluded from the analyses as they did not meet the inclusion criteria for age. Thus, A final sample of 502 participants were included in this study. A majority of these participants were white (N = 441; 87.85%), heterosexual (N = 424; 84.46%), and women (N = 402; 80.08%). Participants were aged between 18 and 69 (Mean = 30.43, SD = 12.57). 4

4.3.2. Measures

Sociodemographic variables. Participants were asked self-report questions to collect demographic details regarding age, gender, sexual orientation, and relationship status. Information about age was collected with the question "What is your age?" with a continuous response. Participants were asked to report their gender by selecting either "Man", "Woman", "Non-binary", or "Prefer not to answer" and "Other" with a text response option to the question "Which best describes your gender identity". As no participants selected "prefer not to answer" or "other" and very few participants reported being non-binary (n = 3, 0.60%), this variable was dummy coded as "Man" or "Woman" in the analyses with non-binary as the reference category.

ACEs. The adverse childhood experiences questionnaire (Dube et al., 2001; Felitti et al., 1998) is a 10-item dichotomously scored questionnaire that assesses the presence of specific types of childhood adversity (e.g. "Did a parent, guardian or other household [A3] member spank, slap, kick, punch or beat you up?"). The response categories for each item were "Yes" (Coded 1) and "No" (Coded 0). The adversities measured were physical abuse,

sexual abuse, physical neglect, emotional abuse, emotional neglect, parental divorce, parental incarceration, domestic violence, household substance abuse, and household mental illness. The scores for this scale range from 0 to 10 indicating the number of adversities experienced by the participant, and has previously shown good internal consistency (α = .88; Murphy et al., 2014).

Defeat/Entrapment. The Short Defeat and Entrapment Scale is an 8-item scale that measures feelings of defeat/entrapment ("I feel defeated by life"). The responses range from 0-5 on a Likert-type scale from "not at all like me" to "extremely like me". The scale has demonstrated high reliability (α = .88 to .94) and validity (Griffiths et al., 2015).

Suicidal Ideation. The Suicidal ideation attributes scale (SI-DAS) was used to measure suicidal ideation (van Spijker et al., 2014). This is a 5-item scale ranging from 1-10 "never" to "always" to measure frequency, distress and impact on functioning, closeness to attempt, and control over suicidal ideation in the past month (e.g. "In the past month, how often have you had thoughts about suicide?"). The SIDAS has shown high internal consistency (α = 0.89-0.91), sensitivity and specificity, and convergent validity with a range of constructs (Harris et al., 2021; van Spijker et al., 2014).

Control variables. Based on reviews of research on the relationship between maltreatment in childhood and suicide risk (Angelakis et al., 2020; Angelakis et al., 2019; A. B. Miller et al., 2013), the effects of age and gender were controlled for.

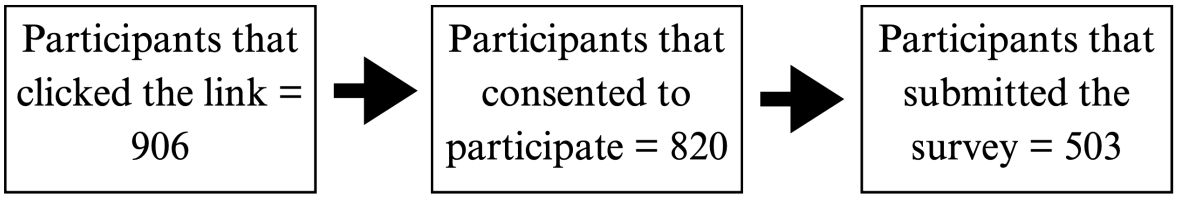
4.3.3. Procedure

Participants were recruited through advertisements at a university campus and social media between November 2020 and December 2021. Interested participants were directed to an online survey on Qualtrics, a remote survey website where they were initially presented with an information sheet detailing the survey and eligibility. This data was collected as part of a larger study investigating the risk and protective factors for suicidal behaviours. The

questionnaire also including measures for additional variables including suicide proneness, suicidal behaviour, psychological distress (depression, stress, and anxiety), psychological flexibility, self-compassion, suicide related coping, resilience, and history of coronavirus (COVID-19) symptoms. Eligible participants were aged above 18 and resident in the United Kingdom. Participants were also informed of their ability to withdraw from the study before final submission. Figure 4.2 outlines the number of participants that initially clicked the link to participate, consented to participate, and submitted the survey. Upon providing informed consent, the participants could begin the survey. All participants were provided information about support services as well as contact details for the researchers in the participant information sheet at the start of the survey and the debrief sheet upon completion of the survey. Ethics approval was obtained from the University of Strathclyde ethics committee.

Figure 4.2

Flow diagram illustrating participant recruitment



4.3.4. Statistical Analyses

Missing data analysis. Within the final dataset, 0.58% of the overall data was missing. The highest missingness at item level was (n = 5, 0.99%) which was primarily for items in the SIDAS scale. A Little's missing completely at random (MCAR) test was conducted to examine the mechanism of missingness (Little, 1988; Tierney & Nelson, 2009). The results of the MCAR test were not significant ($\chi^2 = 191$, $p = 0.986$), suggesting that the data were missing completely at random. Based on guidelines for approaching missing data (Newman, 2014), multiple imputation with predictive mean matching using the mice package

was employed to impute the missing data using 10 imputed datasets (van Buuren & Groothuis-Oudshoorn, 2011).

Preliminary analyses. The multivariate normality of the variables of interest were investigated using the QuantPsyc package (Fletcher, 2022). The results indicated deviations from normality with skewness ($\beta = 212.65$, $\kappa = 17295.75$, $p < 0.001$) and kurtosis ($\beta = 914.71$, $\kappa = 110.65$, $p < 0.001$). As a result, the multivariate normality assumption was not met. As a result, the following data analyses used a robust estimator to address deviations from normality. Additionally, preliminary correlational analyses were run using Spearman correlations to assess descriptives and investigate multicollinearity. The findings are presented in the results section.

Confirmatory factor analysis (CFA). Confirmatory factor analyses for each measure were conducted using the lavaan package to test the hypothesised factor structure and validate the measurement models (Rosseel, 2012). Model fit was assessed using incremental fit indices, including Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI); as well as an absolute fit index, Root Mean Square Error of Approximation (RMSEA) and Standardised Root Mean Square Residual (SRMR). However, RMSEA and SRMR were interpreted with caution for models using the Weighted Least Squares Mean and Variance adjusted (WLSMV) estimator based on potential bias when using these estimators (Shi et al., 2020). Specifically, the RMSEA values are likely to overestimate goodness of fit while SRMR values are likely to underestimate it when using the WLSMV estimator. The goodness of fit was assessed using existing rules of thumb where CFI and TLI values higher than 0.90 and RMSEA and SRMR values below 0.08 were considered acceptable (Hu & Bentler, 1999). Additionally, as the chi-squared test is sensitive to sample size differences, this fit index will be reported but not used for assessing model fit (Stone, 2021). Due to deviations from

multivariate normality, the maximum likelihood robust (MLR) estimator was used for factor analysis of remaining variables (defeat/entrapment, suicidal ideation).

Model testing. The main hypotheses were tested with structural equation modelling using the lavaan package (Rosseel, 2012). The relationship between ACEs and suicidal ideation with defeat/entrapment as a mediator was investigated using the MLR estimator. Age and gender were controlled for in the analyses. All statistical analyses were conducted in RStudio. The analysis codes for data manipulation, descriptives statistics, and model testing are uploaded to the open science framework (OSF) at the following link (https://osf.io/qsa54/?view_only=3767576b65a7488fb0591688f5781c28).

4.4. Results

4.4.1. Descriptive characteristics

Of the 502 participants included in the analyses, 317 (63.15%) reported experiencing at least one type of ACE and 80 (15.94%) participants reported experiencing four or more ACEs. Household mental illness was the most common childhood adversity reported (N = 160; 31.87%), followed by loss of a parent due to any reason (N = 134; 26.69%) and emotional abuse/humiliation (N = 133; 26.49%). Additionally, less than half the participants (N = 181; 36.06%) reported experiencing suicidal ideation in the past month.

Spearman correlations were conducted between the variables ACEs, defeat/entrapment, and suicidal ideation. The results of the correlational analyses and the means, standard deviations, and ranges of each variable are presented in table 4.1. All of the variables were significantly positively correlated with one another.

Table 4.1

Descriptive statistics and correlational analyses

	ACEs	Defeat/Entrapment	Suicidal Ideation
ACEs	1		
Defeat/Entrapment	0.36***	1	
Suicidal Ideation	0.35***	0.66***	1
M	1.64	8.31	4.48
SD	1.82	8.10	8.68
Range	0-8	0-32	0-47

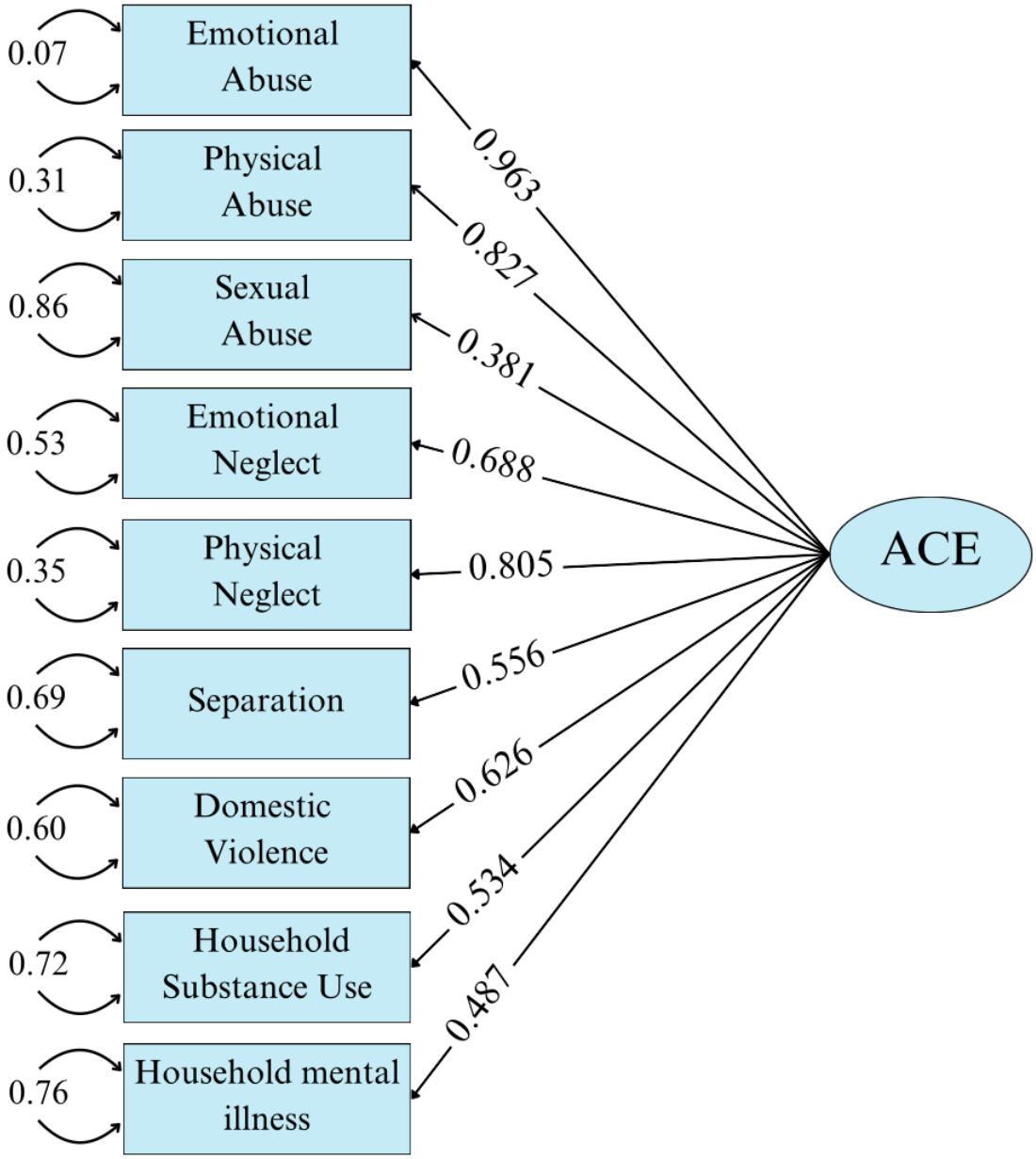
Note. *p<0.05, **p<0.01, ***p<0.001. M - Mean. SD – Standard deviation

4.4.2. Confirmatory factor analyses

ACEs: The WLSMV estimator was used for dichotomously scored variables (ACEs; See supplementary figure 1 for factor loadings). This model indicated a good fit (χ^2 (df) = 80.52 (35), p = 0.000, CFI = 0.968, TLI = 0.959, RMSEA = 0.051, SRMR = 0.119). However, one item (parental incarceration) was dropped due to low factor loading (<0.3), likely due to very few participants reporting having experienced this (n = 13; 2.5%). The resulting model fit was not impacted substantially and a good fit to the data (χ^2 (df) = 73.99 (27), p = 0.001, CFI = 0.967; TLI = 0.956; RMSEA = 0.059, SRMR = 0.116). The CFA model for ACEs (χ^2 (df) = 73.99 (27), p = 0.001, CFI = 0.967; TLI = 0.956; RMSEA = 0.059, SRMR = 0.116) and for defeat/entrapment and suicidal ideation (χ^2 (df) = 247.91 (64), p = 0.001, CFI = 0.967, TLI = 0.959, RMSEA = 0.076, SRMR = 0.031) demonstrated good fit. Results of the final CFA model are presented in figure 4.2.

Figure 4.2

Final confirmatory factor analysis of the one-factor model for measuring ACEs



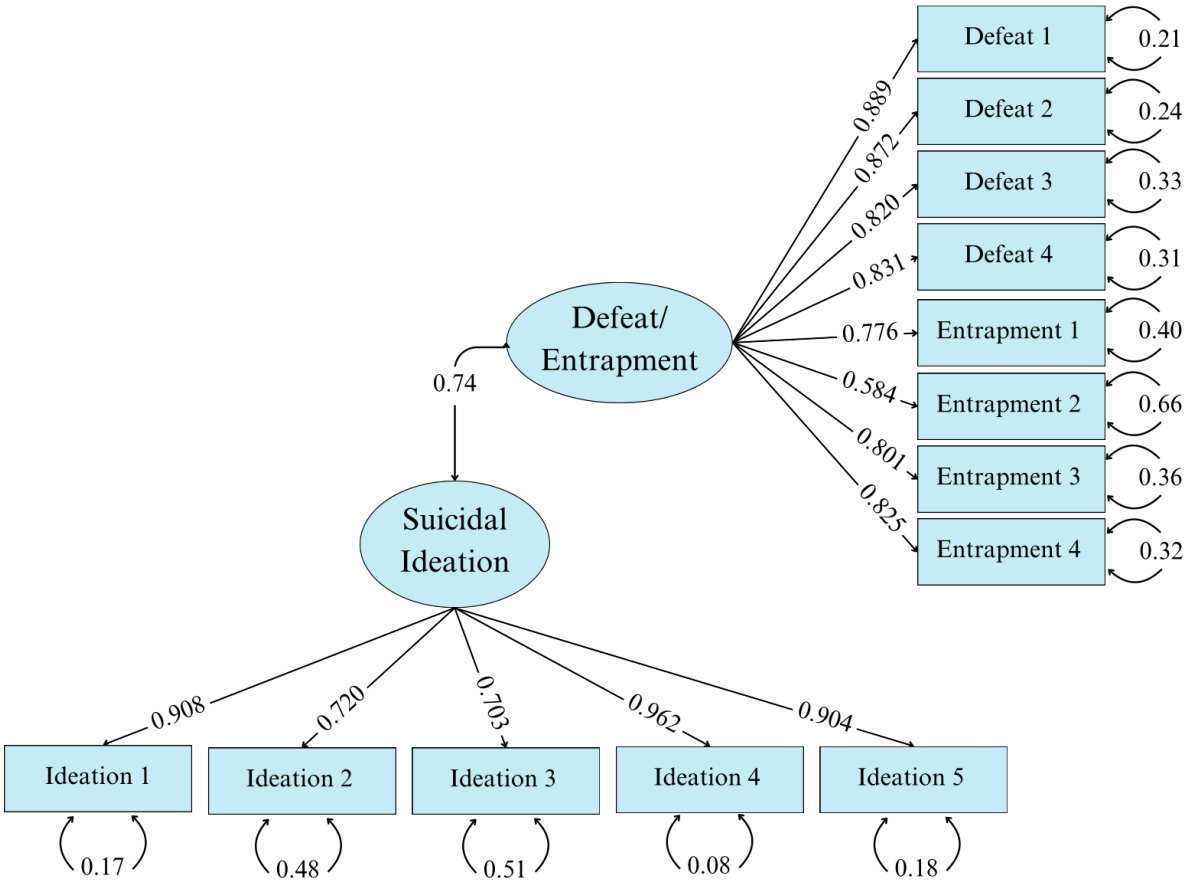
Note. Model fit and standardised factor loadings of all items measuring ACEs are illustrated here. ACE Item 10 was dropped due to low factor loadings.

Defeat/entrapment: Initially, defeat/entrapment was conceptualised in a three-factor model with defeat, internal entrapment, and external entrapment as distinct variables (see results of CFA in supplementary figures 2 and 3). However, high-covariances between these

variables (covariance > 0.93-0.98) indicated that they were best conceptualised as a single factor. This is likely due to the measure being developed to measure defeat and entrapment as a single construct as various researchers have theorised that a single factor underlies defeat and entrapment (Griffiths et al., 2015; J. Johnson et al., 2010; Taylor et al., 2009). The standardised factor loadings, residual variances, and covariances of the final CFA models are presented in Figure 4.3.

Figure 4.3.

Final confirmatory factor analyses for defeat/entrapment



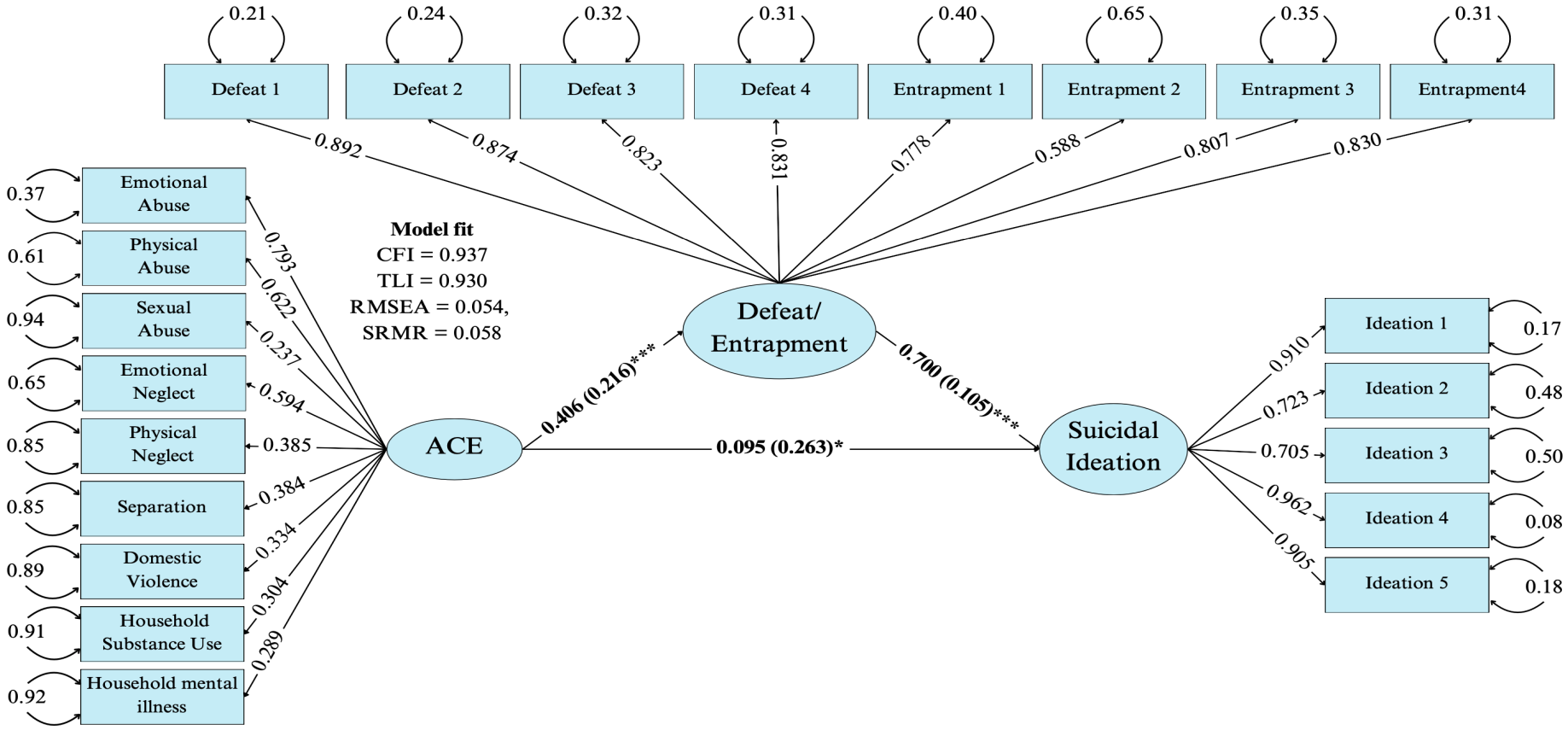
Note. This figure presents the standardised factor loadings. ACE – Adverse childhood experiences

4.4.3. Model testing

The hypothesised mediation model was tested with ACEs as the predictor, defeat/entrapment as the mediator, and suicidal ideation as the outcome variable. The effects of age and gender were controlled for in all analyses. The model fit was acceptable (χ^2 (df) = 659.923 (266), p = 0.001, CFI = 0.937; TLI = 0.930; RMSEA = 0.054, SRMR = 0.058). The standardised regression coefficients and standard errors are presented in Figure 4.3. As illustrated here, higher ACEs positively predicted having higher feelings of defeat/entrapment (β = 0.406; SE = 0.216; p= 0.000). Defeat/entrapment also positively predicted suicidal ideation (β = 0.700; SE = 0.105; p= 0.000)

Figure 4.3.

Results of the Structural equation model



Note. Statistically significant associations are presented in bold. Standardized regression coefficients (standard errors) are presented in the figure.

*p<0.5; **p<0.01; ***p<0.001. ACE – Adverse childhood experiences.

The results of the mediation analyses also supported the hypotheses. The effect of ACEs on suicidal ideation was significantly mediated by defeat/entrapment (β = 0.285; SE = 0.309; p= 0.000). The direct effect from ACEs to suicidal ideation remained significant after accounting for the effects of defeat/entrapment indicating partial mediation (β = 0.093; SE = 0.263; p= 0.043). The standardised and unstandardised estimates are presented in table 4.2. This model explained 26% of the variance in defeat/entrapment (R^2 = 0.259) and 57% of the variance in suicidal ideation (R^2= 0.565).

Table 4.2

Standardised and unstandardised estimates of direct, indirect, and total effects in the model

Direct Effects	Std. Est	Unstd. Est	Std. Err	p-value
ACEs → Defeat/entrapment	0.406	1.249	0.216	0.000
Defeat/entrapment → Suicidal ideation	0.700	1.285	0.105	0.000
ACEs → Suicidal ideation	0.095	0.534	0.263	0.042
Indirect Effect				
ACEs → Defeat/entrapment → Suicidal ideation	0.284	1.604	0.309	0.000
Total Effect				
Direct + Indirect Effect	0.379	2.138	0.373	0.000

Note. Std. Est – Standardised Estimates, Unstd. Est – Unstandardised Estimates, Std. Err – Standard Error. ** p<0.5; **p<0.01; ***p<0.001.*

4.5. Discussion

This study aimed to investigate the relationship between ACEs and suicidal ideation from the perspective of the IMV model. The current study thus hypothesised that defeat/entrapment would mediate the relationship between ACEs and suicidal ideation. Consistent with the hypotheses, the findings indicated that experiencing a higher number of ACEs was positively linked to experiencing feelings of defeat/entrapment, and suicidal ideation while controlling for age and gender. These findings lend support to the hypothesis that experiencing a higher number of co-occurring adversities in childhood may result in increased vulnerability to defeat/entrapment. The results are also consistent with the existing literature supporting a positive link between ACEs and suicidal thoughts and behaviours (Afifi et al., 2008; Angelakis et al., 2020; Angelakis et al., 2019; Choi et al., 2017; Merrick et al., 2017; Rogerson et al., 2024). While there is limited research on the association of ACEs and defeat/entrapment, these findings are somewhat consistent with other research investigating the association between childhood trauma and defeat alone. For instance, using ecological momentary assessment, Rogerson et al. (2024) reported that childhood trauma was significantly associated with increased daily defeat, entrapment, and suicidal ideation. However, these results differ from the findings by Hong & Shin (2021) which reported that childhood trauma did not significantly predict defeat. While this study did not conceptualise defeat and entrapment as one construct, differences in populations and location compared to this study may also explain the differences in results.

The results also indicated that defeat/entrapment was significantly associated with increased suicidal ideation. This is consistent with prior literature that reported that defeat/entrapment was associated with suicidal ideation both cross-sectionally (Hollingsworth & Polanco-Roman, 2022) and prospectively over three months (O. H. Pollak et al., 2021). Based on the findings of the systematic review, other studies that included defeat and overall

entrapment characterised as distinct constructs also found that these variables were associated with increased suicidal ideation (Branley-Bell et al., 2019; Lucht et al., 2020; Wetherall et al., 2018b). Finally, the study found that consistent with the hypothesis, defeat/entrapment partially mediated the relationship between ACEs and suicidal ideation. This suggests that individuals with a history of co-occurrence of adversity may be more likely to have suicidal thoughts as a result of increased feelings of defeat/entrapment.

This study presents novel findings regarding the role of ACEs in the development of suicidal thoughts from the perspective of the IMV model. This results in two key messages for future work. Firstly, these findings contribute further to the evidence supporting the IMV model, indicating that the pathways outlined by the model may be important in understanding the relationship between ACEs and suicidal ideation. Secondly, these findings suggest that ACEs are likely to be pre-motivational phase variables that affect suicide through increased feelings of defeat/entrapment. The latter is further supported by ACEs generally being stable over time (Pereira da Silva & da Costa Maia, 2013) while defeat and entrapment tend to vary over several hours (Stenzel et al., 2020; van Ballegooijen et al., 2022).

Another noteworthy finding from this study was that defeat, internal, and external entrapment showed very high covariances in confirmatory factor analyses. As mentioned in section 4.2, this study initially aimed to investigate defeat, internal entrapment, and external entrapment as distinct constructs. The higher redundancy between these concepts does not necessarily indicate that defeat and entrapment theoretically capture the same underlying construct. Instead, it is possible that defeat and entrapment may share conceptually overlapping aspects while also retaining distinct characteristics. The overarching literature as well as observation of items of the full defeat and entrapment scales (Gilbert & Allan, 1998) support this view (Forkmann et al., 2018; Höller et al., 2020; Oakey-Frost et al., 2021). Consistent with this, some items on the defeat and entrapment scales indicate conceptual

similarity such as "*I feel powerless*" on the short and long defeat scales, "*I feel powerless to change myself*" in the internal entrapment subscale, and "*I feel powerless to change things*"in the external entrapment subscale in the long forms. It is possible that responses to these items depend on individual interpretation. For instance, "*I feel powerless to change things*" may represent powerlessness to change things about one's own thoughts and feelings, while "*I feel powerless*" in the defeat scale may be interpreted as feeling powerless with regard to external circumstances or internal experiences. However, items such as "*I feel trapped by my obligations*" from the external entrapment subscale or "*I feel trapped inside myself*" may capture aspects unique to these subscales of entrapment. Given that the SDES was developed based on the highest loading items on a single factor from each subscale (Griffiths et al., 2015), it is possible that the short measure captured the overlapping aspects of defeat, internal and external entrapment. Thus, it is likely that the factor structure of defeat and entrapment depends on the measure used.

This finding would thus indicate that individuals experiencing a greater number of different types of co-occurring adversities are more likely to feel defeated with no way to escape, and subsequently more likely to have thoughts about suicide. However, as defeat and entrapment were conceptualised as a single construct here, the current study could not investigate whether ACEs result in increased feelings of entrapment as a result of increased defeat. Additionally, the current study could not explore the differences between internal and external entrapment and their role within the motivational phase of the IMV model. Further clarity is needed on the differences in factor structure and dimensionality of defeat and entrapment based on measures used and the theoretical and measurement implications of this.

4.5.1. Directions for future research

The findings of the current study indicate that the IMV model may present a useful framework for investigating the mechanisms by which ACEs may affect suicidal thoughts

and behaviour. However, it is still unclear why individuals experiencing higher levels of co-occurring adversity are more likely to report feelings of defeat and entrapment in adulthood. Several possible explanations have been proposed to explain the associations of ACEs with these outcomes. As discussed in Chapter 2 (Section 2.4), it has been suggested that ACEs may result in dysregulation of the HPA axis (Dempster et al., 2021; Kalmakis & Chandler, 2014; Ouellet-Morin et al., 2019). Other research has suggested that experiencing adversity may lead to increased "allostatic load", which is described as "wear and tear" of the body as a result of chronic stress (McEwen, 1998, 2000; Vaughn-Coaxum et al., 2020; See Section 2.4.2). However, this view assumes that all types of adversity confer risk through the same mechanisms and other developmental outcomes associated with early childhood experiences (McLaughlin, 2016; Sheridan & McLaughlin, 2020).

The DMAP addresses these issues by presenting a conceptualisation of ACEs that focuses on mechanisms by which they affect development (See section 2.6 for a full overview). Specifically, the DMAP hypotheses that threatening experiences in childhood result in higher emotional reactivity and difficulties with regulation while experiences involving deprivation result in difficulties in executive functioning and poorer language abilities. These partially distinct mechanisms may explain why ACEs are associated with increased feelings of defeat. The following chapter (chapter 5) will thus take theoretical advancements presented by the DMAP into consideration while investigating mechanisms by which ACEs confer risk for suicidal thoughts and behaviours (McLaughlin et al., 2014). Specifically, these developmental outcomes proposed by the DMAP will be investigated as mediators between adverse experiences involving threat and deprivation and motivational phase variables.

It is also important to consider the effects of different characteristics of adverse experiences in influencing outcomes. For instance, different types of adversity, the age at

which an individual experienced the ACEs, how often the individual experienced it, and how long these experiences of adversity lasted all impact the outcomes associated with it (Krinner et al., 2021; Pierce & Jones, 2022; Schroeder et al., 2020; Sicorello et al., 2021). Additionally, protective factors such as positive childhood experiences have also been found to influence the outcomes associated with experiencing ACEs (Bethell et al., 2019; Narayan et al., 2018; Skodol et al., 2007). Thus, it is important for future research to consider the influence of these characteristics of ACEs in understanding the mechanisms of risk.

4.5.2. Strengths and Limitations

This study was the first to investigate the role of defeat/entrapment as mediators between ACEs and suicidal ideation from the perspective of the IMV model among general population in the UK. A key strength of this study was thus a theory-focussed investigation on the pathways by which ACEs affect suicidal ideation. There are also several limitations in the current study. Firstly, this study was based on cross-sectional data, so we are unable to draw conclusions about causal relationships. Additionally, the survey employed retrospective self-report data which may be subject to recall bias (Susser & Widom, 2012). However, the relationship between ACEs and suicidal outcomes has been established prospectively (M. P. Thompson & Kingree, 2022). Additionally, research comparing retrospective and prospective reporting of adversity in childhood has reported low bias (Hardt et al., 2010; Scott et al., 2010).

Another limitation of the current study was the lack of a priori power analyses conducted to assess the sample size requirements. Given that the study used secondary data and undertook model modifications, power analyses were not conducted for the models tested. Kline (2011) recommends a minimum sample size of 200 for analyses employing SEM while outlining that this may not be adequate for more complex models. Given that the model tested a simple mediation analysis, it is thus less likely that the model lacked statistical

power. Additionally, given that the current study tested a simple mediation model, multiple comparisons were not adjusted for. However, it is important for future research investigate these pathways guided by a priori power analyses.

It should further be noted that eligible participants were adults living in the UK and the demographics indicated that participants were primarily white, cis-gender, heterosexual, and female suggesting that these findings may not be generalizable to other populations. Finally, while the ACEs scale has been demonstrated to be psychometrically sound, it is not without limitations. For instance, it has been argued that a measure capturing a broader range of adversities in childhood would be useful in getting a clearer understanding of the effects of ACEs (Finkelhor et al., 2013). Additionally, utilising a dichotomous measure does account for the chronicity, developmental timing, or other aspects of the adversity which may be crucial in understanding the developmental impacts of ACEs (Ports et al., 2020).

4.5.3. Implications

The findings of the current study have implications for research and practice. The findings of the current study highlight the role of measures used in the resulting conceptualisation of defeat and entrapment. Additionally, the discrepancy between the results from the systematic review (i.e. that defeat, internal, and external entrapment are distinct constructs) and the high covariances in the current study indicate that measures used to assess feelings of defeat and entrapment may affect the overall conceptualisation. This has implications for the theory and research. In terms of development of theory, these findings raise questions regarding the utility of conceptualising defeat, internal, and external entrapment as distinct constructs in understanding the effects of each of these variables on suicidal thoughts and behaviours. Further research investigating differences in conceptualisation based on measures, analyses used, and conceptual overlap related to the phrasing of items could be useful in better understanding the relationship between these

variables. Further investigations using ecological momentary assessments over a period of hours could be useful in determining the temporal dynamics of the interaction of these variables.

In terms of risk assessments, screening instruments for suicidal behaviours alone may not be effective in identifying individuals at higher risk for suicide (Carter et al., 2017). While routine screening for ACEs has also been suggested (Watson, 2019), it is important to consider the sensitivity and specificity of the screening tool and whether evidence-based interventions are available and accessible to identified high-risk groups (McLennan et al., 2020). Additionally, it is important to consider the potential harms from labelling groups as high-risk and costs associated with implementing risk assessments alongside the benefits (Finkelhor, 2018).

While literature focussed on the relationship between ACEs and suicidal outcomes from the perspective of the IMV model is sparse, a strong dose-response relationship between ACEs and suicidal outcomes has been established (Angelakis et al., 2020; Angelakis et al., 2019; Felitti et al., 1998). Replication of these findings in prospective studies would indicate that defeat and entrapment could be targeted in interventions for individuals with a history of ACEs in reducing suicidal ideation. Currently, most research and suicide prevention strategies focus on downstream prevention such as individual-level safety plans (Armitage et al., 2016; Nuij et al., 2021) brief interventions (McCabe et al., 2018), and postvention (Ruocco et al., 2022). Recent research has also largely focussed on differentiating between individuals with suicidal thoughts and individuals that act upon those thoughts in order to identify individuals at a high risk for suicide (Dhingra et al., 2015; Klonsky et al., 2021; Wetherall et al., 2018a). While these have shown to be effective in reducing suicidal behaviours, they are not as useful in preventing suicidal thoughts (McCabe et al., 2018; Nuij et al., 2021). Given that suicidal ideation has been identified as one of the strongest predictors

of suicide mortality and attempts, affects a larger group of people, and causes considerable distress, researchers have called for a greater focus on the reduction of suicidal thoughts (Franklin et al., 2017; Jobes & Joiner, 2019; Kleiman, 2020). Ports et al. (2017) further argue that upstream prevention efforts such as those focussing on the effects of ACEs should be utilised to develop comprehensive plans for suicide prevention at different stages of the suicidal process.

4.6. Conclusion

The results of this study suggest that defeat and entrapment might be a potential pathway in explaining the association between ACEs and suicidal thoughts. However, these findings also further raise questions regarding the conceptualisation of defeat and entrapment and how the measures used may influence the factor structure. The systematic review in Chapter 3 found that internal but not external entrapment consistently mediated the relationship between defeat and suicidal ideation. The studies included in the systematic review also primarily used the full defeat scale and entrapment scale to measure these variables. Thus, the full defeat and entrapment scales will be utilised as measures in chapter 5.

Additionally, while the findings of this study further indicate that the IMV model could be useful in understanding the relationship between ACEs and suicidal ideation, it is still unclear why childhood experiences could increase vulnerability to motivational phase variables such as defeat and entrapment. Theoretical models such as the DMAP could thus be useful in further investigating the mechanisms by which ACEs could affect suicidal ideation. Chapter 5 will thus further investigate the dimensions of ACEs (threat and deprivation) and developmental mediators by which these may increase vulnerability to defeat.

Chapter 5 - Dimensions of Adversity in Childhood as Predictors of Defeat: A Theory-Based Investigation

5.1 Overview

Chapter 4 presented an empirical study on the overall effects of ACEs as pre-motivational phase variables on suicidal ideation through defeat/entrapment in the IMV model. Specifically, defeat and entrapment were examined as mediators between ACEs and suicidal ideation. The results indicated that defeat/entrapment conceptualised as one variable partially mediated this association. However, as described in sections 2.5 and 4.5.1, this cumulative risk model of ACEs assumes that all ACEs affect outcomes through similar mechanisms, which is unlikely to be the case. As a result, this chapter considers the dimensions of ACEs (threat and deprivation) and investigates the developmental pathways as presented by the DMAP in section 2.6.

Two hundred and fifty-one participants were recruited from Prolific academic to answer a self-report survey. The survey included measures for threat, deprivation, emotional reactivity and regulation, executive functioning, language abilities, critical thinking disposition, and defeat. After investigating measurement model fit using CFAs, each individual pathway was investigated using path analysis models.

The hypotheses of the DMAP were not consistently supported by the findings. Specifically, the findings indicated that cognitive neglect (deprivation) was associated with increased defeat through heightened emotional reactivity. Additionally, expressive suppression mediated the effects of physical violence (threat) and cognitive neglect (deprivation) on defeat. Language abilities also mediated the effects of cognitive neglect (deprivation) on defeat. While these results do not contradict the hypotheses of the DMAP,

they suggest that developmental effects of threat and deprivation may vary by specific sub-facets of emotional processing and cognitive abilities. Implications for conceptualisation and measurement are discussed alongside limitations.

5.2. Introduction

The findings of the systematic review in Chapter 3 and the empirical study in Chapter 4 highlight that the IMV model may be a useful framework for understanding the relationships between ACEs and suicidal ideation. Chapter 4 additionally provided preliminary support for ACEs indirectly affecting suicidal ideation through defeat/entrapment. This study addressed a paucity in the literature exploring the role of ACEs from the perspective of the IMV model and highlighted key limitations in the literature that could present areas for further research. However, while the findings of chapter 4 indicate a relationship between co-occurrence of ACEs and vulnerability to defeat, there is a limited understanding of how ACEs in the pre-motivational phase could result in increased vulnerability to defeat. This is especially pertinent given that the prevailing approach of conceptualising ACEs (i.e. the cumulative risk model) involves summing the presence of an arbitrary set of different adversities with a higher score indicating the presence of multiple types of adversities (Dube et al., 2001; Felitti et al., 1998). This approach thus assumes that different types of adversities confer similar risks of negative health outcomes through similar mechanisms, which is unlikely (McLaughlin, 2016). While the cumulative risk approach can be useful in establishing the effects of the co-occurrence of different types of ACEs on various outcomes, it is inadequate in identifying how these adversities result in an increased vulnerability to these outcomes (Lacey & Minnis, 2020). As a result, this study draws from theoretical advancements in conceptualising ACEs that aim to highlight pathways by which these experiences could increase vulnerability to defeat.

As described in section 2.6, the DMAP (McLaughlin et al., 2014) posits that different dimensions of adversity impact developmental, psychological, and behavioural outcomes through partially distinct mechanisms. Adversities involving threat (of harm) are hypothesised to result in emotional processing difficulties characterized by heightened emotional reactivity and difficulties in emotional regulation. In contrast, deprivation (of cognitive or social inputs of sufficient complexity) would result in executive functioning and language difficulties (McLaughlin et al., 2020; McLaughlin et al., 2014). This conceptualisation of adversities has found empirical support in recent studies (Carozza et al., 2022; Machlin et al., 2019; McLaughlin et al., 2019; A. B. Miller et al., 2018; Schäfer et al., 2023). However, the effects of these dimensions of adversity (threat and deprivation) on defeat is yet to be tested. Thus, the proposed study aims to investigate the effects of threat and deprivation on defeat from the perspective of the IMV model.

This study further includes critical thinking disposition alongside executive functioning in order to obtain a broader understanding of the effects of adversities such as deprivation on other cognitive abilities. Critical thinking disposition refers to the motivation, attitude, or goal orientation with respect to critical thinking (Ku, 2009; Sosu, 2013). Theoretical accounts position executive functioning skills as key to critical thinking (J. S. B. T. Evans & Stanovich, 2013; S. Li et al., 2021; Sanz de Acedo Lizarraga et al., 2012). For instance, researchers have argued that similar cognitive processes and brain regions are involved in both critical thinking and executive functioning (Sanz de Acedo Lizarraga et al., 2012). Sanz de Acedo Lizarraga et al. (2012) further argue that these dispositional aspects of critical thinking have common components to facets of executive functioning such as energization and task fixing. Specifically, energization and task fixing involve resource allocation towards tasks, which are contingent upon motivational and goal-oriented aspects of

critical thinking disposition. Given that critical thinking disposition and executive functioning are theoretically closely related, this study included critical thinking disposition as an additional mediator between childhood experiences of threat and deprivation and motivational phase variables.

5.3 The current study

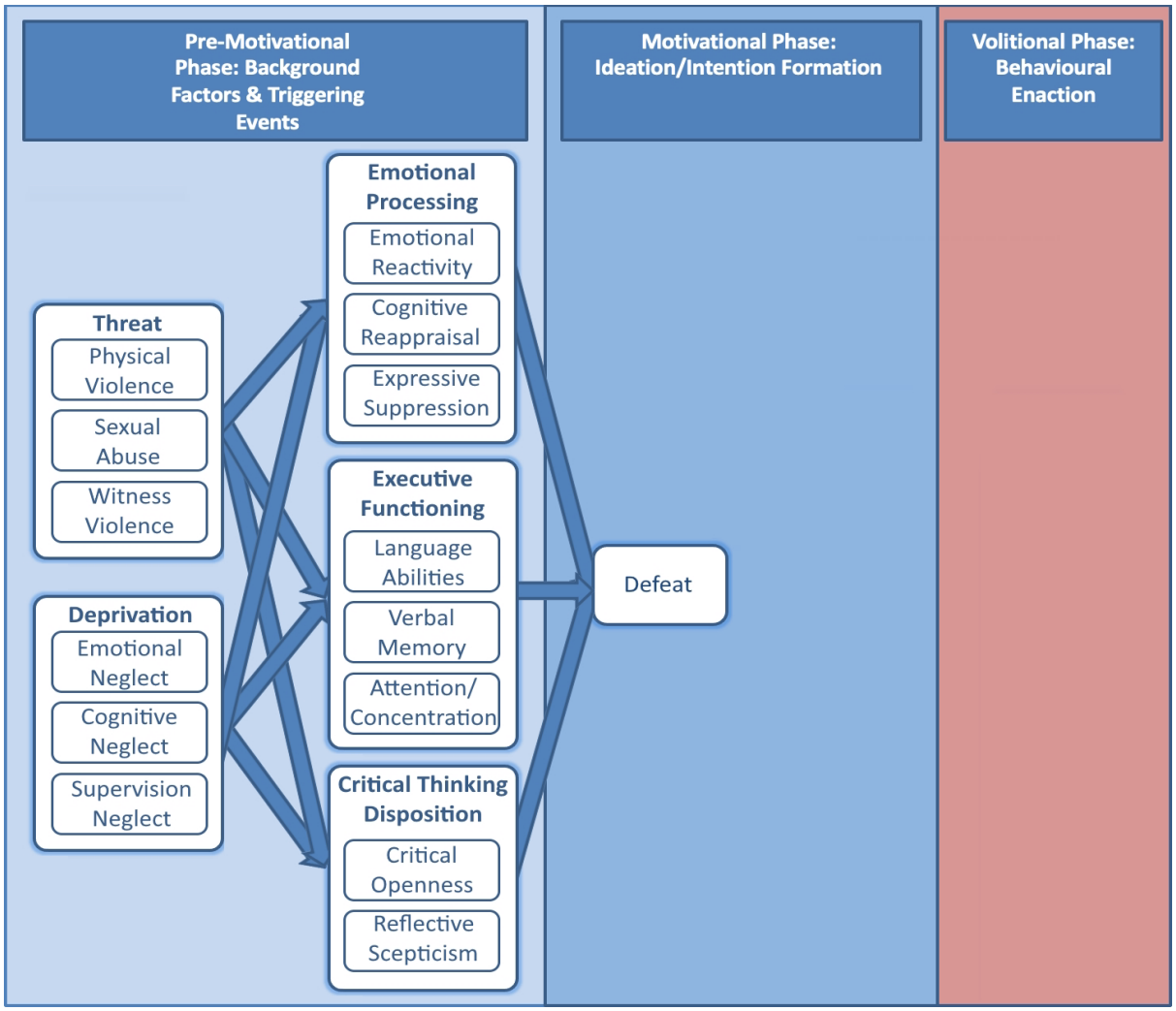
In line with the DMAP and the IMV models, the proposed study has the following aims:

1. To investigate the measurement models for each of the variables of interest in the study (including childhood experiences, developmental mediators, and defeat).
2. To investigate whether the associations between the dimensions of adversity (threat and deprivation) and defeat are mediated by developmental outcomes including emotional processing, executive functioning, critical thinking disposition, and language abilities .

Figure 5.1 outlines the specific associations that will be investigated using path analyses in order to address these aims.

Figure 5.1.

Conceptual model of pathways based on the IMV and DMAP models



5.3. Methods

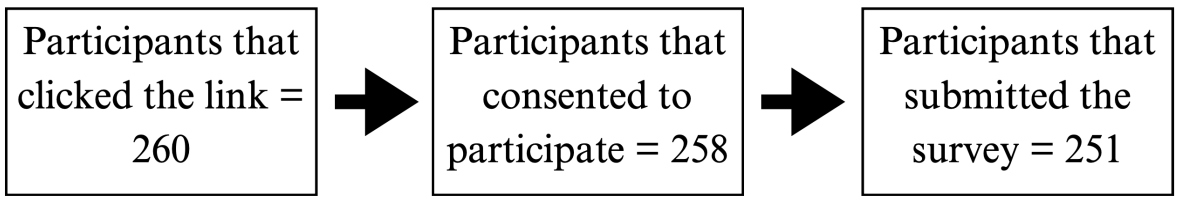
5.3.1. Participants and Procedure

A total of 251 participants that were aged above 18 and resident in the UK were included in the study. The participants' age ranged from 20 to 81 (Mean = 41.57, SD = 14.26). Similar to the sample in study 2 (chapter 4), a majority of the participants were white (83.27%) and from the United Kingdom (85.66%). Most of the participants were also female (68.92%), Heterosexual (85.26%), and Cisgender (84.85%).

Data collection took place on an online survey platform called Qualtrics in September 2023. Participants were recruited via Prolific Academic and redirected to Qualtrics to fill in the survey. Participants were presented with an information sheet outlining the purpose and nature of the survey, informed they were able to withdraw from the study at any point before submission, and informed of the data management procedures that will be followed. Participants were then asked to click the consent form before answering the survey. The survey included a battery of measures that took approximately 20 minutes to complete. Upon completing the survey questions, participants were invited to take part in a mood elevation procedure where they were asked to rate cute animal pictures based on recommendations that positive mood inductions may be useful in improving mood after participation in studies involving questions of such sensitive nature (Lockwood et al., 2018; Ellen Townsend et al., 2020). A downloadable debrief sheet detailing the data management and signposting support services was provided at the end of the survey. Ethical approval was obtained from the University of Strathclyde ethics committee (UEC23/42). Figure 5.2 outlines the participant recruitment steps including the numbers of participants that clicked the link to participate, consented to participate, and submitted the survey.

Figure 5.2

Flow diagram illustrating participant recruitment



5.3.2. Measures.

5.3.2.1. Independent Variables (Childhood Experiences)

Threat: ACEs involving experiences of threat were measured with the Juvenile Victimization Questionnaire (JVQ-R2), Screener sum version, and adult retrospective form (Finkelhor et al., 2011). Experiences involving threat including physical violence measured using items from the child maltreatment and peer and sibling victimization modules (e.g. "*When you were a child, did a grown-up in your life hit, beat, kick, or physically hurt you in any way?*"); sexual abuse measured using the sexual victimization module (e.g. "*When you were a child, did a grown-up you did not know touch your private parts when they shouldn't have, make you touch their private parts or force you to have sex?*"); and witnessing violence using the witnessing and indirect victimisation module (e.g. "*When you were a child, were you in the middle of a war where you could hear real fighting with guns or bombs?*").

The screener sum version is a 34-item scale where each item is dichotomously scored ("yes" or "no"). The original JVQ questionnaire has been validated and found to have good psychometric properties (Finkelhor et al., 2005). This scale was adapted to only questions that measure adversities clearly involving threats. As such, 5 items were excluded, resulting in 29 items in total. The excluded items asked participants if they were kidnapped, physically neglected (e.g. not taken to the doctor or given enough food), kept away from a parent by another parent, humiliated by adults, and humiliated by other children. This is because items involving kidnapping, neglect, and separation from parent involved deprivation while items measuring humiliation included name-calling, saying mean things, or being told they were unwanted which may not clearly imply threat.

Additionally, two questions from the original form (e.g. "*Not including spanking on your bottom, when you were a child, did a grown-up in your life hit, beat, kick, or physically hurt you in any way?*") were revised so that the phrase "*Not including spanking on your*

bottom" was excluded. This was to avoid minimising the participants' experiences and because research has demonstrated that spanking has also been found to affect developmental and behavioural outcomes (Avezum et al., 2022).

Deprivation: The emotional, cognitive, and supervision needs subscales of the multidimensional neglectful behaviour scale – Adolescent and adult-recall version (MNBS; M. Straus et al., 2011) was adapted to measure deprivation. Each subscale had 5 items measuring emotional needs (e.g. "*Did not help me when I had problems*"), cognitive needs (e.g. "*Did not read books to me*"), and supervision needs (e.g. "*Did not make sure I went to school*"). While the original scale measured the number of times the participant experienced instances of neglect in a year (e.g., 1 = once that year to 6 = more than 20 times that year), each item was initially be dichotomously scored ("yes" or "no") as screener questions with follow up questions measuring other characteristics of deprivation including frequency. This measure has shown good psychometric properties (Straus et al., 2011; Straus, 2006).

5.3.2.2. Mediators (Developmental factors)

Emotional Reactivity: The Sensitivity subscale of the Emotional reactivity scale (ERS) was used to measure emotional reactivity (Nock et al., 2008b). The sensitivity subscale includes 10 items from the 21-item self-report scale measuring sensitivity of emotional responses (e.g. "*I tend to get very emotional very easily*"). It is a 4-point Likert-type scale where items are rated from 0 (not at all like me) to 4 (completely like me). This scale has demonstrated good reliability (α=.94) and validity (Nock et al., 2008b).

Emotional regulation: The Emotional regulation questionnaire (ERQ) is a 10-item scale with responses ranging from 1 (strongly disagree) to 7 (strongly agree; Gross & John, 2003). This scale measures emotional regulation through cognitive reappraisal (e.g. "*When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay*

calm.") and emotional suppression (e.g. "*I control my emotions by not expressing them*"). It has demonstrated good consistency and validity (Preece et al., 2021).

Executive Functioning and Language abilities: The Multiple-ability self-report questionnaire ((MASQ; Seidenberg et al., 1994) was used to measure executive functioning and language abilities. Specifically, the verbal memory ("*I forget to give phone call messages*") and attention/concentration (*"I am alert to things going on around me"*) subscales of the MASQ were used to measure executive functioning. Each of these subscales contains 8 items ranging on a 5-point scale ranging from 1 = Never to 5 = Always, indicating the level of difficulty participants face in completing a particular task. The overall scale has shown good validity and reliability (Seidenberg et al., 1994). Language abilities were measured using the Language subscale of the MASQ. As discussed above, this subscale measures language abilities using 8 items on a 5-point scale (e.g. "My speech is slow or hesitant"). The responses range from 1 = Never to 5 = Always.

Critical Thinking Disposition: The Critical thinking disposition Scale (CTDS; Sosu, 2013) is an 11-item scale that measures critical openness (e.g. "I am often on the lookout for new ideas") and reflective scepticism (e.g. "I often re-evaluate my experiences so that I can learn from them"). The responses range from 1 (strongly disagree) to 5 (strongly agree). The scale has exhibited good internal consistency (α=.80) and validity (Sosu, 2013).

5.3.2.3. Dependent Variable (Defeat)

Defeat: The Defeat scale (DS; Gilbert & Allan, 1998) is a 16-item 5-point Likert type scale with responses ranging from 0 (Never) to 4 (Always) that measures feelings of defeat (e.g. "I feel defeated by life"). It has shown good reliability and validity (Forkmann et al., 2018).

5.3.2.4. Control variables (Age and gender)

Control variables: As in Chapter 4, age and gender were controlled for in each pathway investigated in this study. In order to assess age, participants were asked a self-report question ("*What is your age?*") with a continuous response. Age was then included as a continuous numerical variable in the models.

Details about participants' gender were recorded with the question "*Which of the following best describes your gender?*" with the options "Male", "Female", "Non-binary", "Prefer not to say", and "Other – open ended". Additionally, participants were asked "*Does your gender identity/expression differ from your sex assigned at birth?*" with the options "Yes", "No", "I don't know", and "Prefer not to say". Gender was included as a dummy coded dichotomous categorical variable based on whether participants identified as female (1) or male/other (0). This was because only 3 (1.20%) participants responded that they were non-binary and 2 (0.80%) preferred not to respond. As a result, these were not included as separate categories.

5.3.3. Statistical Analyses

All statistical analyses were conducted using RStudio. The code for data manipulation, descriptives, and analyses for chapters 5 and 6 are available on OSF (https://osf.io/vqfp7/?view_only=a4054784d1224ec9bc6cb00bd0763ab7).

Multivariate normality. The multivariate normality of the variables in the dataset at the composite scale level was investigated using the mult.norm() function in the QuantPsych package (Fletcher, 2022). As the significance tests for both skewness and kurtosis indicated that the data were significantly different from a normal distribution, the assumption of multivariate normality was not met (See Table 5.1). As a result, a robust estimator was utilised in following analyses to address the violation of the normality assumption.

Table 5.1

Multivariate normality at scale level for items in dataset

	Beta-hat	kappa	p-value
Skewness	57.08	1997.75	<0.001
Kurtosis	311.61	18.16	<0.001

Missing Data. The percentage of missing data was 0.20%. Missingness at item level was also low (Mean = 0.20, SD = 0.28, Min = 0, Max = 1.20). The MCAR test conducted at the scale level indicated that the data were missing completely at random (χ^2(df) = 317 (319), p = 0.514). As a result, missing data was addressed using multiple imputation in all models (Newman, 2014). Specifically, all analyses were conducted using 10 multiply imputed datasets and results were pooled.

Confirmatory factor analyses. Prior to hypothesis testing, CFAs were run to test the measurement models. Since two measures utilised dichotomous scales (the juvenile victimisation questionnaire and the multidimensional neglectful behaviour scale), the WLSMV estimator was used. All other analyses used the MLR which is robust to non-normality (X. Zhong & Yuan, 2011). Model fit was assessed using existing rules of thumb for the CFI > 0.90, TLI > 0.90, RMSEA < 0.80, and SRMR < 0.80 (Hu & Bentler, 1999; Kyndt & Onghena, 2014). As outlined in section 4.3.4, the RMSEA and SRMR values were interpreted with caution for models using the WLSMV estimator. Additionally, the chi-squared test indices are reported but not used to assess model fit due to its sensitivity to sample size (Stone, 2021).

Modification indices. Modification indices were utilised judiciously in model re-specification. One reason was due to some measures being adapted or not being previously validated using confirmatory factor analyses (e.g. ERS – English). Due to concerns with empirical modifications capitalising on chance, modification indices were only used when

freeing suggested parameters were theoretically defensible (Kline, 2011). Each modification is explained in detail.

Path Analyses. Upon validating the measurement models using CFAs, the Path models outlined in figure 1 were tested using path analyses. As with CFA models, the model fit were assessed using CFI, TLI, RMSEA, and SRMR and robust standard errors to address non-normality. Additionally, model estimation was conducted using MLR estimator.

5.4. Results

5.4.1. Descriptive statistics.

Descriptive information regarding the variables in the study is presented in Table 5.3. This includes the mean, standard deviation, and range of each of the measures included in the sample.

Table 5.2

Descriptive statistics of included participants (n = 251)

Variables	Mean (SD)	Range
Childhood Experiences (Independent Variables)		
Juvenile Victimisation Questionnaire (threat)		
Physical Violence	2.48 (2.21)	0-9
Sexual Abuse	0.61 (1.1)	0-6
Multidimensional Neglectful behaviour scale (deprivation)		
Cognitive Needs	1.08 (1.55)	0-5
Supervision Needs	0.26 (0.72)	0-5
Developmental Factors (Mediators)		
Emotional Reactivity Scale		
Sensitivity	17.01 (9.8)	0-40
Emotional Regulation Questionnaire		
Cognitive reappraisal	22.89 (6.01)	6-36
Expressive Suppression	11.81 (5.21)	0-24

Multiple Abilities Self-report Questionnaire		
Language	8.98 (5.43)	0-27
Verbal Memory	11.23 (5.7)	0-27
Attention/Concentration	18.36 (2.17)	11-25
Critical Thinking Disposition Scale		
Critical Openness	20.1 (3.41)	7-28
Reflective Scepticism	11.96 (2.19)	4-16
Dependent Variable		
Defeat Scale	24.86 (16.23)	0-64

Additionally, table 5.4 outlines the frequencies and percentages of participants reporting any type of adversity. The most prevalent type of threat was physical violence, with 193 participants (76.89%) answering "yes" to having experienced at least one type of physical violence. This was followed by 123 (49%) participants reporting that they witnessed at least one form of physical violence and 83 (33.07%) participants having experienced sexual abuse before the age of 18. In terms of neglect, cognitive neglect was the most prevalent with 110 (43.82%) participants answering yes to one form of cognitive neglect. This was followed by emotional neglect reported by 99 (39.44%) participants and 41 (16.33%) participants reporting supervision neglect.

Table 5.3

Frequencies of participants reporting at least one type of adversity

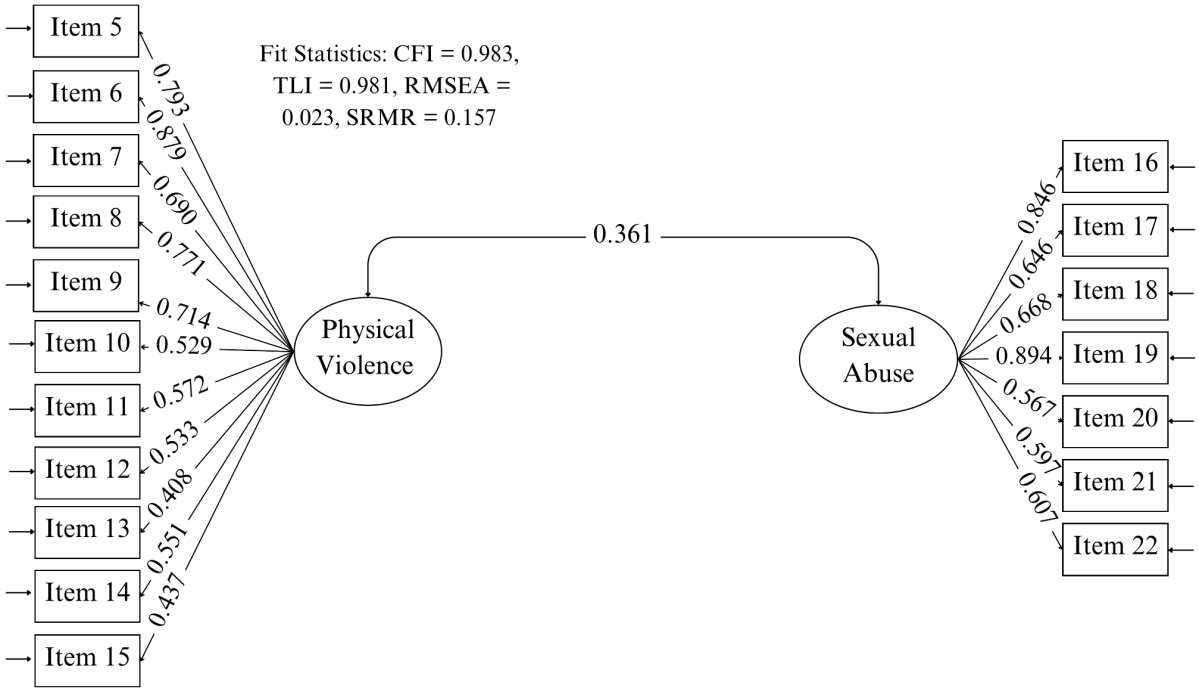
Variable	Frequency (Percentage)
Physical Violence	193 (76.89%)
Sexual Abuse	83 (33.07%)
Cognitive Neglect	110 (43.82%)
Supervision Neglect	41 (16.33%)

5.4.2. Confirmatory factor analysis

Threat: The initially proposed 3 factor CFA model for the juvenile victimisation questionnaire included subscales: physical violence, sexual abuse, and witnessing violence. This CFA model measuring threat indicated an overall acceptable-to-good fit (χ^2 (df) = 373.47 (272), $p < 0.001$, CFI = ` 0.958, TLI = 0.953, RMSEA = 0.039, SRMR = 0.169). Factor loadings were overall also high (>0.4), however, one item measuring experiences involving war ("*When you were a child, were you in the middle of a war where you could hear real fighting with guns or bombs?*") had a low factor loading of 0.266. The covariance between witnessing violence and physical violence was high (0.92) indicating multicollinearity. This made theoretical sense as individuals in environments with violence would be expected to perceive as well as experience violence. Given the redundancy between these factors, the witnessing violence subscale was excluded from the model. The resulting model had improved fit (χ^2 (df) = 151.07 (134), $p = 0.149$, CFI = 0.983, TLI = 0.981, RMSEA = 0.023, SRMR = 0.157). The factor loadings are presented in Figure 5.2.

Figure 5.3.

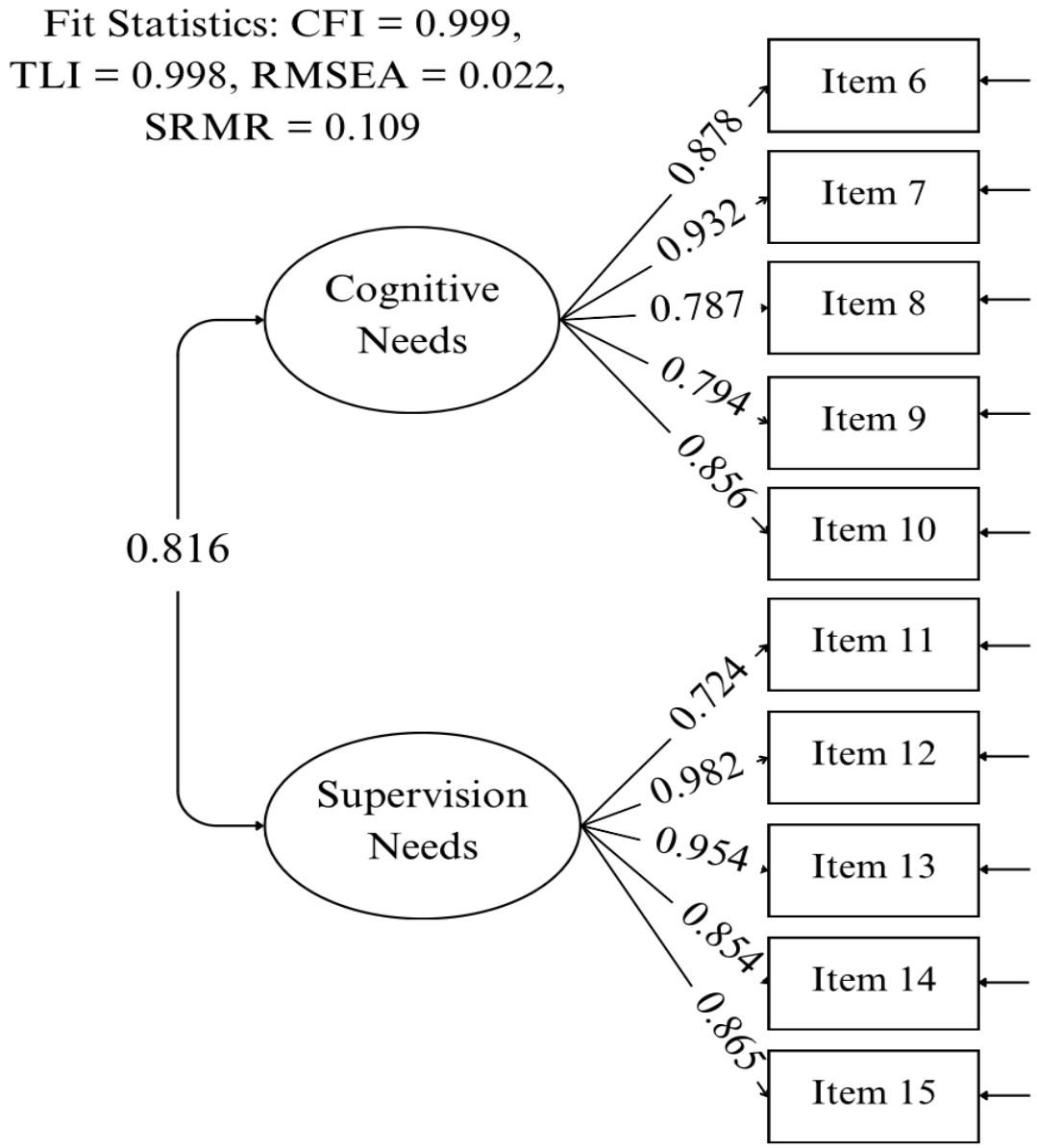
CFA of the dimensions of threat – physical violence and sexual abuse



Deprivation: An initial 3 factor CFA model for the cognitive, emotional, and supervision neglect subscales was hypothesised. This model showed good fit (χ^2 (df) = 87.24 (87), p = 0.473, CFI = 1.000, TLI = 1.000, RMSEA = 0.003, SRMR = 0.101). However, the latent factors for emotional and cognitive needs had high covariance (0.95) indicating redundancy. Items in both scales were focussed on caregiver interactions. Specifically, the emotional needs subscale was focussed on emotional experiences with caregivers (e.g. doing things together for fun) while the cognitive needs subscale was focussed on interactions with caregivers focussed on learning (e.g. reading books together). Given that the dimensional model hypothesises that learning experiences impact executive functioning and verbal abilities, cognitive needs were regarded as more relevant to the model and retained while emotional needs were dropped. There were only slight differences in the model fit of the resulting model (χ^2 (df) = 37.93 (34), p = 0.295, CFI = 0.999, TLI = 0.998, RMSEA = 0.022, SRMR = 0.109). The parameter estimates are presented in Figure 5.3.

Figure 5.4.

CFA of the dimensions of deprivation – cognitive and supervision needs

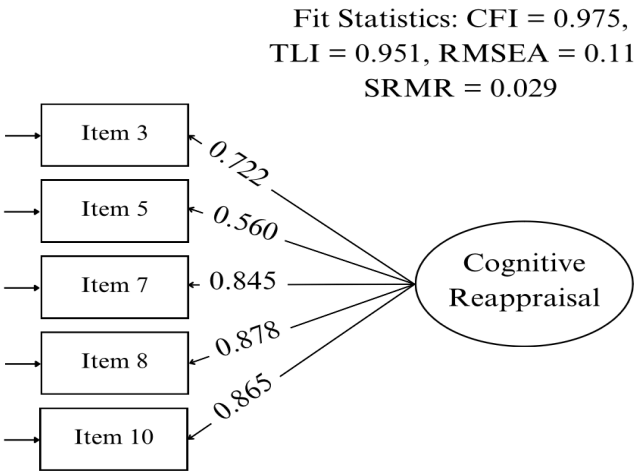


Emotional Regulation Questionnaire: The initial 2 factor CFA model for emotional regulation subscales of cognitive reappraisal and expressive suppression showed acceptable fit indices for χ^2 (df) = 122.90 (34), $p < 0.001$, CFI = 0.930, TLI = 0.908, and SRMR = 0.061 but not RMSEA = 0.102. However, the covariance between cognitive reappraisal and expressive suppression was low -0.006, indicating that a single higher-order factor did not underlie these latent variables. As a result, CFAs were run for each latent factor separately.

The CFA model for cognitive reappraisal showed poor fit (χ^2 (df) = 86.98 (9), $p < 0.001$, CFI = 0.914, TLI = 0.857, RMSEA = 0.186, SRMR = 0.057). Upon investigating modification indices, it was recommended that residual variances of items 1 ("*When I want to feel more positive emotion (such as joy or amusement), I change what I'm thinking about*") and 3 ("*When I want to feel less negative emotion (such as sadness or anger), I change what I'm thinking about*") from the cognitive reappraisal subscale be correlated. As both items focus on influencing different types of emotions by changing one's thoughts, item 1 was dropped to reduce redundancy. The resulting model had showed an improved fit (χ^2 (df) = 22.42 (5), $p < 0.001$, CFI = 0.975, TLI = 0.951, RMSEA = 0.118, SRMR = 0.029; See Figure 5.4).

Figure 5.5

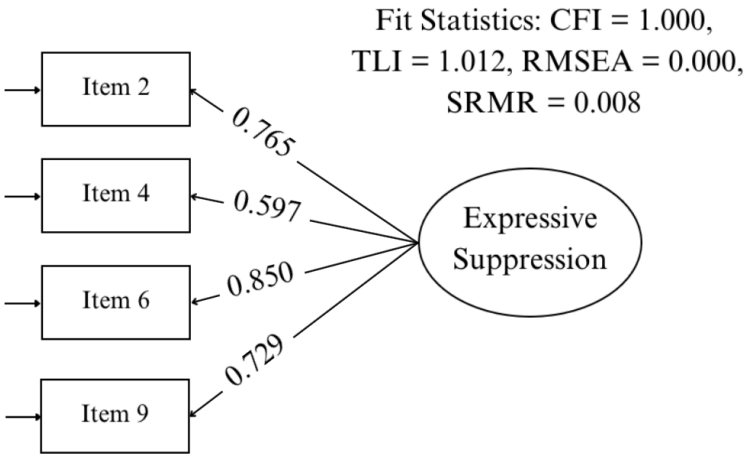
CFA of the dimensions of emotional regulation subscale - Cognitive Reappraisal



The CFA model for expressive suppression had nearly perfect fit (χ^2 (df) = 0.632 (2), $p = 0.729$, CFI = 1.000, TLI = 1.012, RMSEA = 0.000, SRMR = 0.008). However, this was likely due to this being a parsimonious model with low degrees of freedom. The factor loadings are presented in Figure 5.5.

Figure 5.6.

CFA of the dimensions of emotional regulation subscale – Expressive suppression

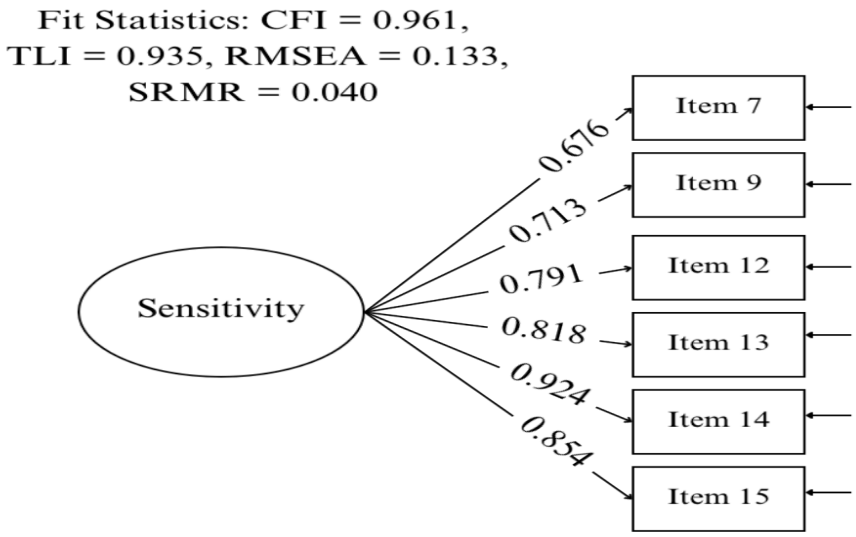


Emotional Reactivity: The initial CFA model for the emotional sensitivity subscale measuring emotional reactivity indicated poor model fit (χ^2 (df) = 434.22 (35), $p < 0.001$, CFI = 0.808, TLI = 0.753, RMSEA = 0.213, SRMR = 0.087). Modification indices were used to investigate the poor fit which resulted in suggestions of correlated residuals. The first recommendation was to correlate residuals of item 5 ("*I tend to get very emotional very easily*") and item 9 ("*Even the littlest things make me emotional*"). As these are very similar items, it was decided that item 9 better reflected emotional sensitivity and item 5 was thus dropped. Although this improved the model fit, the overall fit was still poor (χ^2 (df) = 273.34 (27), $p < 0.001$, CFI = 0.857, TLI = 0.809, RMSEA = 0.191, SRMR = 0.082). Further modifications suggested that residuals between item 2 ("*My feelings get hurt easily*") and item 18 ("*I am a very sensitive person.*") should be correlated. These items were thus also considered redundant due to content and item 18 was dropped resulting in a further improved fit (χ^2 (df) = 161.91 (20), $p < 0.001$, CFI = 0.904, TLI = 0.865, RMSEA = 0.168, SRMR = 0.065). Two similar additional modifications were made. Firstly, item 2 ("*My feelings get hurt easily*") and item 9 ("*Even the littlest things make me emotional*") were redundant and

item 2 was dropped. Secondly, item 15 ("*My emotions go from neutral to extreme in an instant*") and item 16 ("*When something bad happens, my mood changes very quickly. People tell me I have a very short fuse*"). Since item 16 is double-barrelled, this item was dropped, resulting in a further improved fit (χ^2 (df) = 48.74 (9), $p < 0.001$, CFI = 0.961, TLI = 0.935, RMSEA = 0.133, SRMR = 0.040). While the RMSEA value for this model was still high, this model was retained (See Figure 5.6).

Figure 5.7.

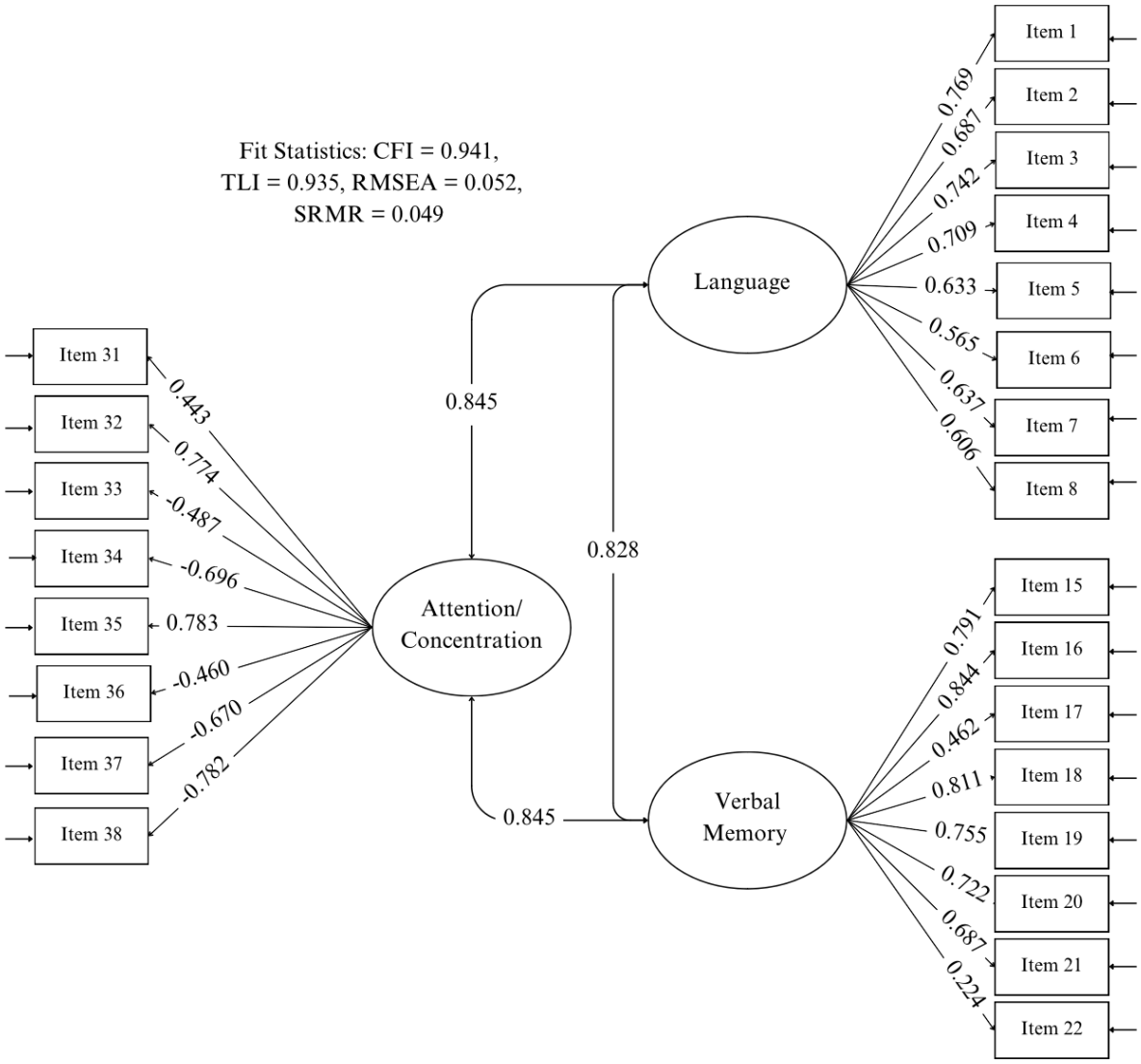
CFA of the dimensions of emotional regulation subscale – Expressive suppression



Verbal abilities and Executive functioning: A 3 factor CFA model was conducted for the language, verbal memory, and attention concentration subscales of the multiple abilities self-report questionnaire. The model demonstrated acceptable-to-good fit indices (χ^2 (df) = 415.73 (249), $p < 0.001$, CFI = 0.941, TLI = 0.935, RMSEA = 0.052, SRMR = 0.049). Figure 5.7 represents the factor loadings.

Figure 5.8.

CFA model for verbal abilities and executive functioning

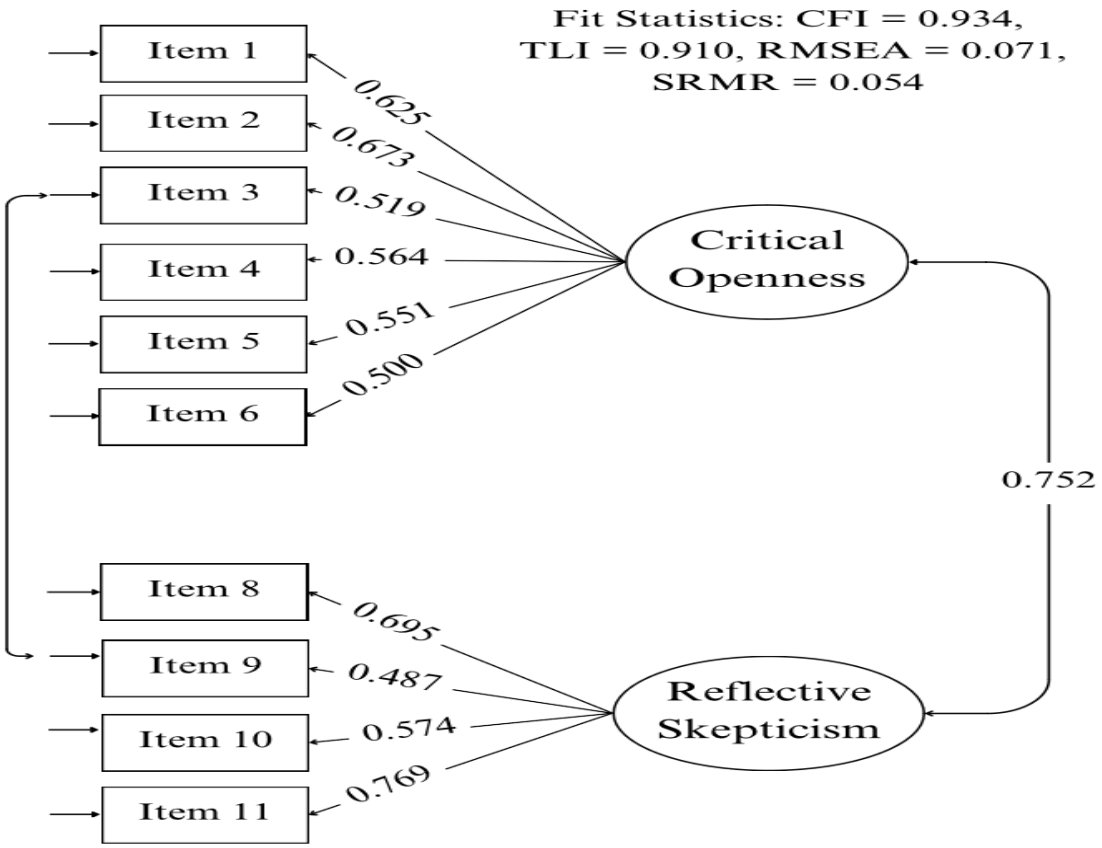


Critical thinking disposition: The hypothesised 2-factor CFA model for the critical thinking disposition subscales (critical openness and reflective scepticism) indicated that the fit was poor (χ^2 (df) = 122.32 (43), $p < 0.001$, CFI = 0.879, TLI = 0.845, RMSEA = 0.086, SRMR = 0.063). Modification indices indicated that the residuals for item 3 ("*I use more than one source to find out information for myself*") and item 9 ("*I usually check the credibility of the source of information before making judgements*") should be allowed to correlate. While these items were from different subscales, they indicated similarities in

wording and are related to examining sources of information. As a result, the residuals of these items were allowed to correlate. Factor loadings are presented in Figure 5.8. Item 7 ("*It is important to justify the choices I make*") had low factor loading (0.270). As a result, this item was excluded. The resulting model had an acceptable fit (χ^2 (df) = 74.41 (33), p < 0.001, CFI = 0.934, TLI = 0.910, RMSEA = 0.071, SRMR = 0.054).

Figure 5.9.

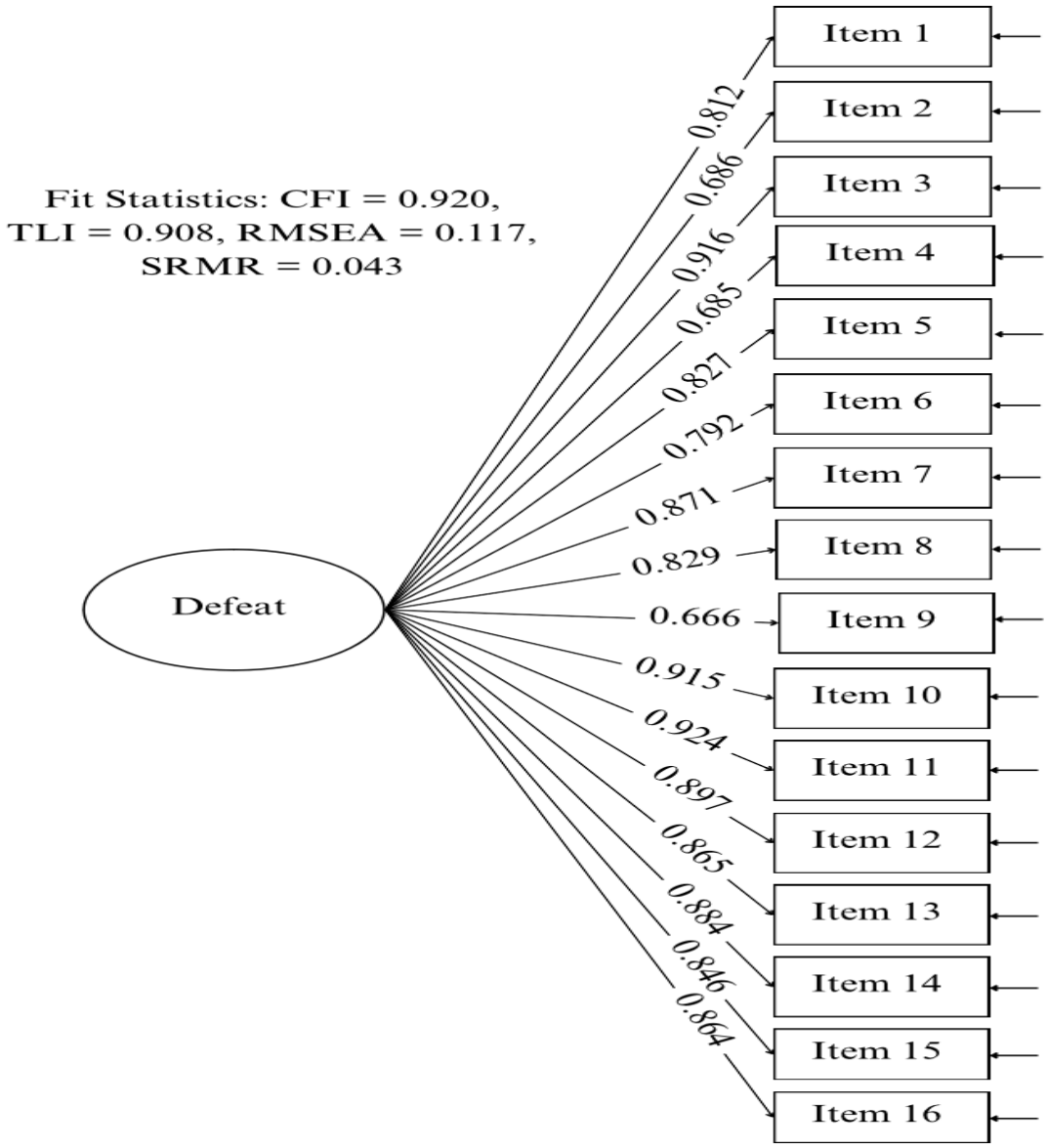
CFA model for Critical Thinking disposition



Defeat: The one factor defeat measure (χ^2 (df) = 459.413 (104), p <0.001, CFI = 0.920, TLI = 0.908, SRMR = 0.043) except for RMSEA = 0.117. Factor loadings for all items were also high (> 0.65). As a result, this model was retained. The overall fit and factor loadings for the CFA model are represented in Figure 5.9.

Figure 5.10.

CFA model for defeat



All the modifications to CFA models are outlined in Table 5.5

Table 5.4

Respecifications for all CFA models

Measure	Initial fit	Modifications	Reason for modification	Final fit
JVQ-R2 (Threat)	χ^2 (df) = 384.95 (272), p = 0.000, CFI = ` 0.959, TLI = 0.954, RMSEA = 0.041, SRMR = 0.170.	Witnessing Violence subscale excluded.	High redundancy (Covariance = 0.92) between physical violence and witnessing violence.	χ^2 (df) = 152.086 (134), p = 0.136 , CFI = 0.984, TLI = 0.982, RMSEA = 0.023, SRMR = 0.158.
MNBS (Deprivation)	χ^2 (df) = 87.074 (87), p = 0.478, CFI = 1.000, TLI = 1.000, RMSEA = 0.002, SRMR = 0.101.	Emotional Needs subscale excluded.	High redundancy (Covariance = 0.95) between Emotional needs and Cognitive needs.	χ^2 (df) = 37.656 (34), p = 0.305, CFI = 0.999, TLI = 0.998, RMSEA = 0.021, S RMR = 0.108.
ERQ	χ^2 (df) = 127 (34), p = 0.000, CFI = 0.928, TLI = 0.905, RMSEA = 0.104, SRMR = 0.062.	Cognitive reappraisal and expressive suppression subscales treated as distinct constructs.	Low covariance between cognitive reappraisal and expressive suppression (-0.004).	--

ERQ – Cognitive Reappraisal	χ^2 (df) = 90.059 (9), p = 0.000, CFI = 0.912, TLI = 0.853, RMSEA = 0.189, SRMR = 0.057	Item dropped.	Item 1 ("*When I want to feel more positive emotion (such as joy or amusement), I change what I'm thinking about*") redundancy due to similarity with item 3 "*When I want to feel less negative emotion (such as sadness or anger), I change what I'm thinking about*"	χ^2 (df) = 22.56 (5), p = 0.000, CFI = 0.975, TLI = 0.950, RMSEA = 0.118, SRMR = 0.029.
ERS - Sensitivity	χ^2 (df) = 434.22 (35), p = 0.000, CFI = 0.808, TLI = 0.753, RMSEA = 0.213, SRMR = 0.087	Items dropped.	Item redundancy. • Item 5 (*"I tend to get very emotional very easily")* similar to item 9 ("*Even the littlest things make me emotional*"). • Item 18 (*"I am a very sensitive person")* similar to item 2 ("*My feelings get hurt easily*") • Item 2 (*"My feelings get hurt easily")* similar to item 9 ("*Even the littlest things make me emotional*") • Item 16 ("*When something bad happens, my mood changes very*	χ^2 (df) = 48.737 (9), p = 0.000, CFI = 0.961, TLI = 0.935, RMSEA = 0.133, SRMR = 0.040

			quickly. People tell me I have a very short fuse") similar to item. 15 ("*My emotions go from neutral to extreme in an instant*")	
CTDS	χ^2 (df) = 127.30 (43), p = 0.000, CFI = 0.872, TLI = 0.837, RMSEA = 0.088, SRMR = 0.064	• Item dropped. • Correlated errors.	• Item 7 ("*It is important to justify the choices I make*") dropped due to low factor loading. • Correlated errors between item 3 ("*I use more than one source to find out information for myself*") and item 9 ("*I usually check the credibility of the source of information before making judgements*").	χ^2 (df) = 75.82 (33), p = 0.000, CFI = 0.933, TLI = 0.909, RMSEA = 0.072, SRMR = 0.054

5.4.3. Findings of path analyses

5.4.3.1. Indirect effect of threat and deprivation on defeat through emotional reactivity and regulation variables.

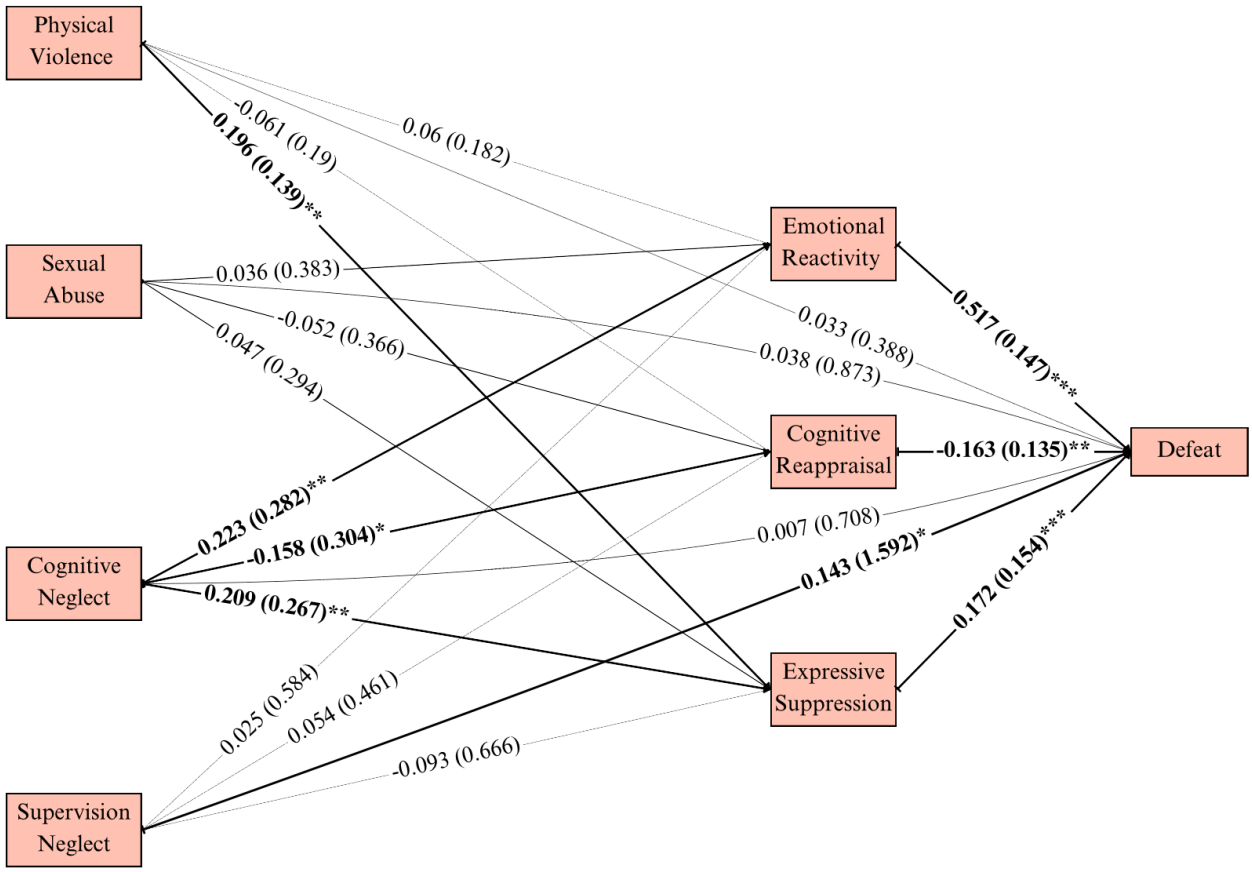
Model 1 examined emotional reactivity and regulation (cognitive reappraisal and expressive suppression) as mediators between threat (physical violence and sexual abuse) and deprivation (cognitive and supervision neglect) in childhood and defeat. Findings for each association and mediation pathway are presented in table 5.6. Additionally, figure 5.10 outlines each association in the pathway. In terms of threats, reporting higher physical violence exposure was linked with significantly higher expressive suppression (β = 0.196, SE = 0.139, p = 0.001). Additionally, expressive suppression in childhood was also associated with increased feelings of defeat (β = 0.172, SE = 0.154, p = 0). The indirect associations of physical violence (β = 0.034, SE = 0.104, p = 0.016) through expressive suppression were significant while the direct effect of physical violence on defeat was not significant (β = 0.033, SE = 0.388, p = 0.525). This indicated that expressive suppression fully mediated the association between physical violence and defeat. None of the other mediators included in the model explained the association between the threat subscales of physical violence or sexual abuse and defeat.

In terms of deprivation, experiencing cognitive neglect in childhood was linked to increased expressive suppression neglect (β = 0.209, SE = 0.267, p = 0.009), heightened emotional reactivity (β = 0.223, SE = 0.282, p = 0.002), and reduced cognitive reappraisal (β = -0.158, SE = 0.304, p = 0.046). As with expressive suppression, participants scoring high in emotional reactivity (β = -0.163, SE = 0.135, p = 0.001) and lower in cognitive reappraisal (β = -0.163, SE = 0.135, p = 0.001) were also significantly more likely to report higher feelings of defeat. Investigation of the indirect pathways indicated that emotional reactivity (β =

0.115, SE = 0.424, p = 0.005) and expressive suppression (β = 0.036, SE = 0.174, p = 0.031) but not cognitive reappraisal (β = 0.026, SE = 0.147, p = 0.067) significantly mediated the association between cognitive neglect and defeat. The direct effect of cognitive neglect on defeat was also not significant (β = 0.007, SE = 0.708, p = 0.915), suggesting that emotional reactivity and expressive suppression fully mediated the relationship between cognitive neglect and defeat. None of the other investigated mediation pathways were significant, however supervision neglect was directly associated with increased feelings of defeat (β = 0.143, SE = 1.592, p = 0.042).

Figure 5.11.

Emotional regulation and reactivity as mediators of the relationship between dimensions of adversity and defeat.



Note. Standardised effects (Standard errors) presented in the diagram. Bold text indicates significant effects. *p<0.05, **p<0.01, ***p<0.001.

Table 5.5

Associations between threat/deprivation and defeat through emotional reactivity and regulation

Associations tested	B	β	SE	P-value
Direct Effects				
Physical violence → Emotional reactivity	0.167	0.060	0.182	0.357
Sexual abuse → Emotional reactivity	0.202	0.036	0.383	0.599
Cognitive neglect → Emotional reactivity	**0.877**	**0.223**	**0.282**	**0.002**
Supervision neglect → Emotional reactivity	0.216	0.025	0.584	0.712
Physical violence → Cognitive reappraisal	-0.166	-0.061	0.190	0.385
Sexual abuse → Cognitive reappraisal	-0.282	-0.052	0.366	0.441
Cognitive neglect → Cognitive reappraisal	**-0.606**	**-0.158**	**0.304**	**0.046**
Supervision neglect → Cognitive reappraisal	0.450	0.054	0.461	0.330
Physical violence → Expressive suppression	**0.462**	**0.196**	**0.139**	**0.001**
Sexual abuse → Expressive suppression	0.224	0.047	0.294	0.446
Cognitive neglect → Expressive suppression	**0.695**	**0.209**	**0.267**	**0.009**
Supervision neglect → Expressive suppression	-0.671	-0.093	0.666	0.314
Emotional reactivity → Defeat	**1.370**	**0.517**	**0.147**	**<0.001**
Cognitive reappraisal → Defeat	**-0.444**	**-0.163**	**0.135**	**0.001**
Expressive suppression → Defeat	**0.539**	**0.172**	**0.154**	**<0.001**
Physical violence → Defeat	0.247	0.033	0.388	0.525
Sexual abuse → Defeat	0.559	0.038	0.873	0.522
Cognitive neglect → Defeat	0.075	0.007	0.708	0.915
Supervision neglect → Defeat	**3.232**	**0.143**	**1.592**	**0.042**
Mediation Analyses				
Physical violence → Emotional reactivity → Defeat	0.229	0.031	0.248	0.356
Sexual abuse → Emotional reactivity → Defeat	0.276	0.019	0.526	0.599
Cognitive neglect → Emotional reactivity → Defeat	**1.201**	**0.115**	**0.424**	**0.005**

Supervision neglect → Emotional reactivity → Defeat	0.296	0.013	0.791	0.709
Physical violence → Cognitive reappraisal → Defeat	0.074	0.010	0.089	0.408
Sexual abuse → Cognitive reappraisal → Defeat	0.125	0.008	0.161	0.437
Cognitive neglect → Cognitive reappraisal → Defeat	0.269	0.026	0.147	0.067
Supervision neglect → Cognitive reappraisal → Defeat	-0.20	-0.009	0.201	0.320
Physical violence → Expressive suppression → Defeat	**0.249**	**0.034**	**0.104**	**0.016**
Sexual abuse → Expressive suppression → Defeat	0.121	0.008	0.159	0.448
Cognitive neglect → Expressive suppression → Defeat	**0.374**	**0.036**	**0.174**	**0.031**
Supervision neglect → Expressive suppression → Defeat	-0.362	-0.016	0.364	0.320

5.4.3.1. Indirect effect of threat and deprivation on defeat through executive functioning and language abilities

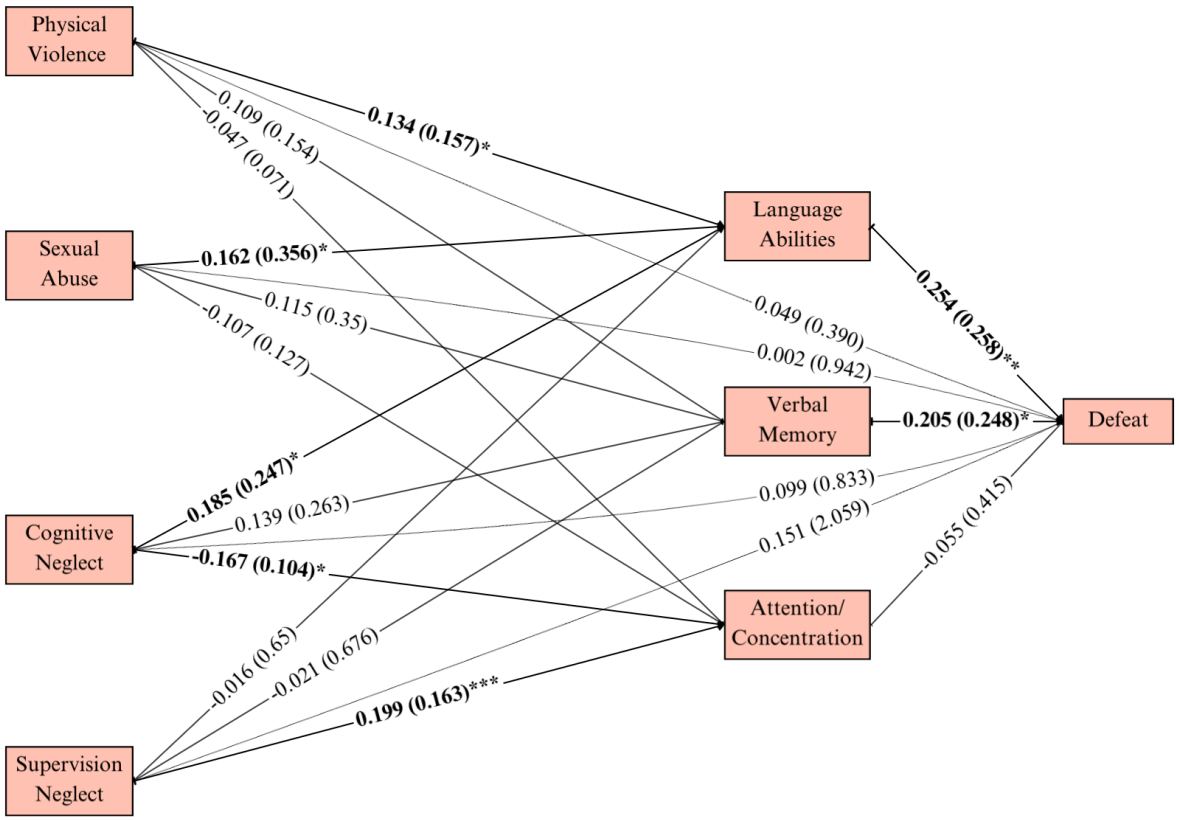
Model 2 outlines the effects of threat and deprivation on defeat through executive functioning variables (verbal memory and attention/concentration) and language abilities. The direct effects of associations within each pathway are presented in figure 5.11. Additionally, the findings for each direct and indirect effect investigated in this model are outlined in table 5.7. In terms of threats, While physical abuse (β = 0.134, SE = 0.157, p = 0.036) and sexual abuse (β = 0.162, SE = 0.356, p = 0.024) were significantly linked to increased language difficulties, the indirect effects of both variables on defeat through language abilities were not significant. None of the mediators explained the relationship between the threat subscales (physical or sexual abuse) and defeat.

With regard to deprivation, the findings indicated that cognitive neglect was significantly associated with increased language difficulties (β = 0.185, SE = 0.247, p = 0.01). Language difficulties were also significantly associated with increased feelings of defeat (β = 0.254, SE = 0.258, p = 0.003). The indirect effect of cognitive neglect on defeat through language difficulties was also significant (β = 0.047, SE = 0.237, p = 0.039). The direct effect of cognitive neglect on defeat was not significant (β = 0.099, SE = 0.833, p =

0.213), indicating that language difficulties fully mediated the effect of cognitive neglect on defeat. None of the other mediators examined in this model explained the effects of the deprivation subscales (cognitive and supervision neglect) on defeat. Similarly, both cognitive neglect (β = -0.167, SE = 0.104, p = 0.026) and supervision neglect (β = 0.199, SE = 0.163, p = 0) were significantly associated with attention/concentration. However, the association between attention/concentration and defeat was not significant (β = -0.055, SE = 0.415, p = 0.316). As a result, attention/concentration did not significantly mediate the effects of these variables on defeat.

Figure 5.12.

Executive functioning and language abilities as mediators of the relationship between dimensions of adversity and defeat.



Note. Standardised effects (Standard errors) presented in the diagram. Bold text indicates significant effects. *p<0.05, **p<0.01, ***p<0.001.

Table 5.6

Associations between threat/deprivation and defeat through executive functioning and language abilities

Associations tested	B	β	SE	P-value
Physical violence → Language abilities	**0.328**	**0.134**	**0.157**	**0.036**
Sexual abuse → Language abilities	**0.801**	**0.162**	**0.356**	**0.024**
Cognitive neglect → Language abilities	**0.641**	**0.185**	**0.247**	**0.010**
Supervision neglect → Language abilities	-0.119	-0.016	0.65	0.855
Physical violence → Verbal memory	0.281	0.109	0.154	0.069
Sexual abuse → Verbal memory	0.597	0.115	0.35	0.088
Cognitive neglect → Verbal memory	0.509	0.139	0.263	0.053
Supervision neglect → Verbal memory	-0.162	-0.021	0.676	0.810
Physical violence → Attention/Concentration	-0.046	-0.047	0.071	0.517
Sexual abuse → Attention/Concentration	-0.213	-0.107	0.127	0.095
Cognitive neglect → Attention/Concentration	**-0.232**	**-0.167**	**0.104**	**0.026**
Supervision neglect → Attention/Concentration	**0.599**	**0.199**	**0.163**	**<0.001**
Language abilities → Defeat	**0.764**	**0.254**	**0.258**	**0.003**
Verbal memory → Defeat	**0.585**	**0.205**	**0.248**	**0.019**
Attention/Concentration → Defeat	-0.416	-0.055	0.415	0.316
Physical violence → Defeat	0.364	0.049	0.390	0.351
Sexual abuse → Defeat	0.032	0.002	0.942	0.973
Cognitive neglect → Defeat	1.036	0.099	0.833	0.213
Supervision neglect → Defeat	3.401	0.151	2.059	0.099
Physical violence → Language abilities → Defeat	0.251	0.034	0.148	0.091
Sexual abuse → Language abilities → Defeat	0.612	0.041	0.346	0.077
Cognitive neglect → Language abilities → Defeat	**0.490**	**0.047**	**0.237**	**0.039**
Supervision neglect → Language abilities → Defeat	-0.091	-0.004	0.494	0.854
Physical violence → Verbal memory → Defeat	0.164	0.022	0.115	0.154
Sexual abuse → Verbal memory → Defeat	0.349	0.023	0.243	0.151
Cognitive neglect → Verbal memory → Defeat	0.297	0.029	0.204	0.145
Supervision neglect → Verbal memory → Defeat	-0.095	-0.004	0.395	0.810

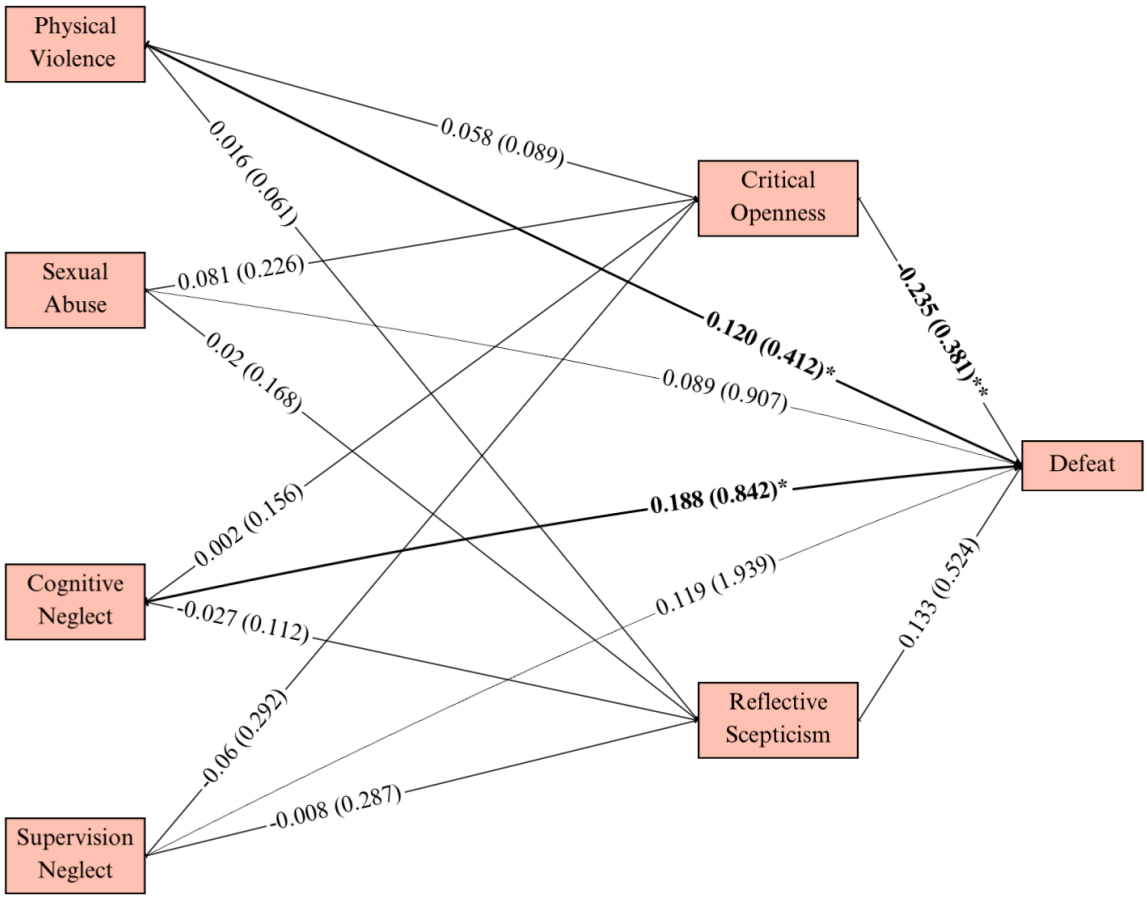
Physical violence → Attention/Concentration → Defeat	0.019	0.003	0.036	0.598
Sexual abuse → Attention/Concentration → Defeat	0.088	0.006	0.098	0.370
Cognitive neglect → Attention/Concentration → Defeat	0.097	0.009	0.107	0.367
Supervision neglect → Attention/Concentration → Defeat	-0.249	-0.011	0.249	0.317

5.4.3.1. Indirect effect of threat and deprivation on defeat through critical thinking disposition.

Model 3 examined critical thinking disposition subscales – critical openness and reflective scepticism as mediators of the relationship between childhood experiences of threat and deprivation and defeat. The findings for each association investigated are outlined in Table 5.8. As illustrated in Figure 5.12, none of the threat variables (i.e. physical violence and sexual abuse) or deprivation variables (cognitive neglect and supervision neglect) were significantly associated with the critical thinking disposition variables. Critical openness (β = -0.235, SE = 0.381, p = 0.002) but not reflective scepticism (β = 0.133, SE = 0.524, p = 0.059) was associated with reduced feelings of defeat. As a result, critical thinking disposition did not explain the indirect effects of threat and deprivation on defeat.

Figure 5.13.

Critical thinking disposition as mediators of the relationship between dimensions of adversity and defeat.



Note. Standardised effects (Standard errors) presented in the diagram. Bold text indicates significant effects. *p<0.05, **p<0.01, ***p<0.001.

Table 5.7

Associations between threat/deprivation and defeat through critical thinking disposition

Associations tested	B	β	SE	P-value
Physical violence → Critical openness	0.083	0.058	0.089	0.351
Sexual abuse → Critical openness	0.235	0.081	0.226	0.299
Cognitive neglect → Critical openness	0.004	0.002	0.156	0.981
Supervision neglect → Critical openness	-0.262	-0.06	0.292	0.368
Physical violence → Reflective scepticism	0.016	0.016	0.061	0.792
Sexual abuse → Reflective scepticism	0.040	0.020	0.168	0.811
Cognitive neglect → Reflective scepticism	-0.038	-0.027	0.112	0.736
Supervision neglect → Reflective scepticism	-0.024	-0.008	0.287	0.934
Critical openness → Defeat	**-1.206**	**-0.235**	**0.381**	**0.002**
Reflective scepticism → Defeat	0.991	0.133	0.524	0.059
Physical violence → Defeat	**0.883**	**0.120**	**0.412**	**0.032**
Sexual abuse → Defeat	1.325	0.089	0.907	0.144
Cognitive neglect → Defeat	**1.962**	**0.188**	**0.842**	**0.020**
Supervision neglect → Defeat	2.673	0.119	1.939	0.168
Physical violence → Critical openness → Defeat	-0.101	-0.014	0.109	0.357
Sexual abuse → Critical openness → Defeat	-0.284	-0.019	0.304	0.351
Cognitive neglect → Critical openness → Defeat	-0.005	0.000	0.189	0.981
Supervision neglect → Critical openness → Defeat	0.317	0.014	0.360	0.379
Physical violence → Reflective scepticism → Defeat	0.016	0.002	0.062	0.797
Sexual abuse → Reflective scepticism → Defeat	0.040	0.003	0.166	0.811
Cognitive neglect → Reflective scepticism → Defeat	-0.037	-0.004	0.116	0.747
Supervision neglect → Reflective scepticism → Defeat	-0.023	-0.001	0.287	0.935

5.5. Discussion

In line with the predictions of the DMAP and IMV models, this study aimed to examine potential mediators that may explain the relationship between dimensions of adversity and defeat. It was hypothesised that threats (physical violence and sexual abuse)

would indirectly influence feelings of defeat through emotional reactivity and regulation, and deprivation (cognitive and supervision neglect) would indirectly affect feelings of defeat through executive functioning, critical thinking disposition, and language abilities. The findings indicated that expressive suppression significantly mediated the relationship between physical violence and defeat. This finding suggests that experiences of threat may result in a higher likelihood of regulating emotions using expressive suppression, which may in turn result in increased feelings of defeat. However, the current study did not find evidence of associations between threatening experiences and emotional reactivity and cognitive reappraisal.

The existing literature investigating the DMAP supports the association between threats in childhood and emotional processing (Poon et al., 2023; Schäfer et al., 2023). These findings thus suggest that emotional reactivity and regulation strategies may depend on specific emotions or emotion regulation strategies. For instance, research investigating emotional processing in relation to adversity often focuses on emotional perception or recognition (Dunn et al., 2018; Milojevich et al., 2021; Schäfer et al., 2023). Milojevich et al. (2021) thus call for further research to investigate the effects of adversity on emotion perception, understanding, and expression in addition to reactivity and regulation. This literature further focuses on recognition and reactivity to angry or fearful facial expressions reporting that individuals with a history of childhood maltreatment show higher reactivity to specific expressions (McCrory et al., 2011; Sandre et al., 2018; Schäfer et al., 2023). Some evidence on emotional regulation also indicates that emotional regulation strategies may depend on the specific emotion being regulated (Zimmermann & Iwanski, 2014). However, the current study investigated the role of overall emotional reactivity in relation to negative affect and the use of cognitive reappraisal and expressive suppression as emotional regulation

strategies. As a result, it may be helpful for future research to investigate the relationship between threats and emotional processing specific to different emotions.

Cognitive neglect was also associated with increased emotional reactivity and expressive suppression. Additionally, emotional reactivity and expressive suppression significantly mediated the relationship between cognitive neglect and defeat. The finding that cognitive neglect was associated with emotional processing is also consistent with wider literature (Berzenski, 2019; Shipman et al., 2005; Vajda & Láng, 2014). For instance, a meta-analysis of 58 studies investigating emotional reactivity and regulation among children with a history of abuse and neglect found that emotional neglect in childhood was associated with both emotional reactivity and regulation (Lavi et al., 2019). These findings suggest that emotional processing variables may present key insights into the relationship between specific types of childhood adversity and defeat.

These findings are partially consistent with other literature that has found that deprivation is associated with executive functioning and language difficulties (D. Johnson et al., 2021; Spratt et al., 2012). As with emotional processing, the observed discrepancies may be explained by executive functioning being an umbrella term for a range of cognitive abilities (Duggan & Garcia-Barrera, 2015). It is thus possible that specific cognitive abilities (e.g. language abilities) may explain the link between childhood experiences and defeat better than others (e.g. attention abilities). For instance, Enlow et al. (2019) found that maternal cognitive support was linked to improved working memory while emotional support was linked to inhibitory control. These findings indicate that the pathways between different types of adversity and developmental outcomes may be more nuanced than expected. It would thus be useful for future research to investigate how adversity in childhood may influence different aspects of emotional processing specific to emotions and aspects of executive functioning. Additionally, it may be useful for future research to compare differences

between objective and subjective measures of executive functioning dimensions in the context of these associations.

Similarly, the study did not find evidence for associations between either threat or deprivation and critical thinking disposition (critical openness or reflective scepticism). As discussed in section 5.2, critical thinking disposition has been theoretically linked to aspects of executive functioning. Despite executive functioning being identified as a potential risk factor for suicide and its established associations with childhood adversity, there is a dearth of research investigating critical thinking disposition from the perspective of suicide. Taking these findings in the context of the literature (S. Li et al., 2021; Sanz de Acedo Lizarraga et al., 2012), it is possible that specific aspects of executive functioning overlap with and contribute to critical thinking disposition, but that the specific dimensions of adversity investigated here do not directly predict critical thinking disposition.

While the findings from this study indicate that both subscales of threat (physical violence) and deprivation (cognitive neglect) are associated with expressive suppression and that the cognitive neglect subscale of deprivation is linked to aspects of both emotional processing and language abilities, these findings do not necessarily contradict the DMAP as the model hypotheses that threat and deprivation result in psychopathology through partially distinct ways. This is because the model acknowledges that some adversities are likely to co-occur and include aspects of both threat and deprivation (McLaughlin et al., 2021). Furthermore, this model hypotheses that threat and deprivation affect outcomes through partly distinct pathways, suggesting that it is possible that threat is related to executive functioning and deprivation is linked to emotional processing (McLaughlin, 2016; Sheridan et al., 2017). However, it is expected that threat would more strongly predict emotional processing and deprivation would be more strongly associated with executive functioning (D. Johnson et al., 2021; Wade et al., 2022). As a result, these findings suggest that the

mechanisms by which the dimensions of adversity proposed by the DMAP increase risk of defeat may be more complex and specific to sub-facets of the developmental outcomes being discussed. However, given the low sample size, these findings should be interpreted with caution and replicated in a larger sample.

5.5.3. Implications

Chapters 3 and 4 highlighted the limitations of the literature in understanding the role of ACEs from the perspective of the IMV model. This study drew from theoretical developments in the understanding of the effects of adversity on developmental outcomes to address this gap. As a result, the current study followed a theory-based approach to address the gap in understanding the increased vulnerability to defeat among individuals with high ACEs. The findings of this study partially supported the hypotheses of the DMAP and highlighted the need for a deeper understanding of the specific types of emotional processing and executive functioning that may be affected by threat and deprivation. Additionally, the findings suggested that examining specific forms of threats (such as violence or accidents) and deprivation (such as physical or emotional neglect) in particular may be useful in examining the developmental outcomes associated with these adversities. As a result, it would be useful for future research to investigate the effects of specific types of threat and deprivation on different subfacets of emotional processing and executive functioning.

The current study also identified several variables that might explain the increased vulnerability to defeat. These variables include emotional reactivity and regulations, poorer language abilities, verbal memory and critical thinking disposition. The study has thus presented novel findings with regard to the pathways by which adversity in childhood may be linked with feelings of defeat from the perspective of the IMV model. While these findings are exploratory, these variables may present key targets for interventions focussed on reducing defeat and suicidal ideation. As a result, with replication in prospective research,

more upstream prevention methods targeting emotion regulation and executive functioning skills could be useful in reducing feelings of defeat, entrapment, and subsequently suicidal ideation. Given that these factors in the pre-motivational phase are likely to be transdiagnostic factors (McLaughlin, 2016), it is possible that such interventions may reduce the risk of other negative psychological outcomes. Existing interventions have been proposed to improve emotional regulation (Sakiris & Berle, 2019; Sloan et al., 2017). An emotional regulation intervention targeted at reducing suicide risk has also been developed (Kiosses et al., 2018). Similarly, interventions to improve executive functioning have been proposed (Otero et al., 2014). However, future research is needed to establish the temporality and causal associations between these pathways.

5.5.4. Limitations and future directions

A key limitation of this study is the cross-sectional design. Given that the current study aims to investigate mediation pathways by which adversities in childhood increase vulnerability to defeat, it is important to note that no conclusions of causality could be drawn from the findings. This limits the understanding of whether the variables investigated are correlates of defeat or actively predict defeat. Additionally, the study relied on retrospective self-reported data which risks the findings being affected by recall bias (Ben-Zeev & Young, 2010). As a result, it is important for future research to investigate these hypotheses prospectively.

Secondly, as there have been no measures developed specifically to examine threat and deprivation in childhood, the current study adapted existing measures recommended by Berman et al. (2022) to investigate threat and deprivation. However, it is important to note that while these measures do not use the sum of an arbitrary set of adversities, the composite scores capture the co-occurrence of specific types of threat and deprivation. For instance, the physical violence measure results in a higher score if participants have experienced different

types of physical violence. However, if a participant experienced the same form of physical violence consistently, this would still result in a lower score than participants that have experienced the same type of violence once. PCEs have also been associated with similar outcomes as ACEs, suggesting that experiencing PCEs may buffer the negative impacts of ACEs (Gunay-Oge et al., 2020; Nguyen et al., 2024). As a result, it is important for future research on threat and deprivation to consider the effect of moderation by PCEs on the relationship between threat and deprivation and developmental outcomes.

An important limitation of the current study also relates to the low sample size and power analyses. Due to modifications to the measurement and path models, a priori power analyses were not calculated. Additionally, the sample sizes in the current study were limited by recruitment constraints increasing the likelihood that the study may have been underpowered. As a result, the findings presented in the study should be interpreted with caution and replicated in a larger sample. Additionally, the current study did not adjust for multiple comparisons within the models despite testing a large number of associations. As testing a larger number of associations is likely to increase the chances of spurious associations being detected, applying corrections such as adjustment of the p-value can adjust for this. However, considering that the analyses in the current study were likely underpowered and the exploratory nature of the study (Althouse, 2016), adjustment of p-values was not adopted in the current study.

5.6. Conclusion

This study drew from the IMV model and the DMAP to explore the pathways by which ACEs may be related to defeat. The overall findings suggested that the DMAP may outline specific developmental factors that may be useful in explaining an increased vulnerability to defeat. However, the current study only accounted for the presence of threat

and deprivation. Given that research indicates that the presence of positive childhood experiences may affect these associations, Chapter 6 will investigate PCEs as a moderator of the relationship between threat/deprivation and these developmental outcomes.

Chapter 6 - Exploring the influence of positive childhood experiences on the association between dimensions of adversity and defeat

6.1 Overview

Chapter 5 investigated the role of a range of developmental factors based on the hypotheses of the DMAP and IMV models. The results suggested that specific facets of emotional processing, executive functioning, and language abilities may be useful in explaining why individuals that experience adversity in childhood may experience increased feelings of defeat. As discussed in section 5.5.4, the conceptualisation of ACEs was primarily focussed on the presence of experiences involving threat and deprivation in childhood. However, the role of potentially protective factors such as positive experiences were not taken into account. The current study aims to address this by examining the role of PCEs as a resilience factor in the relationship between dimensions of adversity and developmental outcomes including emotional reactivity and regulation, executive functioning, language abilities, and critical thinking disposition.

Multigroup path analyses were conducted on the sample of 251 participants as described in chapter 5. Specifically, each association between threat/deprivation and developmental outcomes (emotional reactivity and regulation, executive functioning, language abilities, and critical thinking disposition) were constrained to be equal between individuals with high and low PCEs. The constrained models were then compared to the unconstrained model where all parameters were freely estimated between the groups. The findings indicated that the unconstrained models and models that were constrained to be equal between the high versus low PCEs groups were significantly different. This suggests that PCEs influence the overall hypothesised pathways between threat/deprivation and defeat.

In terms of specific pathways between threat and deprivation and developmental outcomes, physical violence was significantly associated with increased expressive suppression and supervision neglect was associated with attention/concentration difficulties in the low PCEs group alone. Alternatively, sexual abuse was associated with higher language, verbal memory difficulties, and critical openness only in the high PCEs groups. However, the likelihood ratio tests indicated that the moderation effect for these associations were not statistically significant.

The findings of this study additionally indicated that cognitive reappraisal, expressive suppression, and language abilities were linked to defeat among individuals with low PCEs while verbal memory was linked to defeat among individuals with high PCEs. However, only the effects of language abilities and verbal memory difficulties on defeat were significant. In terms of direct effects, the effects of sexual abuse and cognitive neglect on defeat were significant in the high PCEs group alone. Likelihood ratio tests further indicated that these pathways were significantly moderated by PCEs. In contrast, the effects of supervision neglect were significant in the low PCEs group alone, however, the moderating role of PCEs on this association was not significant. As the preliminary analyses and unconstrained models suggested that these variables significantly differ based on PCE groups, it is possible that the likelihood ratio tests were limited by low statistical power. As these findings overall suggest that PCEs may be relevant to understanding the developmental pathways that may increase feelings of defeat, it is important for future research to investigate the ways in which PCEs influence these associations.

6.2. Introduction

The findings of chapters 4 and 5 demonstrate that ACEs are likely to affect suicidal ideation through an increased vulnerability to feelings of defeat. Drawing from the DMAP

and the IMV models, chapter 5 further investigated the developmental pathways that may explain the link between ACEs and defeat. However, it is important to note that childhood adversities are not deterministic; many individuals that experience adversity in childhood do not experience negative outcomes associated with adversity including suicidal thoughts and behaviour (Fuller-Thomson et al., 2020; Roy et al., 2011). A key aspect of the IMV model is also focussed on the role of moderators that may influence the effects of risk factors on suicidal ideation and behaviour. While the empirical studies presented in chapter 4 and 5 established the role of ACEs as a pre-motivational phase variable within the IMV model, these studies focussed on the role of adversity alone without accounting for the role of potentially beneficial experiences in childhood. According to resiliency theory, specific factors may either independently improve outcomes (promotive factors) or reduce the effect of adversity on the outcomes (protective factors; Zimmerman, 2013). While prevention of adversity may not always be possible, identifying protective factors that reduce the effects of adversity on such outcomes could be key to improving the understanding of the negative effects of adversity on developmental trajectories and suicide-related outcomes (Bunting et al., 2023; Zimmerman, 2013).

Until recently, the role of PCEs has been scarcely investigated in the literature. However, the past few years have seen an increasing focus on the effects of PCEs on physical and mental health outcomes. PCEs have increasingly been linked with lower suicidal ideation and overall suicide risk (Bravo et al., 2024; Crandall et al., 2021; Hou et al., 2022; Kuhar & Zager Kocjan, 2021; Moody et al., 2023; Narayan et al., 2023a) as well as their protective role in the context of ACEs (Bethell et al., 2019; Bunting et al., 2023; Crandall et al., 2019; Narayan et al., 2018). Various protective experiences in childhood including family or school connectedness (Areba et al., 2021; Lensch et al., 2021), and social support (Wan et al., 2019) have also been demonstrated to alleviate the negative impacts of ACEs on suicide risk.

Furthermore, experiencing PCEs such as having support from a trusted adult in childhood has also shown to improve future mental wellbeing and increase resilience even among individuals with more than 4 ACEs in a cross-sectional household survey conducted in the UK (Bellis et al., 2017). Thus far, only one study investigated the interaction between PCEs and the dimensions of adversity as proposed by the DMAP (Narayan et al., 2023b). The results indicated that PCEs enhanced the relationship between overall adversities, maltreatment and deprivation and post-traumatic symptoms.

These preliminary findings of studies investigating the role of PCEs in the development of suicidal thoughts and behaviour suggest that PCEs may act as an important protective factor. While no research to date has investigated the role of PCEs from the perspective of the IMV model specifically, evidence supporting the role of PCEs as a moderator of the effects of ACEs and as a protective factor against suicidal thoughts suggest that PCEs may present an important variable influencing the effects of threat/deprivation on pathways resulting in suicidal ideation. As a result, the current study aims to build upon the findings of chapters 4 and 5 to investigate whether the associations between threat/deprivation and developmental factors (emotional processing, executive functioning, language abilities, and critical thinking disposition) or the associations between these developmental mediators and defeat as outlined by the DMAP and IMV models are moderated by positive experiences in childhood. Understanding the effects of protective factors such as PCEs on these pathways could present key modifiable intervention targets, especially for individuals with a history of ACEs. The current study thus aims to address this gap by with the following aims:

1. To examine PCEs as a moderator of the relationship between dimensions of adversity (threat and deprivation) and developmental outcomes (emotional processing, executive functioning, critical thinking disposition, language abilities).

2. To explore the role of PCEs as a moderator of the pathways between developmental factors and defeat, and on the direct effect of threat/deprivation and defeat.

6.3. Methods

6.3.1. Data collection

This study used data from a sample of 251 participants recruited on Prolific Academic. As this study used data from the same participants as chapter 5, details regarding recruitment, participant demographics, and data collection are presented in Section 5.3.1.

6.3.2. Measures

Measures for demographic details, threat, deprivation, emotional reactivity and regulation, executive functioning and language abilities, and critical thinking disposition have been outlined in section 5.3.2.

PCEs: PCEs were measured using the Benevolent childhood experiences Scale (Narayan et al., 2018). An example question is "*Growing up, did you have at least one caregiver with whom you felt safe?*". This is a 10-item scale dichotomously scored questionnaire where participants respond "yes" or "no" to items assessing the presence of specific positive childhood experiences. This scale has shown adequate psychometric properties (Narayan et al., 2018). For this study, the response categories were expanded to measure a wider range of responses from 0 (strongly agree) to 4 (strongly disagree). The item content was not changed.

The range for the composite PCE variable in the current sample was 5-40 (Mean = 28.59, Median = 29, SD = 7.86). Based on guidance by Matthews (2017), it is important for the groups in multi-group analyses to be approximately equal in size to reduce biases arising out of differences in statistical power. Additionally, other literature investigating the role of

PCEs as a moderator have primarily utilised a mean or median split for grouping participants into high and low PCEs (Crandall et al., 2019; Kuhar & Zager Kocjan, 2021; Novilla et al., 2022; Xu et al., 2022). As a result, these analyses opted for a median split of 29 as a threshold to define groups of high PCEs (PCE score >29) and low PCEs (PCE score ≤ 29).

6.3.2. Statistical Analyses

Characteristics of the data including missing data mechanisms are presented in section 5.3.3. As described in chapter 5, the current study used multiple imputation with 10 imputed datasets to address missing data. Preliminary analyses included students t-tests comparing the differences in all variables of interest between the high and low PCEs groups. Initial levene's tests investigating the equality of variance between the groups indicated that the variances of physical violence, cognitive neglect, supervision neglect, language abilities, attention/concentration, and defeat were not equal between the groups (See Appendix 6.1 for levene's test results). As the equality of variances assumption was not met, Welch's t-tests were used to compare the groups for these variables.

In order to investigate PCEs as a moderator between threat/deprivation and developmental outcomes, multigroup path analyses were conducted. The following models were first compared using a likelihood ratio test 1. An unconstrained multigroup model where parameters were freely estimated for each group 2. A fully constrained model where regressions coefficients and intercepts were constrained to be equal between high and low PCE groups. Control variables (Age and gender) were allowed to be free for both models based on prior research and recommendations (Miconi et al., 2017; Miles et al., 2015). Where the constrained model significantly differed from the unconstrained model, each association in the model was then constrained to be equal across groups iteratively and a likelihood ratio test was used to compare this model with the unconstrained model. More specifically, models differing by one degree of freedom as the result of an equality constraint on each association

iteratively were compared with the freely estimated model using a likelihood ratio test. Appendix 17 outlines the likelihood ratio test results comparing models where each association was iteratively constrained to equality and compared with the unconstrained model. The fit indices for each model are also presented here.

6.4. Results

Descriptive information regarding the variables in the study were presented in Table 5.3. This includes the mean, standard deviation, and range of each of the measures included in the sample. The sample for high PCEs group was 118 (47.01%) and low PCEs was 133 (52.99%). Table 6.1 outlines the mean and standard deviations of each variable for the high and low PCE group as well as the t-test results based on PCE group. The results of the t-tests indicated that all variables except sexual abuse, attention/concentration, and critical thinking disposition significantly differed between the high and low PCEs groups. More specifically, participants in the low PCE group reported significantly higher physical violence, cognitive neglect, supervision neglect, emotional reactivity, expressive suppression, language difficulties, verbal memory difficulties, and defeat. Participants in the high PCEs group reported significantly higher cognitive reappraisal.

Table 6.1.

Descriptive statistics (Mean and standard deviation) based on PCE group

Variables	PCE Group		T-test results
	High	Low	t (df), p value
	M (SD)	*M (SD)*	
Threat			
Physical Violence	1.77 (1.77)	3.13 (2.35)	-5.23 (240), p <0.001
Sexual Abuse	0.49 (1.05)	0.71 (1.12)	-1.63 (246), p = 0.100
Deprivation			
Cognitive Neglect	0.45 (1.02)	1.65 (1.73)	-6.84 (216), p <0.001
Supervision Neglect	0.04 (0.24)	0.44 (0.92)	-4.82 (150), p <0.001
Emotional reactivity and regulation			
Emotional Reactivity	7.08 (5.45)	11.58 (5.95)	-6.22 (247), p <0.001
Cognitive Reappraisal	24.19 (5.49)	21.66 (6.15)	3.42 (247) , p <0.001
Expressive suppression	10.75 (4.95)	12.74 (5.22)	-3.08 (247), p = 0.002
Executive functioning & language difficulties			
Language difficulties	7.28 (4.48)	10.49 (5.70)	-4.99 (243), p <0.001
Verbal Memory difficulties	9.63 (5.00)	12.68 (5.89)	-4.40 (247), p <0.001
Attention/Concentration	18.61 (1.85)	18.14 (2.39)	1.75 (242), p = 0.080
Critical thinking disposition			
Critical Openness	17.52 (3.00)	16.90 (3.28)	1.56 (246), p = 0.120
Reflective Scepticism	12.05 (2.14)	11.87 (2.23)	0.65 (247), p = 0.510
Defeat	12.41 (11.90)	23.65 (13.81)	-6.92 (247), p <0.001

Note. M = Mean, SD = Standard deviation, t = t statistic, df = degrees of freedom.

6.4.1. PCEs as moderators between threat/deprivation and emotional reactivity and regulation

Upon comparing the unconstrained and constrained models, the likelihood ratio test indicated that the models were significantly different between the groups (X^2 (29) = 99.77, p < 0.001) suggesting some moderation. The free model was saturated (X^2 (1) = 0, p = 1) and fit

indices were arbitrarily perfect (CFI = 1.000, TLI = 1.328, RMSEA = 0.000, SRMR = 0.000). Figure 6.1 outlines the path coefficients for the unconstrained model for the high vs low PCE group. Physical violence was significantly linked to increased expressive suppression in the low PCEs group (β = 0.228, SE = 0.190, p = 0.008) but not the high PCEs group (β = 0.056, SE = 0.270, p = 0.558). However, the results of the likelihood ratio tests indicated that the association between physical violence and expressive suppression were not significantly different across the groups (X^2 (1) = 1.107, p = 0.293).

In terms of pathways from emotional processing variables to defeat alone, expressive suppression was additionally significantly linked with higher defeat in the low PCEs group (β = 0.170, SE = 0.202, p = 0.011) but not the high PCEs group (β = 0.129, SE = 0.202, p = 0.072). However, expressive suppression did not significantly differ between the groups (X^2 (1) = 0.270, p = 0.604). Cognitive reappraisal was also significantly associated with lower defeat in the low PCEs group alone (β = -0.213, SE = 0.170, p = 0.001). The likelihood ratio test did not indicate a significant difference in the pathway from cognitive reappraisal to defeat between the groups (X^2 (1) = 1.734, p = 0.188). In contrast, emotional reactivity was significantly associated with higher defeat in both high (β = 0.480, SE = 0.182, p <0.001) and low PCE (β = 0.520, SE = 0.180, p <0.001) groups.

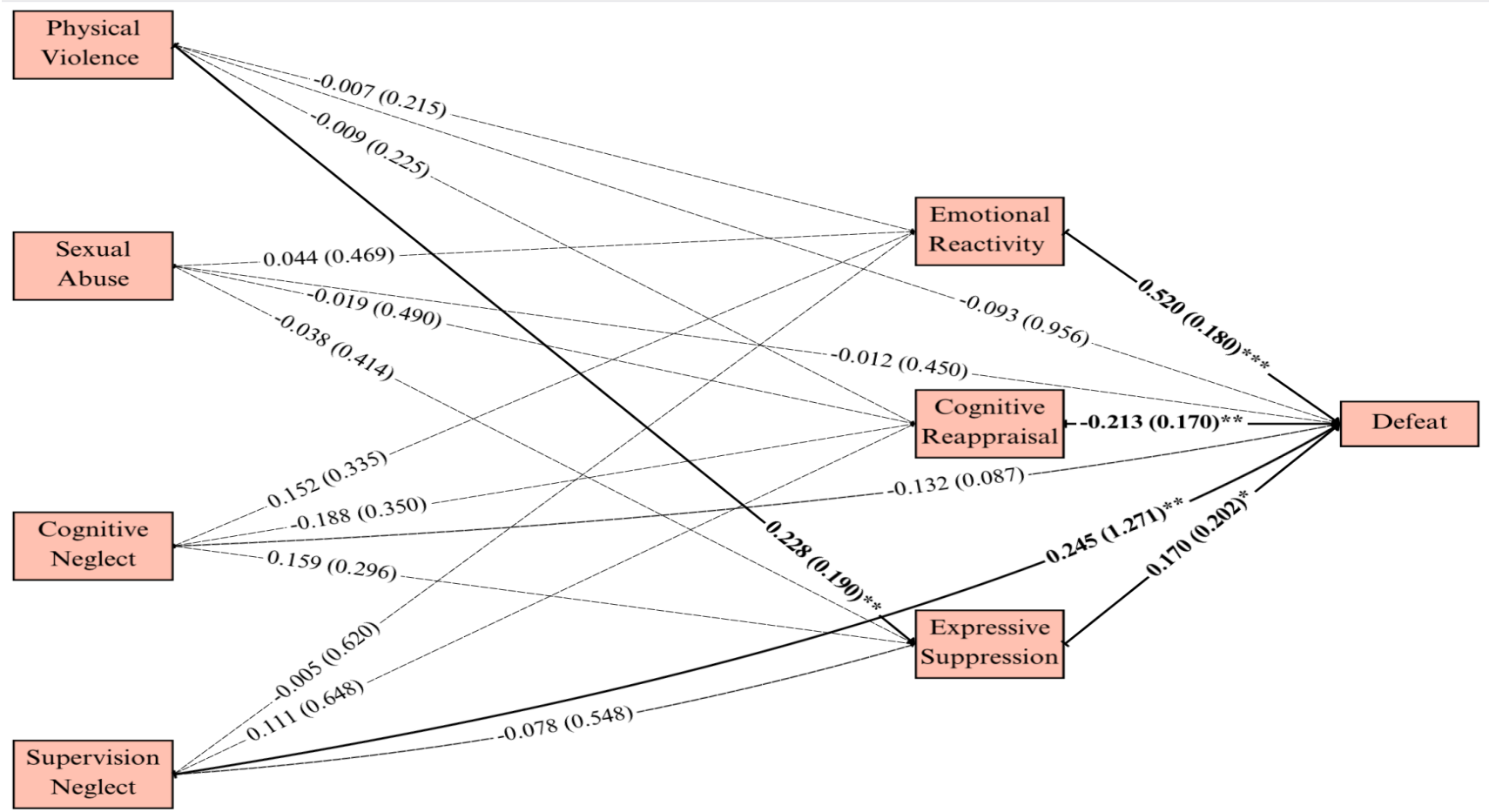
In terms of direct effects from threat and deprivation variables to defeat, sexual abuse (β = 0.206, SE = 1.011, p = 0.007) and cognitive neglect (β = 0.153, SE = 1.010, p = 0.038) were significantly associated with increased defeat in the high PCEs group alone. Additionally, the likelihood ratio tests indicated that the effects of both sexual abuse (X^2 (1) = 8.243, p = 0.004) and cognitive neglect (X^2 (1) = 7.046, p = 0.008) on defeat were significantly moderated by PCEs. In contrast, supervision neglect was only associated with increased defeat among participants with low PCEs (β = 0.245, SE = 1.271, p = 0.001). Additionally, likelihood ratio tests indicated that this model did not significantly differ from

the freely estimated model (X^2 (1) = 0.900, p = 0.343). Figure 6.1 outlines the unconstrained path models for high and low PCEs for model 1.

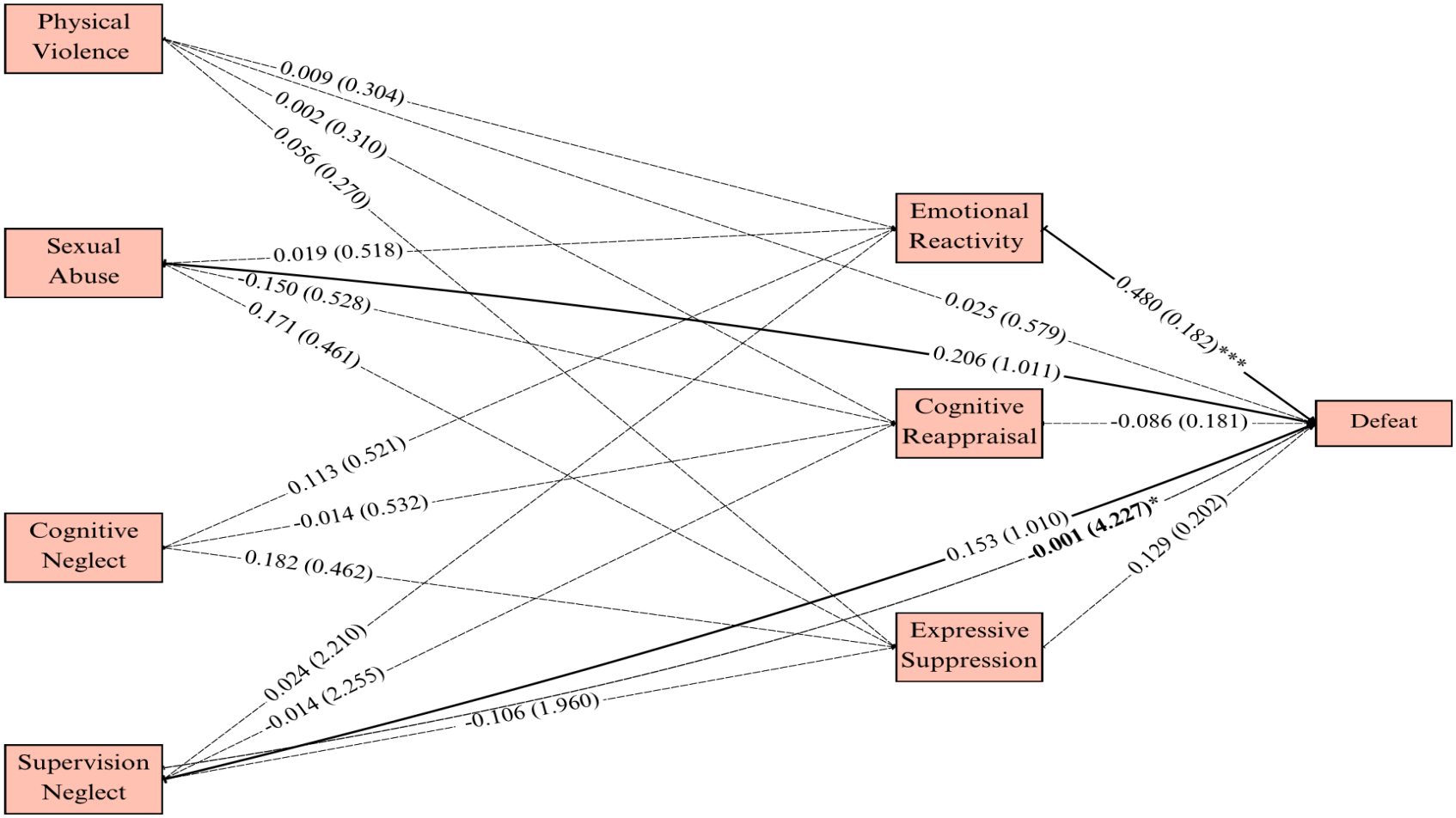
Figure 6.1.

Path Analyses results for low vs High PCE groups for model 1

Low PCEs group



High PCEs group



Note. Dotted lines indicate non-significant paths. Standardised Coefficient (Standard Error) presented for significant pathways. *p< 0.05, **p<0.01, p< 0.001.

6.4.2. PCEs as moderators between threat/deprivation and executive functioning and language abilities

The unconstrained model was saturated and fit was perfect (X^2 (2) = 1.242, p = 0.537, CFI = 1.000, TLI = 1.078, RMSEA = 0.000, SRMR = 0.010). The likelihood ratio test indicated that the constrained and unconstrained models were significantly different (X^2 (29) = 99.964, p <0.001). Figure 6.2 outlines path models for high vs low PCE groups in the unconstrained model. Sexual abuse (β = 0.228, SE = 0.377, p = 0.010) and cognitive neglect (β = 0.225, SE = 0.379, p = 0.009) were significantly linked to worse language abilities in the high PCEs group alone. However, the models with the pathway from sexual abuse (X^2(1) = 0.584, p = 0.445) and cognitive neglect (X^2(1) = 1.967, p = 0.161) to language abilities constrained to be equal did not significantly differ from the unconstrained models. Sexual abuse was also significantly associated with poorer verbal memory in the high PCEs group (β = 0.200, SE = 0.452, p = 0.036) but not the low PCEs group (β = 0.072, SE = 0.442, p = 0.394). The likelihood ratio test comparing the models indicated that this constrained model did not significantly differ from the unconstrained model (X^2(1) = 0.822, p = 0.365). In contrast, supervision neglect was positively linked to attention/concentration difficulties in the low PCEs group (β = 0.253, SE = 0.254, p = 0.010) but not the high PCEs group (β = 0.050, SE = 0.761, p = 0.613). This model also did not significantly differ from the unconstrained model (X^2(1) = 0.113, p = 0.737).

In terms of the associations between the developmental mediators and defeat, language difficulties were significantly associated with higher defeat in the low PCEs group (β = 0.368, SE = 0.327, p = 0.002) but not the high PCEs group (β = 0.005, SE = 0.342, p = 0.964). The likelihood ratio tests additionally indicated that this pathway was significantly moderated by PCEs (X^2(1) = 4.392, p = 0.036). Verbal memory was linked to increased defeat in the high PCEs group alone (β = 0.460, SE = 0.282, p < 0.001). The likelihood ratio

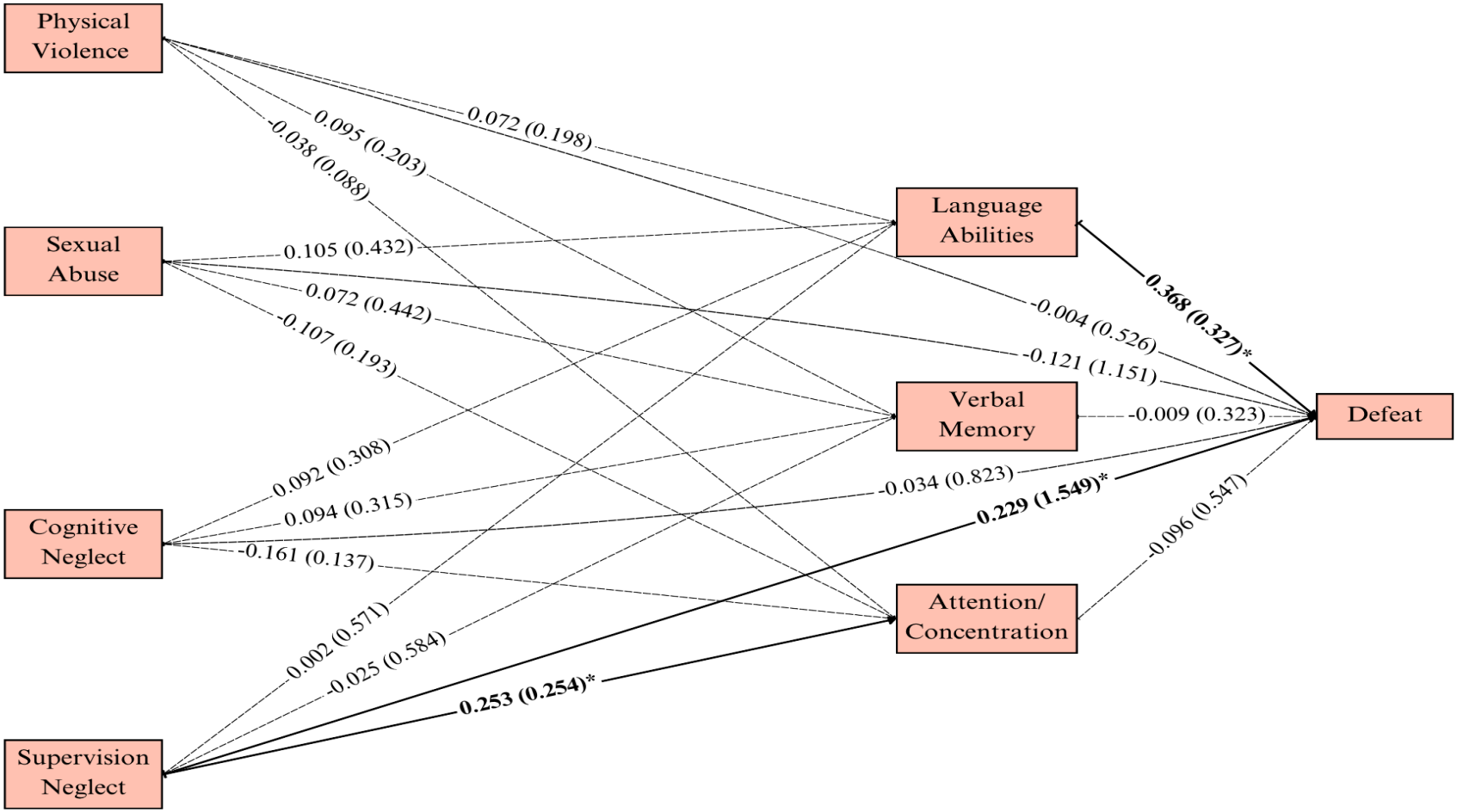
tests indicated that this model significantly differed from the unconstrained model ($X^2(1) = 8.941$, $p = 0.003$).

In terms of the direct effects from threat/deprivation to defeat, the direct effect from supervision neglect to higher defeat was significant in the low PCEs group alone ($\beta = 0.229$, $SE = 1.549$, $p = 0.012$). Alternately, the pathway from cognitive neglect to defeat was only significant among participants reporting high PCEs ($\beta = 0.202$, $SE = 1.093$, $p = 0.012$). Only the association between cognitive neglect and defeat was significantly moderated by PCEs ($X^2(1) = 4.985$, $p = 0.026$).

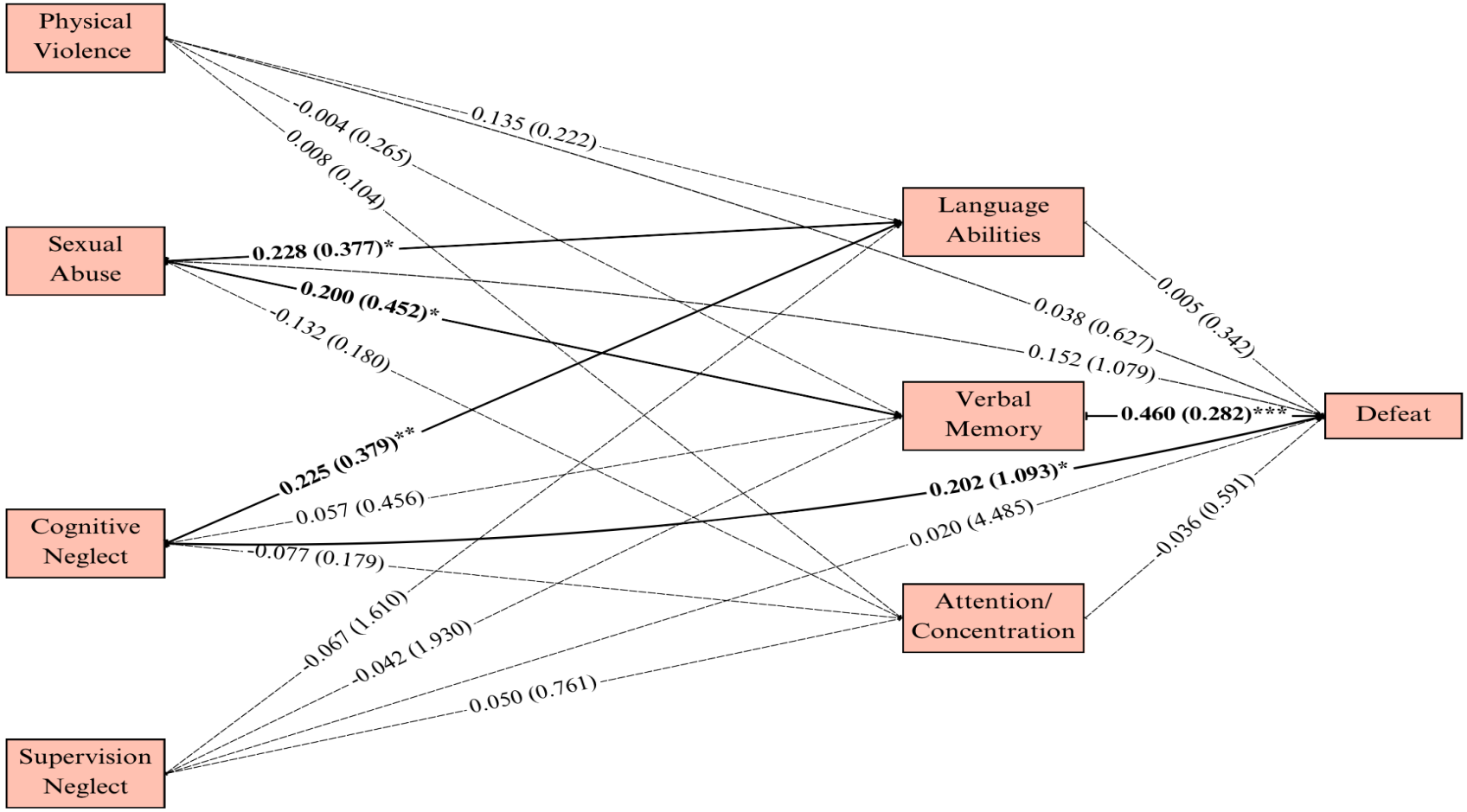
Figure 6.2.

Path Analyses results for low vs High PCE groups for model 2

Low PCEs



High PCEs



Note. Dotted lines indicate non-significant paths. Standardised Coefficient (Standard Error) presented for significant pathways. *p< 0.05, **p<0.01, p< 0.001.

6.4.3. PCEs as moderators between threat/deprivation and critical thinking disposition

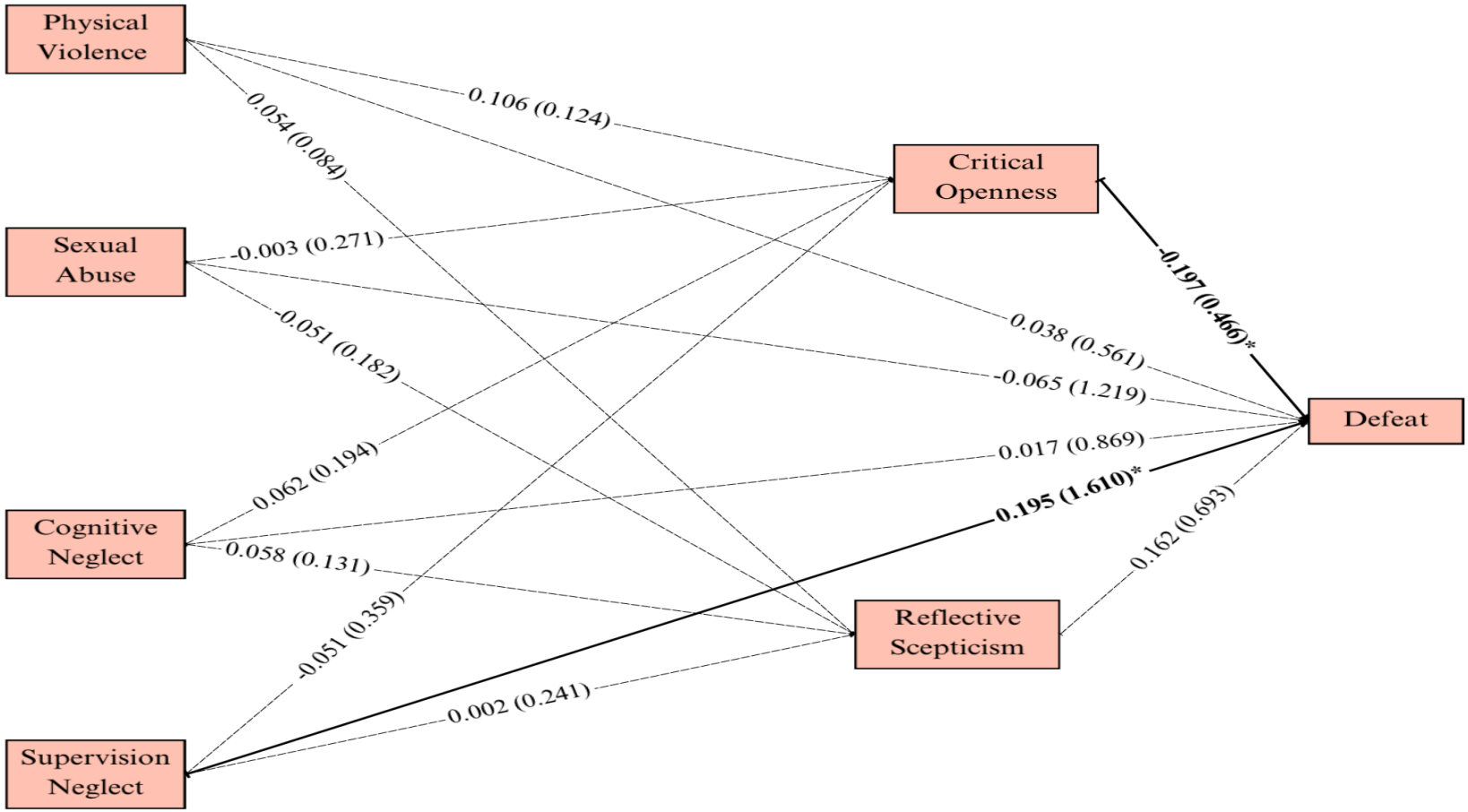
The model fit for the unconstrained model was: X^2 (2) = 1.242, p = 0.537, CFI = 1.000, TLI = 1.118, RMSEA = 0.000, SRMR = 0.010. The likelihood ratio test comparing the constrained and unconstrained models was significant (X^2 (23) = 94.312, p < 0.001). Figure 6.3 outlines the pathways in the low and high PCE groups in the unconstrained model. Sexual abuse was linked to increased critical openness in the high PCEs group (β = 0.216, SE = 0.282, p = 0.029) but not the low PCEs group (β = -0.003, SE = 0.271, p = 0.973). However, this difference was not statistically significant (X^2 (1) = 2.529, p = 0.112). In terms of pathways from critical thinking disposition to defeat, critical openness was significantly associated with lower defeat in both high (β = -0.264, SE = 0.486, p = 0.012) and low PCE groups (β = -0.197, SE = 0.466, p = 0.044). However, the likelihood ratio test indicated that PCEs did not significantly moderate the association between critical openness and defeat (X^2 (1) = 0.176, p = 0.674).

In terms of direct effects, supervision neglect was linked to defeat in the low (β = 0.195, SE = 1.610, p = 0.040) but not the high (β = 0.010, SE = 5.045, p = 0.911) PCEs group. The likelihood ratio tests indicated that this difference was not statistically significant (X^2 (1) = 0.269, p = 0.604). In addition, sexual abuse (β = 0.285, SE = 1.199, p = 0.002) and cognitive neglect (β = 0.234, SE = 1.190, p = 0.007) were linked to increased defeat in the high PCEs group. The pathways from both sexual abuse (X^2 (1) =7.374, p = 0.007) and cognitive neglect (X^2 (1) = 4.220, p = 0.040) were significantly moderated by PCEs.

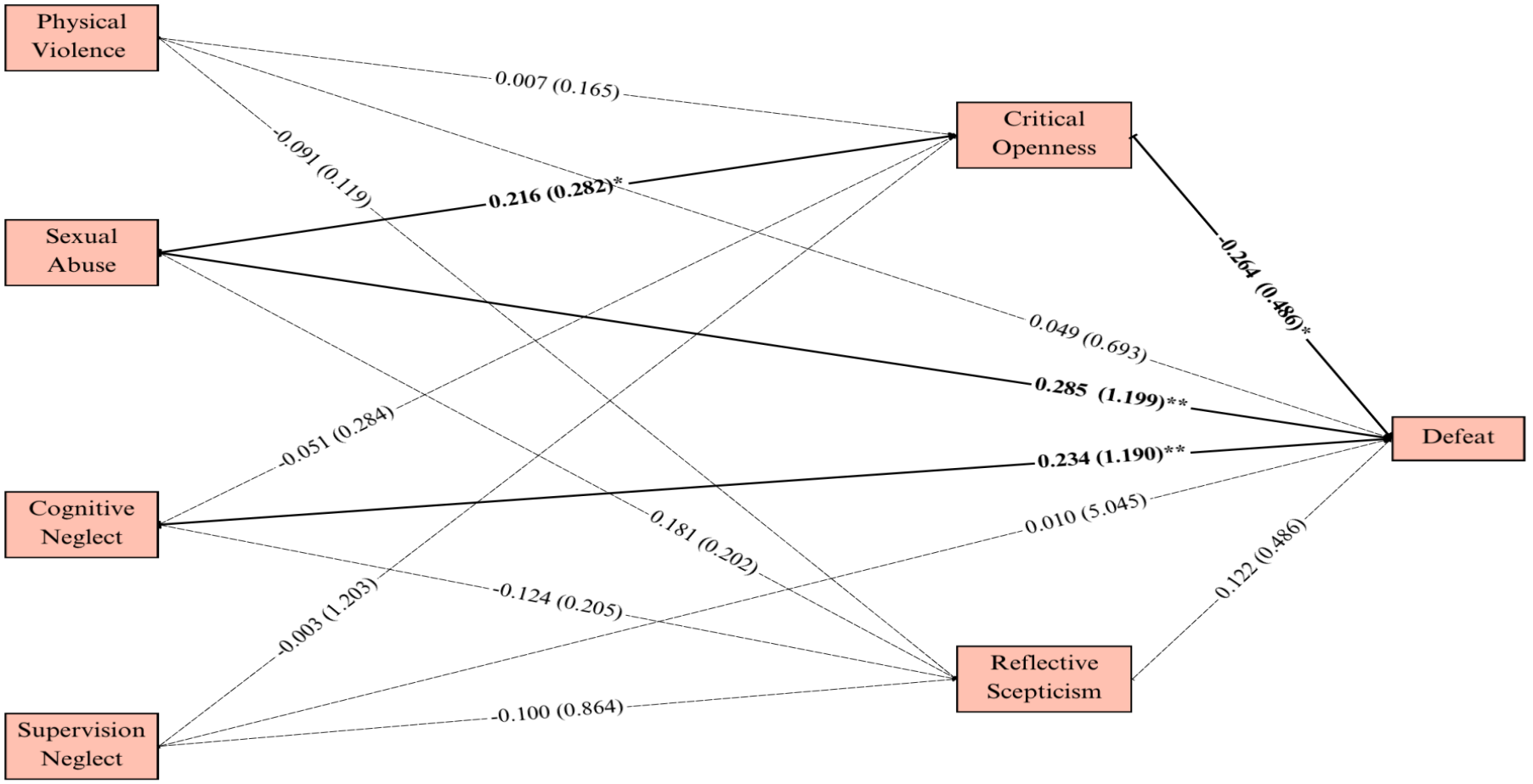
Figure 6.3.

Path Analyses results for low vs High PCE groups for model 3

Low PCEs



High PCEs



Note. Dotted lines indicate non-significant paths. Standardised Coefficient (Standard Error) presented for significant pathways. *p< 0.05, **p<0.01, p< 0.00

6.5. Discussion

6.5.1. Summary of findings

The current study's primary aim was to investigate the role of PCEs as a moderator between threat/deprivation and developmental factors including emotional reactivity and regulation, executive functioning, language abilities, and critical thinking disposition. Additionally, this study aimed to investigate the influence of PCEs on other hypothesised pathways including the effect of developmental factors on defeat and the direct effects of threat and deprivation on defeat. With regard to the overall models, comparison of the constrained and unconstrained models indicated that all three models significantly differed between the high and low PCEs groups suggesting some moderation. With regard to the effects of threat and deprivation on developmental outcomes, the findings indicated that when PCEs were low, individuals reporting a history of physical violence were more likely to use expressive suppression as an emotional regulation strategy. Similarly, participants that experienced supervision neglect were more likely to have difficulties with attention and concentration in the context of low PCEs compared to high PCEs. In contrast, sexual abuse was linked with language and verbal memory difficulties and improved critical openness only among participants with high PCEs. However, the likelihood ratio tests comparing the groups for each of these associations did not detect a significant moderating effect of PCEs on these associations.

In terms of the effects of developmental factors on defeat, the overall results indicated that cognitive reappraisal, expressive suppression, and language abilities were associated with defeat among participants reporting lower PCEs alone. The effects of sexual abuse and cognitive neglect on defeat alone were significantly moderated by PCEs. In contrast, verbal memory deficits were only associated with higher defeat among participants with high PCEs.

The effects of language abilities and verbal memories on defeat alone were significantly moderated by PCEs. In terms of the direct effects of threat and deprivation on defeat, supervision neglect was consistently associated with defeat in the low PCEs group alone. In contrast, the direct effects of sexual abuse and cognitive neglect on higher defeat were significant among individuals with high PCEs. Taken together, these findings indicate that PCEs weakened the association between language abilities and defeat but strengthened the effects of verbal memory, sexual abuse, and cognitive neglect on defeat.

The largely non-significant moderation effects of PCEs on associations between threat/deprivation and developmental factors conflict with the findings of the preliminary t-tests which indicate that apart from attention/concentration and critical thinking disposition, participants in the high PCEs groups significantly differed from participants in the low PCEs groups on all measures. This, in conjunction with differences in pathways noted above between high and low PCEs groups raises the possibility that the likelihood ratio tests may have lacked sufficient statistical power in each PCE group. However, the lack of moderation effect is not inconsistent with prior literature, which shows mixed results for PCEs as a protective factor against the effects of ACEs. Additionally, the differences in direction of effect (i.e. some with some associations stronger in the presence of high PCEs while other associations were weaker) are also consistent with the overall literature. A recent systematic review indicated that moderation effects of PCEs on ACEs showed mixed results based on outcome variables (D. Han et al., 2023). For instance, some studies indicated that high PCEs were protective against harsh parenting attitudes, shame, and recidivism (Baglivio & Wolff, 2021; Morris et al., 2021; Novilla et al., 2022) while other studies reported that they enhanced the association between ACEs and a range of negative physical and mental health outcomes (Crandall et al., 2019; Narayan et al., 2023b; Xu et al., 2022). Other studies reported that PCEs did not significantly moderate the effects of ACEs on psychological

outcomes (Almeida et al., 2023; Doom et al., 2021; Nevarez-Brewster et al., 2022). However, given the low sample size in the high and low PCEs groups, the ability to draw conclusions regarding moderation is limited, and further research is needed to examine the role of PCEs on developmental pathways influencing defeat.

The differences in the direction of moderation effect are interesting as the findings indicate that low PCEs may strengthen the association between some associations (e.g., the effects of sexual abuse or cognitive neglect and defeat) while weakening the association between others (e.g. language abilities and defeat). Despite consistency in other literature, it is not clear why this might be the case. Crandall et al. (2019) suggest that individuals with higher PCEs may have higher baseline levels of specific outcomes, resulting in a more graded effect as ACEs increased. Other literature has also indicated that PCEs may directly and independently affect developmental outcomes (Bethell et al., 2019; Crandall et al., 2023; Crandall et al., 2019; D. Han et al., 2023). Consistent with this, the descriptives (See table 6.1) indicate that individuals with higher PCEs on average reported significantly lower emotional reactivity, expressive suppression, language difficulties, and verbal memory difficulties but significantly higher cognitive reappraisal than individuals with lower PCEs.

It is also possible that other contextual aspects of adverse and positive experiences such as age or chronicity may further explain the differences in development within these groups. For instance, prior research has indicated that age, duration, and frequency of adversity may influence outcomes including delinquency, externalising behaviour, and reactivity (Krinner et al., 2021; Pierce & Jones, 2022; Schroeder et al., 2020; Sicorello et al., 2021). Preliminary research has also indicated that these factors may influence suicidal thoughts and behaviour (Angelakis et al., 2019; Dunn et al., 2013). As a result, it is possible that the ages of experiencing both PCEs and ACEs may influence outcomes, such that individuals with higher PCEs at particularly sensitive ages may have unique influences on

development. A recent systematic review on the literature investigating the effects of PCEs on primarily mental and physical health outcomes ranging from depressive symptoms to physical activity concluded that the combination of the effects of PCEs and ACEs on adult outcomes is likely complex and requiring further research (D. Han et al., 2023). As a result, it would be helpful for future research to carefully consider the effects of both ACEs and PCEs on the hypothesised pathways of the IMV model. Taken together, these findings indicate that PCEs may play an important role in the developmental trajectories of individuals with a history of adversity. Further research aimed at establishing how PCEs interact with these pathways would thus be useful in informing interventions aimed at upstream suicide prevention.

6.5.2. Implications

There has been limited research examining the interaction between PCEs and threat/deprivation to predict mental health outcomes. While prior research has examined PCEs as a moderator of the effects of threat and deprivation on post-traumatic stress symptoms (Narayan et al., 2023b), this was the first study to investigate the role of PCEs on hypothesised pathways by which threat/deprivation are indirectly linked with feelings of defeat through emotional and cognitive developmental factors and defeat. The overall findings from this study highlighted that PCEs may play an important role in the development of feelings of defeat. As a result, this study highlights the need for a more fine-grained examination of the role of PCEs as a promotive and protective factor on the association between dimensions of adversity and defeat. This, in conjunction with further prospective research investigating these pathways and their result on feelings of defeat could be useful in identifying important markers of risk and modifiable targets for intervention.

While exploratory, these findings also have implications for the DMAP and IMV models. In terms of the IMV model, these findings highlight the importance of considering

the role of PCEs in the development of suicide risk. While the moderating role of PCEs on pathways between threat/deprivation and developmental factors was not as clear, the results indicated that the effects of threat/deprivation and developmental factors and defeat were significantly moderated by PCEs. This finding indicates that PCEs may be an important pre-motivational phase variable within the IMV model. Future research investigating PCEs as a pre-motivational phase variable could thus improve the understanding of increased vulnerability to defeat. In terms of the DMAP, these findings further highlight that the interaction between threat/deprivation and PCEs and their effects on early development may be complex and not understood well. Consistent with prior literature (D. Han et al., 2023), these findings indicate that threat/deprivation may be more strongly associated with negative outcomes among individuals with higher PCEs despite the overarching literature suggesting that PCEs have a strong dose-response promotive effects on these outcomes. These results thus indicate that by excluding the role of PCEs, theoretical models outlining the effects of ACEs may be lacking a comprehensive understanding of how experiences in childhood shape development. Taken together, the dearth of research investigating the role of PCEs alongside ACEs highlights an important gap in the understanding of the mechanisms by which adversity in childhood may affect suicide risk.

As other literature suggests that PCEs may have independent and promotive effects aside from the effects of ACEs (Bethell et al., 2019; Crandall et al., 2019), it would also be useful for future research to investigate PCEs as predictors of suicide risk from the perspective of the IMV model. Establishing the relationship between PCEs and suicide-related outcomes could also inform interventions aimed at enhancing the positive experiences of children. As PCEs are largely defined as enjoyable activities; having supportive parents or peers in school; and having a consistent routine; interventions to improve these outcomes could be implemented through programmes in schools and community centres (Baglivio &

Wolff, 2021). Additionally, Crandall et al. (2021) argue that a focus on ACEs alone is likely to suggest that individuals with a history of ACEs are destined to face negative adult outcomes. A growing focus on PCEs alongside ACEs is thus likely to increase hope among individuals that have faced adversity in childhood. The focus on PCEs on connectedness in different contexts (e.g. school, social environment, household, community) also allows for the presence of different sources for the facilitation of resilience. These contexts may be present outside of environments characterised by adversity that may not be as amenable to change. However, these are contingent upon further research establishing causal associations between PCEs and these developmental outcomes.

6.5.3. Limitations and future directions

As the data and measures outlined in chapter 5 were used in this study, most limitations related to data collection are outlined in section 5.5.4. These are primarily associated with the cross-sectional design of the study with retrospective recall. These limitations also apply to PCEs. For instance, it is possible that individuals that feel more defeated may be likely to recall fewer PCEs. As a result, it is important for future research to investigate the role of PCEs on developmental pathways using prospective data. Additionally, given that the measures used for threat and deprivation were adapted from measures developed to assess general maltreatment, it is important for future research to develop and validate instruments to measure threat and deprivation specifically.

Another limitation of the current study was the distribution of PCEs within the overall sample. While using a median split is consistent with prior literature in this area of research, utilising this method may not account for the differences in the levels of PCEs for each participant. Given that the standard deviation for PCEs was 7.86, participants in the low PCEs group were relatively close to the median and may have had slightly fewer PCEs than the high PCEs group. Future research should thus aim to investigate PCEs in a sample with a

wider range of PCEs in order to gain an improved understanding of how different levels of PCEs may influence the effects of ACEs.

Additionally, it is also possible that different types of PCEs are more strongly associated with specific developmental outcomes. The current conceptualisation of PCEs includes strong social support, feelings about oneself, and enjoyment opportunities. It is possible that each of these may have unique effects on development. For instance, supportive caregiver interactions may be useful to develop emotional regulation skills (Humphreys et al., 2022). Similarly, having strong connections with peers and teachers and overall enjoyment in school may be valuable for the development of executive functioning abilities (Dixson & Scalcucci, 2021). As a result, it would be very helpful for future research to investigate the specific developmental effects of different aspects of PCEs alongside experiences of threat/deprivation. A more focussed understanding of specific factors that improve developmental outcomes could be crucial for early interventions.

Finally, it is important to note that the sample sizes for the high and low PCEs groups may have been low, resulting in lack of statistical power. Additionally, as a priori power analyses were not conducted within the study and associations were tested for each PCE group, it is likely that the findings of the study were limited by low statistical power. This is further possible given that the path analyses results differed between the groups (i.e. some pathways were significant in the high PCEs group but not the low PCEs group and vice versa) while the likelihood ratio tests indicated these differences were not statistically significant. As mentioned in section 5.5.4, multiple comparisons were also not adjusted for in the current study given it's exploratory nature and potential lack of statistical power. As a result, it is important for future research to replicate these findings with a larger sample size.

6.6. Conclusion

The current chapter investigated whether the hypothesised pathways presented in chapter 5 were influenced by the presence of PCEs. The findings indicated that the overall pathways differed based on PCE group. However, the study did not find evidence of moderation for the specific associations between threat/deprivation and developmental outcomes (emotional reactivity, emotional regulation, executive functioning, language abilities, and critical thinking disposition). However, participants in the low PCEs group with language difficulties were more likely to report feelings of defeat. Contrary to hypotheses, both sexual abuse, cognitive neglect and verbal memories were more strongly linked to defeat in the high PCEs group. The findings were limited by a potential lack of statistical power due to low sample size. Various explanations for the results and implications were discussed. The final chapter presents a general discussion of the overall findings of investigations presented in this thesis and aims to present key directions for future research.

Chapter 7 - General Discussion

7.1. Summary and key findings

Chapter 1 outlined the current understanding of the literature on suicide including terminology, risk and protective factors, and the need for theory. Key theoretical developments in the understanding of suicide including the need for differentiating between suicidal thoughts and behaviours were highlighted. The comprehensive nature of the IMV model in accounting for the role of both distal predisposing factors and proximal factors alongside the distinction between ideation and action indicated that this model would be useful in understanding the mechanisms by which ACEs affect suicidal ideation. However, it was unclear how ACEs in the pre-motivational phase were associated with motivational phase variables such as defeat. Theoretical advancements in the field of childhood adversity were thus explored to enhance the understanding of these associations. Chapter 2 thus outlined the literature investigating the effects of ACEs on different outcomes. Key limitations of the prevailing literature were outlined and the DMAP was introduced to address these gaps. However, there was limited information regarding empirical investigations of ACEs from the perspective of the IMV model and the empirical support for the hypotheses of the model.

In order to investigate the empirical support for the IMV model and identify literature on ACEs from the perspective of this model, a systematic review (Study 1) of literature testing the hypotheses of the model was conducted. There were several key findings of this review. Firstly, the review found empirical support for the central pathway of the model. Specifically, the hypotheses that entrapment mediates the relationship between defeat and suicidal ideation, and that entrapment and suicidal ideation mediate the relationship between defeat and suicidal behaviour were supported. Additionally, there were some differences in

the conceptualisation of defeat and entrapment, with some studies conceptualising these as a single construct, defeat and entrapment as distinct constructs, and defeat, internal and external entrapment as distinct constructs. Studies differentiating between internal and external entrapment generally found that internal entrapment mediated the relationship between defeat and suicidal ideation, but external entrapment showed mixed results. The review also found that the non-exhaustive set of pre-motivational phase variables and stage-specific moderators resulted in limited overlap in testing each variable across studies. Consistent with this, limited literature investigating the role of ACEs from the perspective of the IMV model was identified. Additionally, a significant portion of the studies investigating the motivational and volitional phase compared group differences among individuals with a no history of suicidal thoughts, a history of suicidal thoughts but not behaviour, and a history of suicidal behaviour. Testing the model through group differences limited the ability to investigate the empirical support for the specific pathways hypothesised by the model.

Chapter 4 presented the results of an empirical study using secondary data investigating defeat and entrapment as mediators between ACEs and suicidal ideation (Study 2). This resulted in two key findings. Firstly, the factor analysis indicated high covariance between defeat, internal, and external entrapment. This was in contrast to the findings of the systematic review, which found that internal but not external entrapment explained the association between defeat and suicidal ideation. A likely explanation for this difference was that the measure used in this study conceptualised defeat and entrapment as a single construct and selected items based on the highest loading items from the defeat and entrapment scales on a one factor model. As a result, defeat/entrapment was conceptualised as a single variable in the current study. Secondly, consistent with the hypothesis, defeat/entrapment mediated the relationship between ACEs and suicidal ideation. While the findings of this study presented preliminary evidence supporting role of the IMV model in understanding the pathways by

which ACEs affect suicidal ideation, key limitations were discussed. Specifically, a gap in understanding of how experiencing adversity in childhood is likely to result in vulnerability to defeat was identified. Prevalent explanations of developmental outcomes associated with ACEs included dysregulation of the stress-response system. However, it was unclear how differences in the stress-response system alone could affect increasing defeat. Emerging literature in the field of ACEs suggested that dysregulation of the stress-response system may explain how stress in general may be associated with specific outcomes but did not explain other differences in information processing or cognitive outcomes observed among participants with exposure to specific types of adversity (Mclaughlin et al., 2021).

Chapter 5 thus drew from the DMAP, an emerging theory in the field of childhood adversity which hypothesises that different types of adversity may have specific dimensions that affect outcomes through partially distinct mechanisms (Study 3). Based on the hypotheses of this theory, an empirical study investigated the role of emotional processing variables including emotional reactivity and regulation in explaining the pathway between childhood adversities characterised by threats and defeat. Additionally, the role of executive functioning, language abilities, and critical thinking disposition in explaining the pathway between childhood adversities characterised by deprivation and defeat was investigated. The findings indicated that the role of these mediating factors depends on the specific adversity types and developmental outcomes considered. In terms of threats, physical violence was indirectly associated with increased defeat through higher expressive suppression. In terms of deprivation, cognitive neglect was significantly associated with defeat through higher emotional reactivity, expressive suppression, and language abilities. These findings present preliminary evidence regarding developmental factors that may explain the link between adversity in childhood and suicide-related outcomes. However, there is relatively less research on protective factors that may reduce the impacts of adversity on development.

Given that protective factors such as PCEs could present key targets for intervention, the following study aimed to investigate the influence of PCEs on the association between threat/deprivation and developmental outcomes within these models.

Chapter 6 then investigated PCEs as a moderator of the hypothesised pathways between the dimensions of adversity and defeat with developmental factors as mediators (Study 4). The findings of multigroup analyses indicated that the overall models outlining pathways from threat/deprivation and defeat through developmental factors significantly differed between individuals with high PCEs and low PCEs. However, the moderation effect did not reach statistical significance for any of the specific associations. Despite this, the results indicated that physical violence was linked with increased expressive suppression and supervision neglect with increased attention/concentration difficulties only when PCEs were low. Similarly, sexual abuse was linked with increased language and verbal memory difficulties only when PCEs were high.

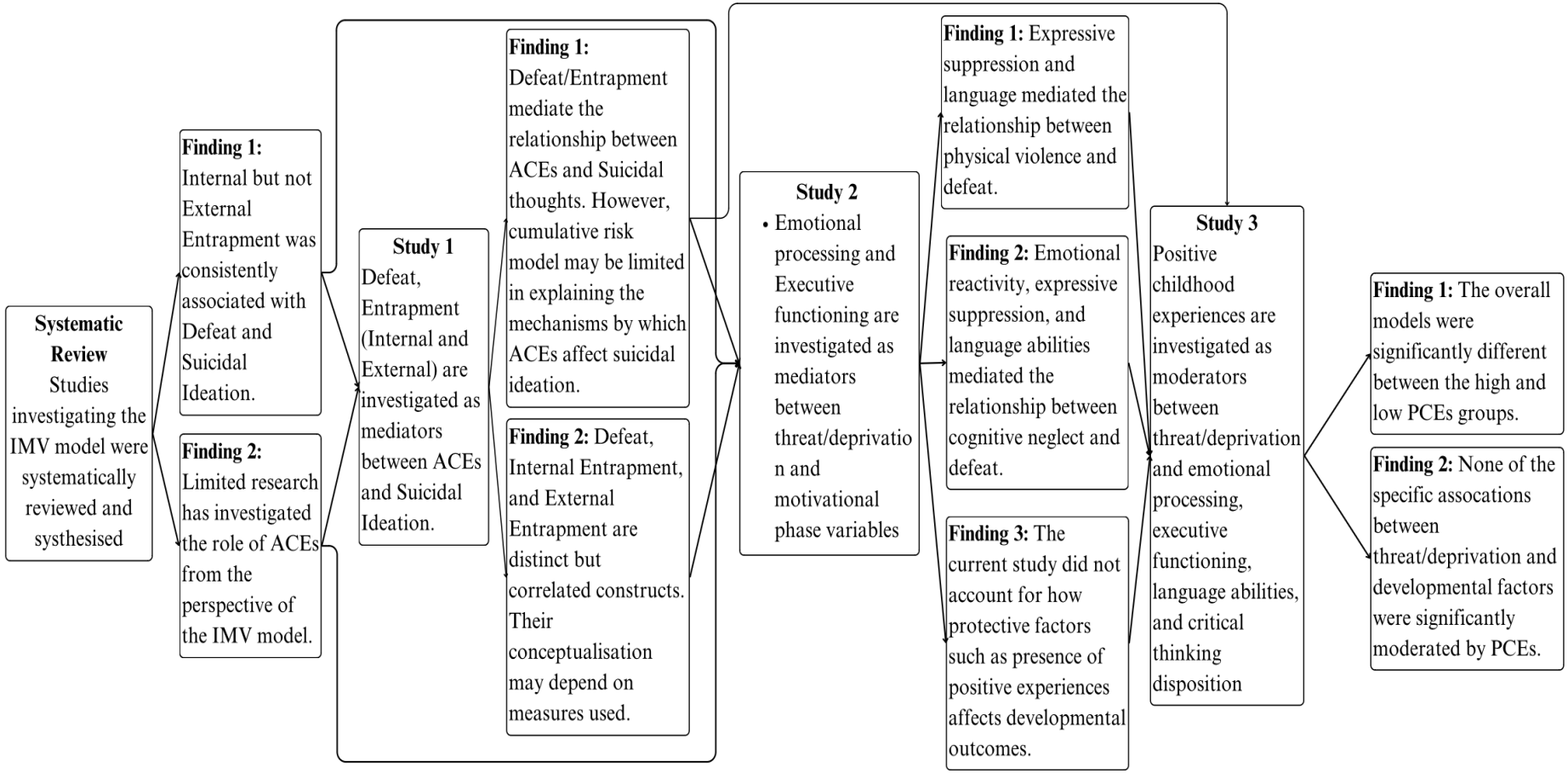
The findings further indicated that the language abilities-defeat association was weakened in the presence of high PCEs while the verbal memory-defeat association was strengthened by PCEs. In terms of direct effects, sexual abuse and cognitive neglect were significantly higher among individuals reporting higher PCEs. These mixed findings suggested a complex interaction between PCEs and ACEs. Overall, these findings indicate that PCEs play an important role on the hypothesised pathways between ACEs and defeat, but that the influence of PCEs on these pathways is not well understood. Further research aimed at better understanding the role of PCEs from the perspective of the IMV model could present important insights into intervention development.

Taken together, these studies have improved the understanding of the mechanisms by which adversity in childhood increase vulnerability to defeat and highlighted the importance of theoretical models in furthering the understanding of these associations. The outline of the

investigations presented in this thesis and how each study informs the next are illustrated in figure 7.1. The implications for theory, research, policy and intervention are discussed below.

Figure 7.1.

Outline of studies in this thesis indicating findings informing future studies



7.2. Implications

7.2.1. Implications for theory

The studies conducted in the current thesis have important implications for the further development of theory, specifically with regard to the IMV model and the DMAP. These are presented in the sections below.

7.2.1.1. Implications for the IMV model

The investigations presented in this thesis contributed to and advanced the understanding of the relationships proposed by the IMV model. Firstly, the findings of the systematic review showed support for the hypotheses of the IMV model, highlighting that this model may be very useful in understanding the complex pathways resulting in the development of suicidal thoughts and behaviours. The findings of the systematic review further highlighted that the pathways outlined by this model may elucidate the mechanisms by which ACEs are linked with suicidal behaviour. This was further supported by the first empirical study in chapter 4 which indicated that defeat/entrapment explained the link between ACEs and suicidal thoughts. The systematic review further highlighted areas of the model that require further research such as the role of pre-motivational phase variables and stage-specific moderators. Additionally, this review highlighted the dearth of prospective research and the differences in time periods in prospective studies.

These findings have key implications for the development of theory and future research. Firstly, while these findings suggest that the IMV model has been highly influential in informing suicide research and finds support in the literature, the role of pre-motivational phase variables and the pathways by which these variables increase vulnerability to defeat are not as well understood. Similarly, it is unclear which threat-to-self, motivational, and volitional moderators are effective in influencing the development of suicidal thoughts and

behaviours. This is especially relevant for the volitional phase, where most studies compare group differences between individuals with a history of suicidal ideation and behaviour while limited research examines the interaction effects between suicidal ideation and volitional phase variables in predicting suicidal behaviour. This lack of empirical support for the factors that may be influential in strengthening or weakening the pathways linked to suicide limits the understanding of these processes and identification of key variables that may be effective targets for interventions. These findings thus underscore the need for more comprehensive research investigating the role of different moderators within pathways of the IMV model

Another key implication for the IMV model highlighted by investigations in this thesis relates to the conceptualisation of defeat and entrapment. Specifically, the findings of the systematic review supported the conceptualisation of these as three distinct constructs (i.e. defeat, internal and external entrapment) while chapter 4 suggested a single construct underlies these variables. As discussed in section 4.2, the conceptualisation of these constructs has been a subject of debate (Forkmann et al., 2018; Griffiths et al., 2015; Oakey-Frost et al., 2022; Taylor et al., 2009). Research aiming to investigate the factor structure of defeat and entrapment has also resulted in mixed findings, with results often depending on methodological differences including measures used or type of statistical analysis (Cramer et al., 2023; Forkmann et al., 2018; Griffiths et al., 2014; Griffiths et al., 2015; Höller et al., 2020). While each of these conceptualisations of defeat and entrapment are consistent with theory, this discrepancy in dimensionality across the literature based on methodological differences highlights a need for research to further examine these constructs from a theoretical and data-driven perspective. Specifically, much of the existing literature exploring the dimensionality of defeat and entrapment using factor analyses, which are likely to underestimate the number of factors when dimensions are highly correlated (Golino et al., 2017). As a result, it may be useful for future research to consider newer developments such

as network psychometrics which account for the interrelationships between different items (Forkmann et al., 2018). Additionally, more theory-driven approaches using qualitative research to examine the experience of defeat and entrapment may be useful to inform the understanding of these concepts. Finally, a key contribution that could be useful in informing this discourse could be research temporal dynamics of defeat and entrapment. As the IMV model hypothesises that defeat results in feelings of entrapment, establishing that defeat temporally predicts internal or external entrapment may be crucial to research aiming to establish the conceptualisation of these variables, and to research aiming to predict and prevent suicidal thoughts and behaviour. Studies employing ecological momentary assessments could thus be highly useful in further understanding the conceptualisation and associations between defeat and entrapment (Stenzel et al., 2020; van Ballegooijen et al., 2022).

The current thesis also contributed to evidence that ACEs are likely pre-motivational phase variables that increase vulnerability to defeat. Studies employing ecological momentary assessment identified in the systematic review indicated that defeat and entrapment show variability over a period of hours (Stenzel et al., 2020; van Ballegooijen et al., 2022) while other literature indicates that ACEs remain relatively stable over time (da Silva & da Costa Maia, 2013; Yancura & Aldwin, 2009). Findings from the empirical study in chapter 4 also largely supported this view as the findings indicated that defeat/entrapment mediated the relationship between adversity in childhood and suicidal ideation. These findings thus provide evidence for ACEs being positioned within the pre-motivational phase of the IMV model. These findings further add to the theory by contributing to the understanding of the role of ACEs within the this model and investigating the pathways by which ACEs may affect motivational phase variables.

The studies in chapter 5 and 6 also aimed to investigate mediators that may explain the heightened vulnerability to defeat among individuals with a history of ACEs involving threat and deprivation. This thesis thus presented novel insights into factors that may explain increased vulnerability to defeat among individuals with experiences of adversity in childhood. By integrating theoretical advancements in understanding developmental effects of adversity and the IMV model, this research identified key mediators (including emotional reactivity, expressive suppression, and language skills) that may explain increased vulnerability to defeat. Upon replication in prospective studies, the associations highlighted in these studies may improve the understanding the development of feelings of defeat. This could be especially important given that motivational phase variables like defeat and entrapment fluctuate over time, indicating that targeting emotional regulation and cognitive abilities that may reduce feelings of defeat may be useful lowering the overall feelings of defeat.

Additionally, these studies also highlighted the role of PCEs, suggesting that these associations may also be influenced by positive experiences alongside adversity. This study thus identified PCEs as an additional pre-motivational phase variable that may be relevant to the development of defeat. The discrepancy in the direction of effect of PCEs as moderators (i.e. whether they strengthened or weakened the association) alongside prior literature highlighted the possibility that PCEs may independently predict the developmental factors being considered. As a result, it may be useful for future research to investigate the role of both ACEs and PCEs as pre-motivational phase variables within the IMV model. In addition, further research investigating the role of PCEs in terms of whether they may act as independent predictors or moderators of the effect of ACEs could be highly useful in building upon the pre-motivational phase of the IMV model.

7.2.1.2. Implications for the DMAP

These findings also have implications for the DMAP. More specifically, The DMAP hypothesises that specific dimensions of threat and deprivation have somewhat distinct effects on development (i.e. threatening experiences are hypothesised to influence outcomes through emotional processing and experiences involving deprivation are likely to impact cognitive and language abilities). The current findings from chapters 5 and 6 do not fully support these hypotheses. Instead, these findings indicate that subfacets of emotional processing, executive functioning, and language abilities may play a role in explaining pathways between both threat and deprivation and defeat. While this does not contradict the hypotheses of the DMAP since the DMAP mentions partially unique mechanisms for different dimensions of adversity, it does suggest that the developmental mechanisms explaining the pathways between dimensions of adversity and defeat may be more complex and require further research. More specifically, these results suggest that different adversity types may be indirectly linked to defeat through different aspects or sub-facets of emotion processing or executive functioning. For instance, emotional suppression but not cognitive reappraisal was found to mediate the relationship between physical violence and defeat. Similarly, language abilities but not verbal memories or attention/concentration mediated the relationship between cognitive neglect and defeat. This indicates that the effects of specific adversities may have unique effects on different aspects of emotional processing or executive functioning. With respect to emotional processing specifically, it is possible regulation and reactivity related to specific emotions may explain the link between dimensions of adversity and defeat. This is consistent with research that indicates that aspects of emotional regulation and reactivity may differ based on valence and regulation strategy (Baer et al., 2022; Ong et al., 2018; Zimmerman et al., 2014). This is also consistent with literature reporting that individuals with a history of exposure to violence show stronger reactivity to angry or

threatening facial expressions (Chichetti & Curtis, 2005; Pfaltz et al., 2019; Sandre et al., 2018). Taken together, these findings highlight that the effects of different types of adversity on specific aspects of emotional processing and executive functioning in theoretical models could be useful to understanding the effects of adversity on development. It may thus be helpful for future work to focus on a more comprehensive conceptualisation of developmental outcomes by considering the individual sub-facets of emotional processing and executive functioning alongside their global constructs.

The findings from this thesis also have implications for the conceptualisation of ACEs as threat and deprivation. Specifically, the relationship between sub-facets of threat (i.e. physical violence and sexual abuse) and deprivation (i.e. cognitive neglect and supervision neglect) and defeat through the same developmental factors was not significant. Indeed, chapter 5 did not find evidence for the indirect effect of sexual abuse and supervision neglect on defeat both directly and indirectly while physical violence and cognitive neglect were both associated with defeat. This finding may suggest that considering individual types of adversity may be more useful for understanding unique developmental impacts of different types of adversity. Consistent with this, Henry et al. (2021) compared the cumulative risk, dimensional, and individual risk models of adversity and found that accounting for individual adversities best explained variance in outcome measures. However, this finding should be interpreted with caution given the relatively lower prevalence of sexual abuse and supervision neglect in the population. It may thus be useful for future research to consider the role of specific types of adversities as individual risk factors. It may also be useful for future research to investigate these pathways within a larger sample size and among participants reporting a higher prevalence of adversities.

There may also be other explanations for the discrepancy between the current findings and prior research in terms of these dimensions of adversity. Firstly, it is possible that the

current measurement of threats and deprivation being largely focussed on the presence or absence of these experiences excluded the role of persistence, severity, or timing. For instance, the studies in the current thesis focus on whether participants experienced different types of threat and deprivation. However, the current study did not measure different levels of exposure such as frequency or severity which are likely to more comprehensively capture experiences of adversity. Additionally, as ACEs are theoretically hypothesised to affect development, including developmental timing within the measurement of threat and deprivation could be useful to enhance the understanding of how these experiences may impact development. This is especially relevant for measuring threats as the DMAP hypothesises that threatening experiences are likely to result in enhanced emotional reactivity as a result of fear conditioning and generalisation (Mclaughlin et al., 2014). Given that fear conditioning may require consistent exposure to threatening stimuli (Baeuchl et al., 2015), it is important for future research to account for the role of timing, frequency and severity of these experiences.

Finally, it is also important to note that there may be other dimensions of adversity that could better explain the associations between adversity and defeat. While the DMAP outlines the dimensions of threat and deprivation, these are not the only dimensions of adversity. For instance, Ellis et al. (2009) outlines harshness and unpredictability as additional dimensions of adversity that affect life trajectories. Based on this, the integrated model of dimensions of environmental experience outlines a model that encompasses the hypotheses of both the harshness-unpredictability model and the DMAP to outline the effects of adversity (Ellis et al., 2022). These additional dimensions of adversity may be useful in explaining the pathways from adversity to defeat.

Another key finding was the effect of positive childhood experiences on developmental outcomes. The findings did not find support for the hypothesis that PCEs

moderate the relationship between the dimensions of adversity and developmental outcomes. Despite being limited by low sample size, the findings indicated that PCEs do play a role in the overall pathways from adversity and developmental outcomes to defeat. It is also possible that PCEs directly and independently affect the same developmental trajectories as ACEs. This is consistent with other literature reporting that PCEs have been linked to a range of psychological outcome variables independent to the effects of ACEs (Bethell et al., 2019; Crandall et al., 2019; Narayan et al., 2017). These findings indicate that PCEs may affect similar developmental pathways as threats and deprivation as hypothesised by the DMAP, but the specific role of PCEs on these pathways is not well understood. This is an especially important finding given that current theories of adversity seldom account for the role of PCEs while understanding the developmental outcomes associated with ACEs. This further suggests that including the role of PCEs alongside ACEs has the potential to expand the understanding of how ACEs affect development and the development of resilience among individuals with high levels of adversity. Additionally, an improved understanding of the role of both ACEs and PCEs on these developmental pathways and defeat may also help identify key intervention targets for individuals with a history of adversity. Future research should thus aim to further examine and establish the role of PCEs on developmental outcomes associated with emotional processing, executive functioning, and language abilities. As these findings indicate that the role of PCEs is not well understood, it would be helpful for future research to consider the role of PCEs as both moderators of the effects of ACEs as well as independent predictors of these outcomes.

7.2.2. Implications for measurement

The studies presented in this thesis highlight important limitations and present several implications for measurement. The implications for the measurement of different constructs examined within this thesis are presented below.

Defeat and Entrapment: As outlined in section 7.3.1, the investigations in this thesis highlighted differences in the conceptualisation of defeat and entrapment which was dependent on the measures used. Specifically, investigations using the short defeat and entrapment scale showed high redundancy between defeat and entrapment, suggesting that a single factor underlies the constructs. While a high correlation between defeat and entrapment is consistent with the literature, many researchers have argued that these are distinct (Forkmann et al., 2018; Cramer et al., 2023; Höller et al., 2020). This debate has led to several studies investigating the factor structure of defeat and entrapment, largely resulting in inconclusive findings (Cramer et al., 2023; Forkmann et al., 2018; Griffiths et al., 2015; Holler et al., 2020; Oakey-Frost et al., 2022). However, there has been limited literature focussing on how measures of defeat affect the resultant dimensionality. This is especially relevant given that the short defeat and entrapment scale was developed through the selection of the highest loading factors from each subscale of the full defeat and entrapment scales (Griffiths et al., 2015). Additionally, the existing measures of defeat and entrapment are based on one measure of defeat and entrapment, thus highlighting the need for future research to investigate how results could be influenced by the measures used.

ACEs: This thesis also aimed to address key limitations in measurement of ACES that has been highlighted in the literature. Researchers have highlighted the limitations associated with using dichotomous scoring to assess the presence of different forms of adversity, limited accounting of contextual factors, and lack of theoretical rationale behind the specific adversities included in the measures (Lacey & Minnis, 2020). The current thesis aimed to address these limitations by drawing from theory that focusses on mechanisms by which ACEs confer risk for suicidal ideation. Given the lack of measures specifically designed to investigate threat and deprivation, these measures were adapted from existing measures

aimed at measuring victimisation and neglect based on recommendations by Berman et al. (2022). As these adapted measures were not previously validated, the measurement model and factor structure were investigated in the current thesis. While these measures specifically investigated threat and deprivation, the composite scores were largely based on the co-occurrence of different types of threat and deprivation. Additionally, other aspects of adversity which may be relevant to outcomes (e.g. severity, relationship with perpetrator, chronicity) were not included. This highlights a need for the development and validation of measures that assess the overall presence of threatening and deprivation-based experiences in childhood and account for specific characteristics of these experiences.

Executive functioning: The current thesis also used self-report measures to measure executive functioning with an aim to preserve ecological validity (Barkley & Fischer, 2011). Specifically, a key concern of objective measures is that they are conducted in unique settings not reflective of everyday functioning. For instance, individuals asked to complete a task in lab settings with minimal distractions may not reflect their ability to complete the task in everyday conditions. However, these measures have shown low correlations with objective measures (Chaytor et al., 2006; Meltzer et al., 2017; Nordvall et al., 2017; Soto et al., 2020; Wood & Liossi, 2006). As a result, it has been suggested that these subjective versus objective measures likely capture executive functioning at different levels (Schmitter-Edgecombe et al., 2020). While objective measures may provide information about processing efficiency, self-report measures relate to reflective day to day functioning in a typical environment. It was thus expected that experiences of difficulties with daily functioning would be more likely to influence feelings of defeat. Given that this study aims to understand the effects of executive functioning on internal states of mind, this reflective level of executive functioning was considered more appropriate. These findings thus indicate that future research may also benefit from comparing the effects of different levels of executive

functioning measured using objective and subjective methods and their associations with theoretically relevant risk factors for suicide.

Emotional Processing: These findings also shed light on the need for emotional regulation and reactivity measures that are specific to the emotions being experienced. As outlined in section 7.3.1, while widely used measures for emotional reactivity and regulation account for emotional valence (positive versus negative), relatively few measures aim to assess emotional processing for specific emotions (Patrick, 2022). While some researchers argue that valence alone is theoretically relevant within emotion research (Barrett, 2006), other research suggests that emotion reactivity and regulation is specific to emotions. Experimental research has indicated that emotional reactivity to angry faces in general may be associated with a stronger response than other emotions including fear or sadness (Rosas et al., 2007). Similarly, in a sample of 562 university students, the participants reported using expressive suppression as a response to sadness compared to other emotions. In contrast, another study investigating emotional regulation trajectories over several decades reported that participants were more likely to use passivity, support seeking, or avoidance to regulate sadness while rumination and expressive suppression was more likely to be used to cope with fear (Zimmermann & Iwanski, 2014). Despite the evidence for emotion specificity of emotional reactivity and regulation, there is a lack of measures aimed at assessing emotion-specific reactivity and regulation. As a result, it is important for future research to focus on the development of emotion specific reactivity and regulation measures to better understand the role of emotional processing in the pathways from ACEs to suicide risk with careful consideration of the specific emotion being processed.

7.2.3. Implications for screening and intervention

The findings of this thesis indicated that overall ACEs as well as threat and deprivation may increase the vulnerability to feelings of defeat. This raises the question of

whether including screening tools for ACEs in measures of suicide risk or routine clinical screening could be useful. Indeed, the discussion of routine screening for ACEs has been a subject of debate (Gentry & Paterson, 2022). The feasibility and acceptability of routine screening for ACEs has been supported by research (Rariden et al., 2021; Watson, 2019). However, some researchers have cautioned against routine screening for ACEs, arguing that careful consideration and evaluation of the availability of intervention, potential harms and costs, and quality of screening tools should precede routine screening of ACEs (Campbell, 2020; Finkelhor, 2018). More specifically, these papers argue that there are limited interventions for individuals experiencing a higher number of ACEs. Additionally, given that ACEs are a range of different types of experiences, it is not clear that interventions for one form of ACE (e.g. physical abuse) would be effective at reducing the effects of another (e.g. household substance abuse). In terms of potential harms, it is possible that being asked about ACEs could cause distress or result in labelling individuals as high risk (Campbell, 2020). This may be particularly relevant in cases where medical professionals have not been trained in trauma-informed practices or where there are no interventions to address the ACEs that have been reported. Finally, as discussed in section 7.3.2, there are several concerns outlined regarding the measurement of ACEs widely used throughout the literature. A lack of rigorously developed and psychometrically sound measures of ACEs are likely to limit the ability to identify individuals at risk of suicidal thoughts and behaviours. For instance, if screening tools do not account for the frequency or severity of experiencing an adversity, practitioners risk labelling individuals that experience a severe form of abuse as relatively lower risk.

However, the results of the studies in the current thesis, if replicated in prospective designs, could have important implications for intervention development. The findings of chapter 4 also add to the literature base highlighting ACEs as an important risk factor for

suicide. This suggests that a trauma-informed approach to clinical practice could be helpful in working with individuals presenting with suicidal thoughts or behaviour (Mirick et al., 2022). The systematic review in chapter 3 and the empirical study in chapter 4 also suggest that the defeat-entrapment pathway could be an important intervention target to reduce suicidal ideation. The systematic review additionally highlights the role of internal entrapment as a target for intervention. While the empirical studies in this thesis were largely cross-sectional, these associations were also supported by other prospective studies in the systematic review. These findings suggest that screening for defeat and entrapment could be useful in assessing overall suicide risk. As recent studies have indicated that defeat and entrapment vary over a period of hours, recent advancements in technology and research methodology to measure these variables could be useful in identifying individuals at risk for suicidal thoughts and behaviour. Consistent with this, preliminary interventions aimed at using EMA data to address suicidal thoughts have been proposed (Barrigon et al., 2022; Czyz et al., 2023). However, as these are recent advancements in the literature, there is limited information on the efficacy of these interventions. Additionally, there is a dearth in research investigating the effects of interventions targeted at reducing defeat or internal entrapment specifically on suicidal ideation. It is thus important for future research to investigate the efficacy of such interventions on suicidal ideation and behaviour, especially among individuals reporting higher instances of adversity in childhood.

Taken together, these findings indicate that comprehensive interventions for suicide prevention adopted at different stages of the suicidal process may be key to reducing suicide risk (Ports et al., 2017). While the IMV model has informed various downstream intervention methods such as safety planning (Nuij et al., 2018; R. C. O'Connor et al., 2017; Sandford et al., 2022), these findings indicate that theory-informed interventions could be developed to address suicide risk prior to the development of suicidal ideation or behaviour. For instance,

interventions aimed at improving emotional regulation could be useful in reducing feelings of defeat (Kiosses et al., 2018). Similarly, other mediators including emotional reactivity, expressive suppression and language abilities may be targeted in future interventions to reduce defeat. However, it is important for future research to empirically established the hypothesised associations between these variables prospectively prior to the development of interventions.

7.2.4. Implications for policy and prevention

Both suicide prevention (Scottish Government, 2022; UK government, 2023) and reduction of the impact of ACEs (Public Health England, 2020; Scottish Government, 2024) are key policy areas within the UK. The IMV model in particular has been pivotal in informing the Scottish national and local suicide prevention policy where early life adversity has been highlighted as a key risk factor (Convention of Scottish Local Authorities (COSLA), 2022; Scottish Government, 2022). The local area action plan outlines the importance of targeting suicide prevention at each stage of the IMV model (COSLA, 2022). As outlined by Ports et al. (2017), addressing risk factors for suicide at different levels of society is key to comprehensive suicide prevention. Consistent with this, upstream suicide prevention measures may include community level interventions aimed at reducing vulnerability to defeat through targeting pre-motivational phase variables while downstream measures could address individual level factors targeting motivational or volitional phase variables.

The findings in the current thesis make an important contribution to delineate the role of risk and protective factors at different stages of the suicidal process. Firstly, the findings of the systematic review outlining the hypotheses of the IMV model that are well-supported are valuable to the development of suicide prevention policy specifically focussed on the IMV model. These findings highlight the importance of the defeat-internal entrapment-suicidal ideation pathway which could be addressed through targeted interventions aimed at reducing

defeat and entrapment. Given that the systematic review indicated that defeat and entrapment fluctuate over hours (Stenzel et al., 2020), it would also be useful for interventions to account for these changes over time.

The empirical chapters further addressed the gaps in understanding of ACEs and elaborated upon existing theories explaining the link between ACEs and suicidal ideation. While these findings were exploratory, the current thesis identified specific developmental pathways that may be useful targets for intervention. As ACEs are experienced are likely distal and transdiagnostic factors, universal or society level interventions could be useful to reduce the impact of ACEs. Upon replication in prospective research, these findings have the potential to inform key policy directions to address developmental concerns and reduce the vulnerability to suicide and other physical and mental health outcomes. For instance, interventions aimed at improving aspects of emotion regulation and executive functioning abilities and a greater focus on PCEs in schools could considered to reduce the impacts of ACEs (Ports et al., 2017). Additionally, as research indicates ACEs are more prevalent among individuals with a lower socioeconomic background (Maguire-Jack et al., 2021), policies aimed at improving economic inequality and improving access to mental health services to children from more deprived regions could be useful in improving the effects of adversity in childhood. Taken together, the findings of this thesis present a valuable contribution to the development of comprehensive policy targeting different stages of the suicidal process.

7.3. Strengths and limitations of this thesis

7.3.1. Strengths

While there has been substantial research outlining the association between ACEs and suicidal thoughts and behaviours, there has been limited investigation of the mechanisms that

explain these relationships. This thesis presented novel insights into how these variables may interact with an aim to highlight crucial intervention targets useful for upstream suicide prevention. Furthermore, this thesis investigated the role of positive childhood experiences in influencing the effects of adversity. Given that ACEs are a transdiagnostic factor for various negative health outcomes, an important policy area is dedicated to reducing the effects of ACEs (Public Health England, 2020; Scottish Government, 2024). Advancements in understanding the pathways by which ACEs and their characteristics can affect outcomes could be crucial in improving public health outcomes.

Another key strength of this thesis was that each of the investigations presented were grounded in emerging and empirically supported theoretical developments in the field. The systematic review in chapter 3 in particular provided this theoretical grounding, by highlighting the aspects of the model that were empirically supported and presenting a comprehensive understanding of the literature in the field. This presented a foundation for building upon aspects of the IMV model that were not well understood or lacking empirical support. The gaps in understanding were further investigated based on theoretical advancements in conceptualising ACEs with a specific focus on mechanisms by which ACEs affect developmental and psychological outcomes. By drawing from key theories in the literature, this thesis presented novel insights regarding the associations between adversity in childhood and suicidal ideation.

A further strength of the current thesis is the use of open science principles wherever possible. Open science refers to increased transparency in the methodology and results of research to improve reproducibility in research and reduce inappropriate scientific practices (Cruwell et al., 2019). While participant data regarding sensitive topics could not be made publicly available, the current thesis aimed at following open science and transparency where possible in the following ways. Firstly, the systematic review protocol was registered on

PROSPERO with relevant updates with details regarding research questions, search strategy, and synthesis strategy. Additionally, the PRISMA (2021) guidelines were followed for reporting which include details regarding search and screening for each field in every database and additional filters (Page et al., 2021). This is aimed at enhancing reproducibility to future researchers that may wish to update the work. The systematic review is also available online open access. In terms of the empirical papers, all analyses were conducted using publicly available open-source software (RStudio) and all codes for data wrangling, descriptive analyses and model testing are uploaded on OSF. Overall, an increase in open science practices has been cited as key to addressing the replication crisis in psychology (Renkewitz et al., 2019). The current thesis has thus aimed to contribute to enhanced reproducibility and transparency in research.

7.3.2. Limitations

The main limitation of this thesis was the cross-sectional nature of the empirical studies. Given that this thesis aimed to understand the developmental outcomes associated with adversity in childhood, cross-sectional findings limited the understanding of the causal direction of these findings or the ability to establish the temporal sequence of these results (O'Laughlin et al., 2018). For instance, it is unclear if the current results imply that individuals with emotional processing and executive functioning difficulties are more likely to report defeat and entrapment or if increased feelings of defeat and entrapment could result in difficulties in emotional processing and executive functioning. However, this presents a starting point for future research to investigate these associations prospectively to investigate causality.

Another limitation was the reliance on retrospective reporting measuring adversity in childhood. This was especially a concern as participants were being asked to report events that occurred over a period of several years retrospectively. Additionally, the studies in this

thesis primarily used self-report measures which may have concerns related to acquiescence bias, social desirability, and differences in interpretation (Hinz et al., 2007; Rosenman et al., 2011). Researchers have raised concerns regarding retrospective recall bias, which may indicate that individuals reporting negative health outcomes may be more likely to report childhood adversity (Breton et al., 2022; Coleman & Baldwin, 2023). However, research in the context of suicide has reported that individuals reporting suicidal thoughts and behaviour often show overgeneralised memory, such that they may struggle to think of specific events from the past but remember broader non-specific periods of time (Jiang et al., 2020; Williams et al., 2006). This may be inconsistent with the view that individuals experiencing suicidal thoughts and behaviours would be more likely to recall experiences of adversity or maltreatment. Additionally, low consistency between prospective and retrospective recall could be attributed to multiple other factors. For instance, research measuring ACEs prospectively employs different methods including reporting by caregivers (which may still be based on memory or influenced by motivations of reporters) or social service/court records (which may only include the most severe forms of maltreatment; Baldwin et al., 2019). Additionally, individuals' comfort in disclosing these events, their interpretation of events, and age of prospective assessment may also influence the reporting of ACEs.

The sample size and characteristics are an additional limitation that should be considered in the interpretation of these findings. Specifically, it should be noted that the some of the analyses conducted may have been underpowered. As a result, it is important for future studies to replicate these analyses with a greater sample size. Additionally, given that the data for chapters 5 and 6 were primarily collected through prolific and limited to participants resident in the UK, these findings may not be generalisable to other populations.

7.4. Future directions for research

The investigations presented in the current thesis present key insights into the relationship between childhood experiences and suicide risk. However, these studies also highlight important questions that limit our understanding of how childhood adversities affect suicide risk. This section thus outlines some areas for future research to further the understanding of these relationships.

Firstly, the current thesis aimed to address the concerns with measurement of ACEs that have been raised by other researchers (Holden et al., 2020; Lacey & Minnis, 2020). As discussed in section 7.3.2, future research aimed at developing and validating measures for threat and deprivation-related ACEs accounting for severity, chronicity, and duration of these experiences are crucial to further understanding and preventing the mechanisms by which ACEs affect suicidal thoughts. Employing mixed-methods studies to qualitatively investigate the experiences of participants and how they affect development and quantitatively validate the developed measures could be highly useful to the development of comprehensive measures for threat and deprivation.

Another limitation of the current thesis was that the relationship between ACEs and suicidal ideation was investigated using cross-sectional data. As a result, the current thesis was limited in examining causality. Future research should thus aim to investigate the developmental factors presented here as mediators between dimensions of adversity and adult defeat, entrapment, and suicidal ideation prospectively. Additionally, given that the research indicates short-term fluctuations in the motivational phase variables, it would be helpful for future research to investigate outcomes at different time points to assess these outcomes over a period of time among individuals with a history of threats/deprivation and those without.

The current thesis additionally did not account for additional theoretically relevant or potential confounding factors such as socioeconomic status or access to treatment, therapy or

interventions aimed at reducing the effects of ACEs. For instance, sociodemographic factors are likely to affect factors such as access to services (Amaddeo & Jones, 2007). Research also indicates that socioeconomic status is linked with an increased likelihood of experiencing childhood adversity and maltreatment (Walsh et al., 2019). As a result, it would be useful for future research to account for the role of additional confounding factors in further understanding the relationship between ACEs and suicidal ideation.

Finally, as outlined in section 7.3.1, the current thesis also focussed on the threat and deprivation dimensions of adversity. As outlined in section 7.3.1, other dimensional models of adversity have been presented such as the harshness-unpredictability model and the integrated model of dimensions of environmental experience. Future research including additional dimensions of adversity such as harshness and unpredictability alongside threat and deprivation to have an improved understanding of which dimensions of adversity are associated with suicide related outcomes, and the pathways by which different dimensions affect suicide risk.

7.5. Covid impact statement

This section will briefly outline the impacts of the COVID-19 pandemic on the research processes during my PhD. Given that the COVID-19 restrictions on international travel were still in place at the beginning of this PhD, the first six months of this PhD were conducted remotely from India and supervision meetings were conducted exclusively online on zoom. This period primarily consisted of the examination of the literature, formulation of the overarching research questions, protocol for the systematic review, and initial stages of screening for the systematic review. These tasks were thus delayed by visa application procedures and relocation to the United Kingdom after beginning the PhD. Additionally, given that India was classified as a red-list country at the time, changing travel restrictions,

quarantine requirements, the lack of clarity and certainty of changes and how these would impact my research caused considerable stress and delayed the initial stages of this PhD.

Despite the impacts of the COVID-19 pandemic in the early stages of my PhD, several steps were taken by the supervisory team to mitigate the adverse effects of the restrictions to research. Firstly, my supervisory team helped me get acquainted with current PhD students with experience working in the same area of research. This allowed me to form friendships and gain further information and guidance regarding the university and department, life as a PhD student, and maintaining wellbeing during the pandemic. Frequent meetings with my supervisors and their encouragement to email them regarding any issues was crucial to reduce the impacts of the pandemic on my research. Secondly, the university also included a mentoring programme and peer network programmes that facilitated remote meetings with current students to connect with other PhD students and share ideas. Thirdly, being in the early stages of my PhD at this time meant that conducting tasks related to the literature and systematic review could be feasibly conducted online without significant disruptions. This also meant that the COVID-19 pandemic and related restrictions did not substantially change the directions and methodology of this thesis.

7.6. Conclusion

The current thesis aimed to examine the pathways by which adversity in childhood is linked with suicidal ideation as an adult. Using the IMV model as a theoretical framework, this thesis aimed to establish the existing evidence for the defeat-entrapment-suicidal ideation pathway and the role of ACEs from the perspective of this model. Subsequently, this study aimed to build upon this theory by integrating the predictions of the DMAP to identify developmental factors that may link ACEs in the pre-motivational phase to defeat in the

motivational phase. Finally, the role of PCEs were explored as potential resilience factors that may influence the hypothesised associations within this thesis.

The overall findings indicated that the IMV model was a useful framework in understanding the effects of ACEs on suicidal thoughts. That is, the findings indicated that defeat/entrapment significantly mediated the association between ACEs and suicidal thoughts. However, the predictions of the DMAP were not well supported. Specifically, the results indicated that the developmental pathways explaining the association between ACEs and defeat may be specific to subtypes of emotional processing and executive functioning. Additionally, the findings supported that the direct pathways from ACEs and emotional processing/executive functioning to defeat were generally moderated by PCEs.

As a result, this thesis has presented key theoretical and empirical contributions to the understanding of the relationship between ACEs and suicidal thoughts. Firstly, the current thesis presents a deeper understanding of empirical support for the IMV model. This thesis further contributed to the literature on the IMV model. Finally, an exploration of novel theory-based pathways aimed at understanding the relationship between ACEs and suicidal ideation was presented. As a result, this thesis identified key mediators and moderators that may enhance the understanding of the link between ACEs and suicidal ideation.

While these findings were primarily based on cross-sectional research, they add to the evidence base on the IMV model and the DMAP and their replication in prospective designs has implications for the further development of theory, measurement, research, and practice. Overall, these findings have provided novel insights into the interactions between ACEs and suicide risk factors that may present important contributions for the development of interventions and policy.

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Appendix 2: Study characteristics for all included studies

Authors	Country	IMV phase/ Compa -red Groups	Study Design	Sample type & Size (n)	IMV Measures	Results
Rasmussen et al., 2021	U.K.	P	Cross-sectional	• G.P. (Young Adults) • 418	TIPI, DASS-21, DS.	Being gay, psychological distress, Extraversion, Conscientiousness, and Emotional stability significantly predicted defeat.
Macrynikola, 2022	U.S.A	P	E.M.A (15 days)	• G.P. • 82	INCOM, DS, SRIs	Social comparison on social media mediated the effect of time on social media on defeat at the within and between person levels. This effect did not remain significant at the between person level after accounting for covariates. Problematic social media use moderated the social comparison on social media-defeat at the within person level.
Hong & Shin, 2021	Korea	P & M	Cross-sectional	• Clinical • 203	Korean versions of the DS, ES, SRLE-SF, Adapted CTQ, BIS, BSSI.	Defeat and entrapment significantly mediated the relationship between impulsivity/stress and suicidal ideation. This indirect effect was not observed for childhood trauma.
Wetherall et al., 2018a	U.K.	P & M	Cross-sectional	• University students • 422	SCSa, DS, ES, MPS-Social, BRS, SPS- SI, SRIs.	The Socially prescribed perfectionism-social comparisons-defeat and the social comparisons-defeat -Entrapment pathways were significant. Resilience acted as a threat-to-self and motivational moderator.
Zortea et al., 2020	U.K.	P & M	Cross-sectional	• G.P. (Adults) • 633	DS, ES, CD-RISC, COPE, PBI, RSQa.	The maternal care/overprotection/paternal care-attachment anxiety -defeat pathway was significant. The paternal care/overprotection/maternal care-anxiety avoidance-defeat was significant. The defeat-Entrapment-suicidal ideation relationship was

						significant. Resilience acted as a threat-to-self moderator and Maladaptive coping acted as a motivational moderator.
Moscardini et al., 2022	--	P & M	Cross-sectional	• G.P. (Adults) • 313	MPS-Social, DS, ES, SCSa, ARSQ.	Both negative social comparison and rejection sensitivity mediated the relationships between socially prescribed perfectionism and defeat. Defeat mediated the effect of negative social comparison and rejection sensitivity on internal and external entrapment.
Bradford et al., 2021	U.K.	P & M	Cross-sectional	• G.P. (Young Adults) • 259	SCI, rMEQ, DS, ES, SIDAS	The insomnia-defeat-entrapment-suicidal ideation pathway was significant.
Russell et al., 2018	U.K.	P & M	Cross-sectional	• School students • 1012	SCI, DDNSI, DS, ES, SRIs	The insomnia-suicidal ideation and nightmares-suicidal ideation relationships were significantly mediated by defeat and entrapment.
Russell, 2020a	U.K.	P & M	E.M.A (7 days)	• School Students • 97	SCI, DDNSI, DS, ES, SRIs	Poor sleep quality but not sleep onset latency, wake after sleep onset, sleep efficiency, total sleep time, sleep quality, nightmares, nightmare distress, Nightmare vividness or nightmare intensity predicted next day defeat. Defeat and internal entrapment but not external entrapment predicted same day and next day suicidal thoughts.
Russell, 2020b	U.K.	P & M	Cohort study (6 months)	• School students • 566	SCI, DDNSI, DS, ES, SRIs	Defeat and internal entrapment but not external entrapment fully mediated the insomnia-self harm thoughts (at time 2) relationship.
Cleare., 2019	U.K.	P, M & V	Cohort (2.5 months)	• Primarily university students • T1 = 514, T2 = 269	PSS, SCSc, DS, ES, FFMQ-SF, BRS, SCSa, FSCRS, SRIs,	Among the self-compassion subscales, mindfulness was negatively associated with defeat in cross sectional analyses only and overidentification-defeat reduced to non-significance after controlling for depression. Self-judgement and isolation predicted defeat in all analyses except the prospective analysis

						controlling for depression. Self kindness and common humanity were not associated with defeat. Defeat also cross-sectionally predicted entrapment and entrapment prospectively predicted suicidal ideation.
Russell et al., 2020c	U.K.	P, M, & V	Cohort study (6 months)	• School students • 573	SWEMWBS, SRIs.	The mental wellbeing (baseline)-defeat-internal/external entrapment-self harm thoughts pathway and the mental wellbeing (baseline)-defeat-internal entrapment-self harm behaviours pathway was significant.
Rosario-Hernandez et al., 2018	U.S.A	M	Cross-sectional	• 898 • G.P.	NAQ, WRSIS, EPS	Total entrapment was positively associated with suicidal ideation.
Lekkas et al., 2023	Online, Any country	P, M, & V	Cross-sectional	• Online sample • 839 posts	Qualitative coded online posts	Physical trauma, emotional trauma and value strain were only linked to defeat/entrapment through thwarted belongingness. Sexual abuse trauma was linked to defeat/entrapment through physical and emotional trauma and thwarted belongingness. Coping strain was directly positively linked to defeat/entrapment. Defeat/entrapment was a central node but not linked to suicidal plans directly. Suicidal plans were also not directly linked to suicide attempts or self-harm.
Branley-bell et al., 2019	U.K.	M	Cohort (1 & 6 month)	• G.P. (Adults) • 299 (study 1 = 145, study 2 = 154)	DS, ES, INQ, BRS, SPS, ESSI, PSS, ACSS,	Entrapment predicted suicidal ideation cross-sectionally and prospectively. Motivational phase variables differentiated control groups from ideation and enactment groups in expected directions while volitional phase moderators differentiated enactment groups from control and ideation groups.
McClelland et al., 2021	U.K.	M	Cross-sectional	• G.P. (Adults)	UCLA, SPS-SI, PSS-SF, CTQ, MPS-Social,	In the moderation models, defeat-entrapment relationship but not entrapment-suicidal ideation

				• 392	TALE, DS, ES, COPE, ESSI, SRIs	was significant. Loneliness significantly moderated these relationships. Loneliness differentiated between control, ideation and enactment groups in the univariate analysis in expected directions. Only ideation and control group difference remained significant in multivariate analysis.
Pollak et al., 2021	U.S.A	M	Cohort (3 & 6 months)	• G.P. (Adolescent) • 74	SDEs, FTT, SIQ, SITBI-R	Defeat entrapment prospectively predicted 3 months but not 6-month suicidal ideation. This effect was reduced to non-significance after controlling for depressive symptoms. Baseline positive future thinking moderated the relationship between defeat/entrapment and suicidal ideation at 3 month follow up alone.
Holler et al., 2021	Germany	M	Cohort (6, 9, and 12 months)	• Clinical (Adults) • 308 (302 for analyses)	German versions of DS, ES, BSSI	Cross sectionally, defeat was associated with internal/external entrapment and change in internal entrapment. Prospectively, defeat predicted change in internal entrapment but not internal/external entrapment. Cross-sectionally, defeat and internal but not external entrapment were associated with suicidal ideation. Internal entrapment and not external entrapment was associated with change in suicidal ideation. Internal entrapment alone predicted suicidal ideation prospectively.
Miller., 2015	U.K.	M	Cohort (2-4 months)	• G.P and university students • T1 = 322, T2 = 220	BHS, SPS-SI, DS, ES, ESSI, SPSI-RS, PSS, RRSa, GAS, SRIs	Defeat- internal entrapment-suicidal ideation significantly predicted internal entrapment. Rational problem solving and goal reengagement acted as a threat-to-self and motivational moderators respectively
Ren et al., 2019	China	M	Cross-sectional	• School students • 1074	Translated RSES, ES, BRLI, SRIs	Entrapment was positively associated with suicidal ideation. Reason for living acted as a

						moderator in the relationship between entrapment and suicidal ideation.
Tiesmann & Forkman, 2017	Germany	M	Cross-sectional	• 368 • G.P and Clinical	ES, DSI-SS	Entrapment was positively associated with suicidal ideation.
Dhingra et al., 2016a	U.K.	M	Cross-sectional	• University students • 1184	INQ, RSQb, DS, ES, GAS, SRI-25, DSI-SS, SRIs	Entrapment and burdensomeness in females and defeat and goal disengagement in males significantly predicted suicidal ideation.
Stenzel et al., 2020	Germany	M	E.M.A (7 days)	• G.P. (adults) • 61	SDEs, ECG & HPT	Defeat was significantly associated with entrapment in the cross-sectional analyses. In the prospective analyses, defeat did not significantly predict entrapment.
Ordóñez-Carrasco et al., 2020a	Spain	M	Cross-sectional	• G.P. (young adults) • 644	ES (adapted), INQ (adapted), SRIs	Entrapment was significantly associated with suicidal ideation in model 1 but reduced to non-significance in later models. EntrapmentxPB but not entrapmentxTB predicted suicidal ideation in model 2 but not model 3. The three-way interaction between entrapment, PB, TB significantly predicted suicidal ideation in model 3.
Ordóñez-Carrasco et al., 2020b	Spain	M	Cross-sectional	• G.P. (young adults) • 620	ES (adapted), PS (adapted), SRIs	Entrapment was significantly associated with suicidal ideation, but the effect was reduced to non-significance when the interaction between entrapment and psychological pain was included. Psychological pain moderated the entrapment-suicidal ideation.
Xu et al., 2022	China	M	Cross-sectional	• G.P. (Men) • 882	DS, ES, INQ, MSPSS, SRIs	Entrapment positively predicted suicidal ideation.
Holler et al., 2022	Germany	M	Cross-sectional	• G.P. • 454	ES, BSSI	Internal and external entrapment were significantly associated with suicidal ideation.

Wang et al., 2023	China	M	Cohort (12 months)	• Students • 211	DS, ES, INQ, MSPSS, UCLA, SRIs	New onset entrapment was significantly associated with higher risk of suicidal ideation prospectively. Persistent entrapment was also associated with higher suicidal ideation risk but this did not remain significant after accounting for covariates.
Sardarzehi et al., 2023	Iran	M	Cross-sectional	• G.P. • 405	DS, ES, INQ, BSSI, CERQ (short)	Defeat was positively associated with entrapment with items from threat to self moderators buffered this relationship. Entrapment did not significantly predict suicidal ideation. TB and PB significantly enhanced this relationship.
van Ballegooijen et al., 2022	U.K.	M	E.M.A (7 days)	• G.P. • 51	SRIs	Defeat and entrapment predicted each other at 3 hours follow up only. Entrapment and suicidal ideation were bidirectionally associated at 3 and 6 hours while entrapment predicted suicidal ideation at 3, 6, 9, and 1 hours.
McClelland et al., 2023	U.K.	M	Cross-sectional	• G.P. • 582 •	DS, ES, UCLA, SELSA, SPS-SI	Defeat was positively associated with Entrapment. Loneliness (global, family, romantic) did not moderate the defeat entrapment relationship but enhanced the entrapment-suicidal ideation relationship.
Nukala et al., 2021	India	M	Cross-sectional	• Clinical (Adults) • 50	DS, ES, MSSI	Defeat, total entrapment and suicidal ideation were significantly correlated. Internal and external entrapment were not correlated but both variables were significantly correlated with defeat, total entrapment, and suicidal ideation.
Wetherall et al., 2021	U.K.	M	Cohort (12 months)	• G.P. (Young Adults) • 2382	BSSI, DS, ES, INQ	The defeat(baseline)->internal entrapment (baseline)-> 12-month suicidal ideation pathway was significant. Both TB and PB did not moderate the entrapment-suicidal ideation relationship.
Scowcroft et al., 2019	U.K.	M	Cross-sectional	• Prison Population (Adult)	DS, ES, INQ, RSSb (revised), RAS, DHS.	The defeat->internal/external entrapment->suicidal ideation->suicide attempts pathway was significant in the linear regression model. In the

				• 785		serial mediation models, internal but not external entrapment significantly mediated the defeat-suicidal ideation and defeat-suicide attempts relationships. Rumination moderates the association between defeat and internal entrapment. PB, resilience and coping appraisals, and attitude to suicide moderate the relationship between internal entrapment and suicidal ideation.
Lucht et al., 2020	Germany	M	Cross-sectional	• Clinical (adults) • 296	German versions of the INQ, DS, ES, BSSI	The defeat-external entrapment and defeat-total/internal entrapment->suicidal ideation pathway was significant. External entrapment predicted suicidal ideation in the moderation analyses but not the mediation models. External entrapment also did not mediate the defeat-suicidal ideation relationship. TB and PB significantly moderated the entrapment (total, internal, external)-suicidal ideation relationship. Three-way interactions between entrapment (total, internal and external) and TBxPB also predicted suicidal ideation.
Teismann & Brailovskaia, 2020	Germany	M	Cross-sectional	• G.P. (Adults) • 301	SSEV (suicidal ideation subscale), ES (german), PMH, PWBS (german)	Entrapment was positively correlated with suicidal ideation. Both positive mental health and psychological wellbeing moderated the entrapment-suicidal ideation relationship. Only the self-acceptance facet of psychological wellbeing significantly moderated the entrapment-suicidal ideation relationship.
Brown, 2019	Australia	M	Cohort (2 months)	• University students • 230	RASS, ES, K10, SRIs	Entrapment prospectively predicted suicidal intent but not ideation. Suicidal ideation but not intent prospectively predicted entrapment. Entrapment moderated the bidirectional prospective relationship between suicidal ideation and intent.

Moscardini et al., 2021	--	M	Cross-sectional	• University Students • 195	BRLI, MLQ, ES, BSSI	Internal/External entrapment was significantly associated with suicidal ideation. Presence of life meaning and reasons for living both moderated this relationship. The interaction between search for life meaning and reasons for living also moderated the internal entrapment- suicidal ideation relationship.
Parra et al. , 2021	Netherlands	M	Cross-sectional	• G.P. (sexual minority adults) • 675; 666 in analyses	ES (dutch), SRIs	Entrapment significantly predicted suicidal ideation. Family belongingness moderated the association between entrapment and suicidal ideation.
Saint-Cyr et al., 2021	U.K.	M	Cross-sectional	• G.P. (Adults) • 116	DOCs, DS, ES, SIDAS	Defeat was significantly associated with entrapment. The relationship between entrapment and suicidal ideation was not significant. Desire for control (decision avoidance) moderated both relationships.
Bannister, 2018	U.K.	M	Cross-sectional	• G.P. (Adult men) • 231	BSRI-SF, GRC-SF, DS, ES, CFS, RSQb	Defeat was significantly associated with entrapment in all models. Gender role conflict, androgyny, and coping flexibility did not moderate this relationship. Rumination was a moderator of the defeat-entrapment relationship.
Ordóñez-Carrasco et al., 2021a	Spain	M	Cross-sectional	• G.P. (Adults) • 620	Adapted DS, ES, AAQ-II, PSRS	The relationship between defeat and entrapment was significant and moderated by experiential avoidance.
Clement et al., 2023	U.S.A	M	Cross-sectional	• G.P (African American women) • 269	DS, ES, DSI-SS, RSQ-Race	The defeat-entrapment-suicidal ideation pathway was significant. Racial rejection sensitivity was not significant as a threat-to-self moderator.
Hollingsworth & Polanco-Roman., 2022	U.S.A	M	Cross-sectional	• College students • 106	HDSQ-SS, MEIM, DS, ES	Defeat/entrapment significantly predicted suicidal ideation. This relationship was moderated by ethnic identity (exploration and commitment) but not ethnic identity (Belonging and affirmation)

Yasdiman et al., 2022	U.K.	M	Cross-sectional	• G.P. (Adults) • 521	DS, ES, DSI-SS, THS, PTGI-SF	Defeat significantly predicted entrapment and entrapment significantly predicted suicidal ideation. Post traumatic growth did not significantly moderate either of these associations.
Dhingra et al., 2016b	U.K.	M	Cross-sectional	• University Students • 1,809	DS, ES, RSQb, SRI-25, INQ, GAS, DIS, ACSS (fearlessness), DSI-SS, SRIs	Defeat and entrapment and entrapment and suicidal ideation were positively related.
Forkmann & Tiesmann., 2017	Germany	M	Cross-sectional	• G.P. (Adults) • 480	German versions of the DSI-SS, INQ, ES	Entrapment was significantly associated with suicidal ideation. TB and PB did not moderate the entrapment-suicidal ideation relationship.
Tucker et al. 2016	U.S.A	M	Cross-sectional	• University Students • 174	HS-R2, DS, ES, BSSI, RRSb	Defeat and not entrapment was significantly associated with suicidal ideation. Brooding moderated the defeat – entrapment relationship. Hope moderated the entrapment-suicidal ideation relationship
Hollingsworth, 2012	U.S.A	M	Cross-sectional	• University Students (African-american) • 75	DS, ES, INQ, RRSa, HDSS-SS,	Entrapment did not mediate defeat-suicidal ideation. Brooding did not moderate the defeat-entrapment relationship. The entrapment-suicidal ideation relationship was moderated by perceived burdensomeness.
Owen et al., 2017	U.K.	M	Cohort (4 months)	• Clinical • 80	DS, ES, BSSI	Defeat significantly prospectively predicted internal entrapment but not external entrapment or total entrapment.Total, external, and internal entrapment significantly predicted suicidal ideation cross-sectionally.
Oakey frost et al., 2021	U.S.A	M	Cross-sectional	• Clinical (Military) • 2690	ES, ACSS - Fearlessness about dying subscale	Internal entrapment but not external entrapment significantly predicted past month suicidal ideation, suicide plans, and self-rated likelihood of attempts. Fearlessness about death only moderated the relationship between internal/external entrapment and self-rated likelihood of attempts.

Shelef et al., 2016	Israel	M	Cross-sectional	• Military • 168	ES, BSSI	Entrapment significantly positively predicted suicidal ideation. This was non-significant after the inclusion of entrapment as a moderator for the effect of stress, social support and problem solving on suicidal ideation.
Littlewood et al., 2018	U.K.	M	E.M.A	• Clinical • 51	ES, BSSI	Poor sleep quality strengthened the relationship between pre-sleep entrapment and next day suicidal ideation. Total sleep time, sleep efficiency, and sleep onset latency did not moderate this relationship.
Holler & Forkmann, 2022	Germany	M	Cross-sectional	• Nurses • 1311 •	SDES, SSEV (German)	Entrapment did not significantly predict suicidal ideation
Ordóñez-Carrasco et al., 2021b	Spain	M	Cross-sectional	• G.P. (Young adults) • 644	DS, ES, SRI	Entrapment was only indirectly associated with suicidal desire through defeat, perceived burdensomeness, and psychological pain.
Ng et al., 2016	Hong Kong	M	Prospective case-control	• 162 • General Population	BSSI, IFES, DS, ES	Entrapment did not significantly mediate the relationship between defeat and suicidal ideation. Suicidal flash forwards moderated the entrapment-suicidal ideation relationship. Only the suicidal ideation group reported suicide flash forwards. Defeat and entrapment were higher in the suicidal ideation group.
Li et al., 2020	China	M & V	Cross-sectional	• School students • 1,239	Chinese versions of the BHS (loss of motivation subscale), ES, RRSa, INQ, ACWRSS, SRI-25, SRIs.	The Defeat-entrapment-suicidal ideation-suicide attempt pathway was also significant Rumination acted as a threat-to-self moderator. TB, PB, and suicide resilience (internal protection, emotional stability, and external protection) significantly moderated the relationship between entrapment and suicidal ideation.
De Beurs et al., 2019	U.K.	M & V	Cross-sectional	• G.P. (Young adults) • 3508	DS, ES, BSSI	Defeat, internal and external entrapment were directly associated with suicidal ideation in the network with only IMV model variables. In

						subsequent networks, internal entrapment had a stronger association with suicidal ideation compared to defeat and external entrapment.
Chelmardi et al., 2021	Iran	M & V	Cross-sectiona	• University students • 909	DSI-SS, SRI	Defeat and entrapment predicted suicidal ideation. Suicidal ideation significantly predicted suicidal behaviour.
De Beurs et al., 2017	U.K.	V	Cohort (15 months)	• Clinical (Adults) • 366	BSSI, Hospital records	Suicidal ideation (duration and frequency) was indirectly linked to suicide repetition via other nodes
Roland et al., 2022	Germany	V	Cross-sectional	• Clinical (Adults) • 301	SITBI (german), SASII, genograms, reason for hospital admission.	None of the exposure variables significantly moderated the relationship between suicidal ideation and behaviour. Exposure to suicide (family and non-family) did not differentiate the ideation and enactment groups.
Jiang et al., 2020	China	V	Cross-sectional	• G.P. & Clinical (adults) • 356	BSSI (Chinese), SRIs	Previous suicidal behaviour was significantly predicted by worst point suicidal ideation. Furthermore, previous suicidal behaviour significantly predicted current suicidal ideation.
Ribeiro et al., 2021	U.S.A	V	Cohort (3, 15, 28 days)	• G.P. • 1,020	SITBI (modified), BSSI (desire subscale), ACSS (fearlessness subscale), AMP	Suicidal desire predicted suicide attempt status and nonfatal suicide attempts at follow up. Fearlessness about death did not significantly moderate these relationships. Preparation for suicide did not moderate the relationship between desire for suicide and suicide attempt status or frequency of attempts.
Linthicum & Ribeiro, 2022	Online, Any country	V	Cohort (3, 14, and 28 days)	• Online sample • 1,013	SITBI	At 28-day follow-up, having a detailed suicide plan and past week plan was positively associated with a nonfatal suicide attempt while plan involving method and lifetime plan frequency were not significantly associated with suicide attempts.

Muehlenkamp et al., 2022	U.S.A	V	Cohort (6 months and 12 months)	• University students • 236	SITBI self-report form	Suicidal ideation frequency was significantly associated with Non-suicidal self injury at time 1. Changes in Suicidal ideation frequency were also associated with similar changes in Non-suicidal self injury.
O'Connor et al., 2012a	U.K.	V	Cohort (2 years)	• Clinical • 237	SPS-SI, Re-Admission to Hospital with Self-harm.	Suicidal ideation was associated with suicidal behaviour
O'Connor et al., 2013	U.K.	V	Cohort (4 years)	• Clinical • 70	SPS-SI, Re-Admission to Hospital with Self-harm.	Suicidal ideation was associated with suicidal behaviour
Okado et al.,	U.S.A	C	Cross-sectional	• School Students • 8113	HYRBSI	Suicidal ideation was associated with suicidal behaviour
Del Carpio et al., 2020	U.K.	P, M, & V	Prospective Case control	• School Students • 115	DS, ES, COPE, RSES, MSPSS, SOSS, LEC, SRIs.	Entrapment, maladaptive coping were higher and family support was lower in ideation relative to control groups in cross-sectional analyses only. Only family self-harm was higher in enactment compared to ideation group in the cross-sectional univariate analysis.
Dhingra et al. 2015	U.K.	P, M, & V	Case Control	• General Population (Adults) • 1288	DS, ES, INQ, GAS, ESSI, BRS, ACSS, BIS, SRIs.	Motivational phase variables differentiated control and ideation groups while volitional phase variables differentiated the ideation and enactment groups in expected directions.
Mars et al., 2019a	U.K.	V	Case Control	• General Population • 1025	WISC-III, ATEAC, SST, AISSS, LEQ, BFIS, DAWBA, SMFQ, CAPE, SRIs.	Intellect/Openness, Cannabis, Smoking, other drug use, and suicide plans differentiated ideation and enactment in expected directions.
Mars et al., 2019b	U.K.	P, M, & V	Case Control	• General Population • 4772	IPIP, WISC-III, ATEAC, SST, AISSS, LEQ, BFIS, DAWBA, SMFQ, CAPE, SRIs.	Volitional phase variables including exposure to suicide and substance use was higher in the enactment compared to the ideation groups. Enactment and ideation groups were more likely to have mental health diagnoses. Other variables showed inconsistent results.

Melson & O'Connor, 2019	U.K.	P, M, & V	Case Control	• General Population • 1546	PSS-SF, NMRS, WEMWS, UPPS-NU, CEOA-SS,	Enactment groups reported higher volitional alcohol factors compared to ideation and control groups.
O'Connor, Rasmussen, & Hawton, 2012	UK and northern Ireland	P, M, & V	Case Control	• 5604 • School students	mCAPS, LOT-R, SRIs, mSCSb	In univariate analyses, all variables differentiated ideation and control groups while volitional variables only differentiated enactment groups from other groups in expected directions. In multivariate analyses, exposure to suicide and stress related variables were higher in enactment group.
Kirtley, 2015a	U.K.	C, I, & E	Experimental/Case control	• 187 • General Population	SITBI, BDI, BHS, DS, ES, OAS, PSRS, PANAS, SRIs	Defeat was higher in the ideation group than the control group while entrapment was higher in the enactment group. Impulsivity, social modelling, and physical pain tolerance over time was higher in the enactment group compared to the ideation group.
Kirtley, 2015c	U.K.	C, I, & E	Experimental/Case control	• 88 • General population	SRIs, BSSI, ERS, PDI, MPS- Social, PCI, PSPS, BDI, PANAS, DTT, PA	Change in negative moods were higher in the enactment groups compared to the control group after completing pain tolerance tasks.
Kirtley et al., 2015b	U.K.	C, I, & E	Case control	• University Students • 351	ERS, PDI, BDI, PCI, PSPS, SRS	Emotional pain sensitivity and physical pain distress were higher in enactment groups followed by ideation and control groups. There were no significant differences on physical pain sensitivity.
Wetherall et al., 2018b	U.K.	C, I, & E	Case-control	• General population • 3435 • Scottish Wellbeing Study	DS, ES, INQ, GAS, ESSI, BRS, ACSS, BIS, SRIs.	Most motivational and volitional variables apart differentiated between control, ideation and enactment groups. Many of these reduced to non-significance in the multivariate analyses.
Stewart et al., 2019	U.S.A	C, I, & E	Case-control	• 197	STRAIN, SITBI, MINI-KID, BSSI, CTQ (short), CES-D, MASC, SHAPS, BHS	Acute interpersonal loss alone was higher in the enactment group compared to the control and ideation groups in univariate and multivariate analyses after accounting for a range of controls.

				• Clinical (adolescents)		
Perez et al., 2017	Spain	C, I, & E	Case-control	• 348 • Clinical	SRIs, SCID, BSSI, BHS, PIL-10, BSL-23, DERS.	Motivational phase variables differentiated the control and ideation groups in expected directions. Having multiple experiences of non-suicidal self-injury (>5) in the past year differentiated the ideation and enactment groups for the past year.
Stoliker et al., 2023	U.S.A	C, I, & E	Case-control	• Prison population • 548	SRIs, CAGE	Family history of suicide, drug use, prior self-harm, and social support differentiated control and ideation groups while aggression related variables and no will to live differentiated ideation and enactment groups.
Vergara et al., 2019	U.S.A	I & E	Case-control	• Clinical (adolescents) • 223	MINI-KID, SITBI, BSSI, CES-D, MASC, RPEQ	Bullying and victimisation was higher in the enactment group compared to the ideation group.
Stoliker, 2020	U.S.A	I & E	Case-control	• 18,185 (Findings from 4436 included in review) • Prison population	SRIs, CAGE	Depression, bipolar, schizophrenia/psychosis, and post-traumatic stress differentiated ideation and enactment groups. Additionally, victimisation, physical health and substance abuse also differentiated these groups in expected directions.
Nestor et al., 2022	USA	C, I, & E	Longitudinal Case-control 2 years	• General Population (National Longitudinal Study of Adolescent	PSAHD, CES-D, SRIs	Exposure to suicide, perceived support, prior ideation and depression differentiated control and ideation groups. Depression and prior suicidal ideation differentiated the ideation and enactment groups.

				to Adult Health) • 4500		
Lange et al., 2021	Belgium and Netherlands	C & I	Case-control	• 1432 • General population (sexual and gender minority)	IHI, UCL, SRIs	Victimisation and coping styles differentiated control and ideation groups in sexual and gender minority populations. In sexual minority groups, stigma consciousness and internalised homonegativity was higher in ideation groups.
Pachkowski, 2017	Canada	C, I, & E	Case control	• University students • 754	BSSI, INQ (short), YRBSS, DES-T, DERS (short), MSI-BPD, PLC-5, SITBI, SCS-3	Dissociation was higher in in ideation compared to control group for lifetime and past year ideation. Enactment group (past year only) reported higher dissociation than ideation group. Differences were significant only in European and native English speaking groups.
Porras-Segovia et al., 2023	France	I & E	Prospective Case-control 6 weeks	• Clinical • LUEUR cohort = 3785 • GENESE cohort = 2698	HADS, MADRS-SI, BHS, SRIs	Prior suicidal ideation and behaviour was associated with an increased likelihood of suicide attempts in univariate and multivariate analyses. Alcohol dependence, hopelessness and treatment related factors predicted suicide attempts in one sample only.
You et al., 2020	South Korea	C, I, & E	Experimental	• General population • 122	UPPS-NU, DERS, C-SSRS	Negative urgency differentiated enactment group from control and ideation groups. Only response inhibition to positive valence in threatening context was better in control group compared to ideation and enactment.
Sherifi, 2022	Canada	I & E	Case control	• 86 • General population (young adults)	SITBI_R, SUPPS-P, DDT, EFT, CRP, SST, CST, PROMIS, DSI-SS	Lack of premeditation and lack of perseverance was higher in the enactment group compared to the ideation group.

Harrison et al., 2018	Australia	I & E	Prospective case-control	• 128 • Clinical	d/s-IAT, SRIs, SITBI, SCB-S,	Death/suicide implicit association test scores and patient and clinician rated likelihood of suicide attempt both did not significantly predict suicide attempts cross-sectionally or prospectively.
Holler et al., 2020	Germany	C & I	Case-Control	• 1065 • Clinical	MINI-DIPS, SDES (german), SSEV-SI, DSI-SS, SITBI (german), INQ (german), SRIs.	Defeat and entrapment were significantly higher in the ideation compared to the control group in the online, outpatient and overall sample but not the inpatient sample.
Rossi, 2019	USA	C, I & E	Case control	• National Epidemiological Survey of Alcohol and Related Conditions • 36,309 • General populatioin	NESARC survey items	All psychiatric diagnoses were more likely to be reported in the ideation compared to the control group and the enactment group compared to the ideation group.
Schombs, 2020	U.K.	C, I & E	Case control	• 106 • Prison population	SRIs, DHS, ES, RSQb, SS-A, PIS, ACSS, DIS, RS-25,	Social support was higher in the ideation compared to control group. Rumination and depression were higher in the enactment group compared to the control group.
Rath et al., 2021	Germany	I & E	Longitudinal	• 297 • Clinical	d/s-IAT, SBQ-R (*german),* SITBI *(german),* INQ, RDS, BHS, GCSQ, DS, ES.	Death/suicide implicit association scores did not differentiate the ideation and enactment groups.
Richardson et al., 2023	U.K.	I & E	Case control	• Adult Psychiatric Morbidity Survey • 7546	SRIs, IMSR, SFS.	Health and mental health variables significantly differentiated ideation and enactment groups in expected directions. Additionally, childhood adversity and trauma were higher in the enactment compared to the ideation group.
Rogers et al., 2021	U.S.A	I & E	Case control	• 211 • University students	PA, CPT, SM, HM, SITBI	Only the cold pressor task differentiated suicide attempt group from only ideation group but not the NSSI group from ideation group.

Seidler et al., 2023	Australia	C & I	Case control	• 700 • General Population	SRIs, COPE, MSPSS, BRS.	Emotion focussed and avoidant coping was higher in the suicidal ideation group while resilience was lower. In the univariate analyses, social support was higher in the control group.
Xu et al., 2023	China	C & I	Case control	• 99 • School student	SIOSS, PRS, TOH.	Emotional control, family support, Interpersonal assistance, and psychological resilience were higher in the control compared to the ideation group. The control group additionally performed worse in problem solving at higher difficulty tasks.
Hsu et al., 2022	Taiwan	C & I	Case control	• 125 • Clinical population	SSS, BRCS, SRIs	Subjective social status and resilience were higher in the control group. Inferiority, loneliness, and hopelessness were higher in the ideation group.

Note. -- data unavailable.

Countries – U.K. = United Kingdom, U.S.A = United States, N.I. = Northern Ireland

IMV model phase – P = Pre-motivational, M = Motivational, V = Volitional, C - Control group, I – Ideation Group, E – Enactment group.

Study Design – C.S = Cross-sectional, C.C = Case Control, Ch = Cohort, Exp = Experimental, E.M.A = Ecological Momentary Assessment

Sample type – G.P. = General population

T1 = Time 1, T2 = Time 2, S1 = Sample 1, S2 = Sample 2, S3 = Sample 3

Measures – TIPI = Ten Item personality inventory, DASS- 21 = Depression, Anxiety and Stress Scale-21 item version, INCOM = Iowa-Netherlands Comparison Orientation Measure (11 items), DS = Defeat Scale (16 items), ES = Entrapment Scale (16 items), SRIs = Self report items, SRLE-SF = Survey of recent life experiences – short form (41 items), CTQ = Childhood Trauma Questionnaire (28 items), BIS = Barratt Impulsiveness Scale (23 items), BSSI = Beck Scale for suicidal ideation (21 items), SCSa = Social

Comparison Scale (11 items), MPS- Social = Multidimensional perfectionism Scale – Socially prescribed perfectionism subscale (15 item), BRS = Brief Resilience Scale (10 item), SPS-SI = Suicide Probability Scale – suicidal ideation subscale (8 items), CD-RISC = Connor-Davidson Resilience Scale (10 items), COPE = Brief COPE Inventory (28 items), PBI = Parental Bonding Instrument (25 item), RSQa = Relationship Scales Questionnaire (30 items), ARSQ- Rejection Sensitivity Questionnaire, Adult version (18 item), SCI = Sleep Condition Indicator (8 items), rMEQ = reduced Morningness–Eveningness Questionnaire (5 item), SIDAS = Suicidal Ideation Attributes Scale (5 items), DDNSI = Disturbing Dreams and Nightmare Severity Index (7 items), SWEMWBS = short version Warwick-Edinburgh mental well-being scale (7 items), INQ = Interpersonal Needs Questionnaire (12 item), SPS = Social Perfectionism Scale (15 items), ESSI = Enriched Social Support instrument (7 items), PSS or PSS-SF = Perceived Stress Scale (or short form)(4 or 10 items), ACSS = Acquired capability of suicide scale(5 items), RSES = Rosenberg Self-Esteem Scale (10 items), UCLA = UCLA Loneliness Scale (20 items), NAQ = Negative Act Questionnaire (14 item), WRSIS = Work-Related Suicidal Ideation Scale (9 Item), EPS = Entrapment Perception Scale (6 Item), TALE = Thinking about Life Experiences (15 items), FTT = Future thinking task, SIQ = Suicidal ideation Questionnaire (7 items), SDEs = Short defeat and entrapment scale (8 items), ECG & HPT = Electrocardiogram and Heartbeat perception task, MSPSS = Multiple Scale of Perceived Social Support (12 items), CERQ = Cognitive Emotional Regulation Questionnaire (18 items), SELSA = The Social and Emotional Loneliness Scale (15 items), PS = Psychache Scale (13 items), MSSI = Modified Scale for Suicidal ideation (18 items), RRSb = Ruminative responses scale (22 items), RAS = Resilience Appraisal Scale (12 items), DHS-S = Depression Hopelessness Scale subscales (13 items), SSEV = Suicide Ideation and Behaviour Scale (4 items); PMH = Positive Mental Health Scale (9 items), PWBS = Psychological wellbeing scales (54 items), K10 = Kessler Psychological Distress Scale (10 items), BRLI = Brief Reasons for living Inventory (12 items), MLQ = Meaning in life questionnaire (10 items), DOCS = Desirability of Control Scale (20 items), BSRI-SF = Bem Sex Role Inventory (10 items), GRC-SF = Gender Role Conflict – Short form (16 items), CFS = Coping Flexibility Scale (10 items), RSQb = Response Styles Questionnaire (5 items), AAQ-II = Acceptance and action questionnaire (7 items), PSRS = Plutchik Suicide risk scale (15 items), DSI-SS = Depressive Symptom Index – Suicidality Subscale (4 items), RSQ-Race = Rejection-Sensitivity-Race Questionnaire (12 item), SITBI

= Self-injurious thoughts and behaviours interview, HDSQ-SS = Hopelessness Depression Symptom Questionnaire-Suicidality Subscale (4 items), MEIM = Multigroup Ethnic Identity Measure (12 items), THS = Trauma History Screen (14 items), PTGI-SF = Post-traumatic Growth Inventory – Short Form (10 items), SRI-25 = Suicide resilience Inventory (25 items), GAS = Goal adjustment scale (10 items), DIS = Discomfort Intolerance Scale (5 items), HS-R2 = Revised trait hope scale (18 items), SPSI-RS = Social Problem Solving Inventory revised – short form (25 items), SCSc = Self-Compassion Scale (26 items), FFMQ-SF Five Facet Mindfulness Questionnaire (24 items), FSCRS = Forms of Criticising/Attacking & Self-Reassuring Scale (18 items), BHS = Beck Hopelessness Scale (20 items), RRSa = Rumination Response Scale (10 items), ACWRSS = Acqired Capability with Rehearsal for Suicide Scale (7 items), SITBI-R = Self-injurious thoughts and behaviours interview- Revised, SASII = Suicide Attempt Self-injury Interview, AMP = Affect misattribution procedure, HYRBSI = Hawaii Youth Risk Behaviour Survey, SOSS = Stigma of suicide scale (16 items), LEC = Life Events Checklist (20 items), WISC-III = Wechsler Intelligence Test for Children, ATEAC = The adapted test of everyday attention for children, SST = Stop signal task, AISSS = Arnett inventory of sensation seeking scale, LEQ = Life events questionnaire, BFIS = Bullying and friendship interview schedule (Modified), DAWBA = Development and Well-being Assessment, SMFQ = Short mood and feelings Questionnaire (13 items), CAPE = Community Assessment of Psychic Experience (42 items), IPIP = International personality item pool (50 items), NMRS = Generalised Expectancies for Negative Mood Regulation Scale (30 items), WEMWS = Items from the Warwick Edinburgh mental wellbeing scale (30 items), UPPS-NU = UPPS impulsive behaviour scale – Negative Urgency subscale (12 items), CEOA-SS = Comprehensive Effects of Alcohol Questionnaire- Subscales (34 items), mCAPS = Modified Child and Adolescent Perfectionism Scale subscale (7 items, LOT-R = revised Life Orientation Scale (10 items), mSCSb = modified Self-concept Scale (30 items), SBQ-R = Suicide Behaviour Questionnaire - Revised (1 Item used), AUDIT = Alcohol use disorders identification test, FAFSI = Form and Function of Self-Injury Scale (13 methods), ERS = Emotional Reactivity Scale (21 items), PDI = Pain Distress Inventory (26 items), BDI = Beck Depression Inventory (21 items), PCI = Perfectionistic Cognitions Inventory, PSPS = Perfectionistic Self-Presentation Scale (27 items), SRS = Self Rating Scale (8 items), ASIQ = Adult Suicidal Ideation Questionnaire (4 Items), SRSMU = Suicide related social media use (6 items), STRAIN = Adolescent Stress and adversity

inventory, MINI-KID = Mini International Neuropsychiatric Interview for Children and Adolescents, CES-D = Center for Epidemiological Studies Depression Scale (20 items), MASC = Multidimensional Anxiety Scale for Children (39 items), SHAPS = Snaith-Hamilton Pleasure Scale (14 items), SCID = Diagnosis Structured Clinical Interview for DSM-IVAxis I Disorders, PIL-10 = Purpose in life (10 items), BSL-23 = Borderline Symptom List-23 (23 items), DERS = Difficulties in emotional regulation scale (28 items), CAGE = The CAGE questionnaire (4 items), RPEQ = Revised peer experiences questionnaire (9-items), PSAHD = Perceived support Add Health Study (8 items), IHI = Internalised Homonegativity Inventory (9 items), UCL = Utrecht Coping List (44 items), YRBSS = Youth Risk Behavior Surveillance Survey (10 Items), DES-T = Dissociative Experiences Scale – Taxon (8 items), MSI-BPD = McLean Screening Instrument for Borderline Personality Disorder (10 items), PLC-5 = PTSD Checklist for DSM-5 (20 items), SCS-3 = Suicide Capacity Scale (6 items), HADS = Hospital Anxiety and Depression Scale, MADRS = Montgomery and Asberg Depression Rating Scale (10 items), C-SSRS = The Columbia–Suicide Severity Rating Scale (Interview), SUPPS-P = Short UPPS-P Impulsive Behaviour Scale (20 items), DDT = Delay Discounting Task (Measure impulsive decision making), EFT = Eriksen Flanker Task (inappropriate response suppression), CRP = Cued Recall Procedure (Resistance to proactive interference), SST = Stop/Signal Task (Prepotent Response Inhibition), CST = Category Switch Task (Measures Shifting), d/s-IAT = Death/suicide implicit association test, Reasons For Living Inventory, SCB-S = Survival and Coping Beliefs Subscale of the Reasons for living inventory (5 items), MINI-DIPS = Short Diagnostic Interview for Mental Disorders, IFES = The Impact of Future Events Scale (24 items), DTT = Distress Tolerance Task, PA = Pressure algometer, NESARC = Survey items from the National epidemiologic survey on alcohol and related conditions, OAS = Other as Shamer Scale (18 items), PANAS = Positive and Negative Affect Schedule (24 items), DHS = Depression, Hopelessness and Suicide Screening Form (39 items), SS-A = Social Support Appraisals Scale (23 items), PIS = Plutchik Impulsivity Scale (2 items used), RS-25 = Resilience Scale-25 (25 items), RDS = Rasch-based Depression Screening (10 items), GCSQ = German Capability for Suicide Questionnaire (11 items), IMSR = Social Support Networks (7 items), SFS = Short Form Survey (1 item used), CPT = Cold pressor task, SM = Shock machine, HM = Heat machine, SIOSS = Self-rating Idea of Suicide Scale

(26 items), PRS = Psychological Resilience Scale (27 items), TOH = Tower of Hanoi task, SSS = MacArthur Scale of Subjective Social Status, BRCS = Brief Resilience Coping Scale (4 items).

Appendix 3: PRISMA 2020 Checklist

Note: The page numbers have been updated from the supplementary materials of the systematic review to reflect the page numbers of the thesis.

Section and Topic	*Item #*	*Checklist item*	*Location where item is reported*
TITLE			
Title	*1*	*Identify the report as a systematic review.*	*Page 68*
ABSTRACT			
Abstract	*2*	*See the PRISMA 2020 for Abstracts checklist.*	*Pages 68-69*
INTRODUCTION			
Rationale	*3*	*Describe the rationale for the review in the context of existing knowledge.*	*Pages 69-73*
Objectives	*4*	*Provide an explicit statement of the objective(s) or question(s) the review addresses.*	*Page 73*
METHODS			
Eligibility criteria	*5*	*Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.*	*Pages 73-77*
Information sources	*6*	*Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.*	*Pages 73-75*
Search strategy	*7*	*Present the full search strategies for all databases, registers and websites, including any filters and limits used.*	*Pages 74-75*
Selection process	*8*	*Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.*	*Pages 75-77*
Data collection process	*9*	*Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or*	*Pages 77-78*

Section and Topic	Item #	Checklist item	Location where item is reported
		confirming data from study investigators, and if applicable, details of automation tools used in the process.	
Data items	*10a*	*List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.*	*Pages 77-78*
	10b	*List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.*	*Pages 77-78*
Study risk of bias assessment	*11*	*Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.*	*Page 78*
Effect measures	*12*	*Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.*	*n/a*
Synthesis methods	*13a*	*Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).*	*Page 77*
	13b	*Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.*	*n/a*
	13c	*Describe any methods used to tabulate or visually display results of individual studies and syntheses.*	*n/a*
	13d	*Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.*	*Page 77*
	13e	*Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).*	*n/a*
	13f	*Describe any sensitivity analyses conducted to assess robustness of the synthesized results.*	*n/a*
Reporting bias assessment	*14*	*Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).*	*n/a*
Certainty assessment	*15*	*Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.*	*n/a*

Section and Topic	*Item #*	*Checklist item*	*Location where item is reported*
RESULTS			
Study selection	*16a*	*Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.*	*Pages 73-77*
	16b	*Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.*	*Pages 73-77*
Study characteristics	*17*	*Cite each included study and present its characteristics.*	*Appendix 2*
Risk of bias in studies	*18*	*Present assessments of risk of bias for each included study.*	*Appendix 10 & 12*
Results of individual studies	*19*	*For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.*	*n/a*
Results of syntheses	*20a*	*For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.*	*Pages 105-106*
	20b	*Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.*	*n/a*
	20c	*Present results of all investigations of possible causes of heterogeneity among study results.*	*n/a*
	20d	*Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.*	*n/a*
Reporting biases	*21*	*Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.*	*n/a*
Certainty of evidence	*22*	*Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.*	*n/a*
DISCUSSION			
Discussion	*23a*	*Provide a general interpretation of the results in the context of other evidence.*	*Pages 106-109*
	23b	*Discuss any limitations of the evidence included in the review.*	*Pages 112-113*

Section and Topic	*Item #*	*Checklist item*	*Location where item is reported*
	23c	*Discuss any limitations of the review processes used.*	*Pages 112-113*
	23d	*Discuss implications of the results for practice, policy, and future research.*	*Page 111*
OTHER INFORMATION			
Registration and protocol	*24a*	*Provide registration information for the review, including register name and registration number, or state that the review was not registered.*	*n/a*
	24b	*Indicate where the review protocol can be accessed, or state that a protocol was not prepared.*	*n/a*
	24c	*Describe and explain any amendments to information provided at registration or in the protocol.*	*n/a*
Support	*25*	*Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.*	*n/a*
Competing interests	*26*	*Declare any competing interests of review authors.*	*n/a*
Availability of data, code and other materials	*27*	*Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.*	*n/a*

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

For more information, visit: http://www.prisma-statement.org/

Appendix 4: PRISMA 2020 Checklist for abstracts

Section and Topic	Item #	Checklist item	Reported (Yes/No)
TITLE			
Title	1	Identify the report as a systematic review.	Yes
BACKGROUND			
Objectives	2	Provide an explicit statement of the main objective(s) or question(s) the review addresses.	Yes
METHODS			
Eligibility criteria	3	Specify the inclusion and exclusion criteria for the review.	Yes
Information sources	4	Specify the information sources (e.g. databases, registers) used to identify studies and the date when each was last searched.	Yes
Risk of bias	5	Specify the methods used to assess risk of bias in the included studies.	Yes
Synthesis of results	6	Specify the methods used to present and synthesise results.	Yes
RESULTS			
Included studies	7	Give the total number of included studies and participants and summarise relevant characteristics of studies.	Yes
Synthesis of results	8	Present results for main outcomes, preferably indicating the number of included studies and participants for each. If meta-analysis was done, report the summary estimate and confidence/credible interval. If comparing groups, indicate the direction of the effect (i.e. which group is favoured).	Yes
DISCUSSION			
Limitations of evidence	9	Provide a brief summary of the limitations of the evidence included in the review (e.g. study risk of bias, inconsistency and imprecision).	Yes
Interpretation	10	Provide a general interpretation of the results and important implications.	Yes
OTHER			
Funding	11	Specify the primary source of funding for the review.	Yes
Registration	12	Provide the register name and registration number.	Yes

Appendix 5: Pathways of the IMV model investigated

Predictor	Mediator (s)	Outcome	Number of studies	Authors
Pre-motivational phase variables[a]	--	Defeat	9	Rasmussen et al., 2021; Russel, 2020a; Macrynikola, 2022; Zortea et al., 2020; Wetherall et al., 2018a; Moscardini et al., 2022; Russel, 2020c; Cleare, 2019; Rosario-Hernandez et al., 2018;
Pre-motivational phase variables[a]	--	Defeat/ Entrapment	1	Lekkas et al., 2023
Pre-motivational phase variables[a]	Defeat	Overall Entrapment	2	Zortea et al., 2020; Wetherall et al., 2018a;
Pre-motivational phase variables[a]	Defeat	Internal/External Entrapment	1	Moscardini et al., 2022
Defeat	--	Total Entrapment	12	Stenzel et al., 2020; Li et al., 2020; Cleare, 2019; McClelland et al., 2021; Saint-Cyr et al., 2021, Bannister, 2018; Ordóñez-Carrasco et al., 2021a; Ordóñez-Carrasco et al., 2021b; Yasdiman et al., 2022; Nukala et al., 2021; van Ballegooijen et al., 2022; McClelland et al., 2023
Defeat	--	Internal Entrapment	5	Nukala et al., 2021; Scowcroft et al., 2019; Miller, 2015; Holler et al., 2021; de beurs et al., 2019;
Defeat	--	External Entrapment	4	Nukala et al., 2021; Scowcroft et al., 2019; Holler et al., 2021; de beurs et al., 2019;
Defeat/ Entrapment	--	Suicidal ideation	4	Hollingsworth & Polanco-Roman, 2022; Pollak et al., 2021; Lekkas et al., 2023; Chelmardi et al., 2021;
Overall Entrapment	--	Suicidal ideation	26	Branley-Bell et al., 2019; Brown, 2019; Dhingra et al., 2016a; Forkmann & Teismann, 2017; Li et al., 2020; Lucht et al., 2020; McClelland et al., 2021; Nukala et al., 2021; Ordóñez-Carrasco et al., 2020a; Ordóñez-Carrasco et al., 2020b; Ordóñez-Carrasco et al., 2021b; Parra et al., 2021; Ren et al., 2019; Saint-Cyr et al., 2021; Cleare, 2019; Yasdiman et al., 2022; Shelef et al., 2016; Littlewood et al., 2018; Holler & Forkmann, 2022; van Ballegooijen et al., 2022; McClelland et

				al., 2023; Xu et al., 2022; Wang et al., 2023; Rosario-Hernandez et al., 2018; Tiesmann & Forkman, 2017; Ng et al., 2016;
Internal Entrapment	--	Suicidal Ideation	12	Moscardini et al., 2021; Scowcroft et al., 2019; Holler et al., 2021; Nukala, 2021; Wetherall et al., 2021; Lucht et al., 2020; Oakey-frost et al., 2021; Miller, 2015; Russel, 2020a; Holler et al., 2022; Russell et al., 2020c; de Beurs et al., 2019
External Entrapment	--	Suicidal Ideation	11	Moscardini et al., 2021; Scowcroft et al., 2019; Holler et al., 2021; Nukala, 2021; Wetherall et al., 2021; Lucht et al., 2020; Oakey-frost et al., 2021; Russel, 2020a; Holler et al., 2022; Russell et al., 2020c; de Beurs et al., 2019
Pre-motivational phase variables[a]	Defeat, Total Entrapment	Suicidal ideation	3	Hong & Shin, 2021; Bradford et al., 2021; Russell et al., 2018;
Pre-motivational phase variables[a]	Defeat, Internal/ External Entrapment	Suicidal ideation	2	Russell et al., 2020c; Russell et al., 2020b
Defeat	Total Entrapment	Suicidal Ideation	10	Wetherall et al., 2018a; Zortea et al., 2020; Clement et al., 2023; Lucht et al., 2020; Branley-bell et al., 2019; Owen et al., 2017; Tucker et al., 2016; Hollingsworth, 2012; Sardarzehi et al., 2023; Ng et al., 2016;
Defeat	Internal/ External Entrapment	Suicidal Ideation	3	Wetherall et al., 2021 (internal); Lucht et al., 2020; Owen et al., 2017;
Suicidal Ideation	--	Suicidal Behaviour	13	Li et al., 2020; Scowcroft et al., 2019; Jiang et al., 2020; Chelmardi et al., 2021; Ribeiro et al., 2021; de Beurs et al., 2017; Muehlenkamp et al., 2022; Linthicum & Ribeiro, 2022; Lekkas et al., 2023; Roland et al., 2021; O'Connor et al., 2012a; O'Connor et al., 2013; Okado et al., 2021;
Defeat	Total Entrapment,	Suicidal Behaviour	2	Dhingra et al., 2016b; Li et al., 2020

	Suicidal Ideation			
Defeat	Internal or External Entrapment, Suicidal Ideation	Suicidal Behaviour	1	Scowcroft et al., 2019;

Appendix 6: Outcomes of studies investigating the Defeat-Entrapment association

Authors & year	Predictor (s)	Outcome variable	Direction of effect	Statistical analyses and additional Variables	Control Variables
Cross-sectional Analyses					
Stenzel et al., 2020	Defeat	Total entrapment	Positive	**Multilevel Models** Autocorrelative Effects	--
Li et al., 2020	Defeat	Total entrapment	Positive	**Hierarchical Regression Analysis** Rumination	Gender Age Depression
McClelland et al., 2021	Defeat	Total entrapment	Positive	**Moderation Analysis** Loneliness	--
Saint-Cyr et al., 2021	Defeat	Total entrapment	Positive	**Linear Regression** Desire for control – Leadership Desire for control – Decision Avoidance Desire for control – Destiny control	Depression Anxiety
Bannister, 2018	Defeat	Total entrapment	Positive	**General Linear Models** Rumination Coping Androgyny Gender Role conflict	--
Ordóñez-Carrasco et al., 2021a	Defeat	Total entrapment	Positive	**Multiple Regression Analysis** Experiential Avoidance	

Yasdiman et al., 2022	Defeat	Total entrapment	Positive	**Moderated regression Analysis** Post traumatic growth	Depression Anxiety
McClelland et al., 2023	Defeat	Total entrapment	Positive	**Moderation Analysis** Loneliness	Gender Age Depression
Ordóñez-Carrasco et al., 2021b	Defeat	Total entrapment	Positive	**Network Analysis** Psychache Hopelessness Perceived Burdensomeness Thwarted belongingness Suicidal desire	--
Nukala et al., 2021	Defeat	Total/Internal/External Entrapment	Positive	**--**	--
Scowcroft et al., 2019	Defeat	Internal/External entrapment	Positive	**Simple Linear Regression** **--** **Moderation Analysis (internal entrapment only)** Rumination	Hopelessness
Holler et al., 2021	Defeat	Internal/External Entrapment	Positive	**Multilevel Models** **--**	--
Miller, 2015	Defeat	Internal Entrapment	Positive	**Moderation and Mediation Analyses** Brooding Reflective Pondering Problem Solving	--

		External Entrapment	No Effect	**Moderation Analyses** Brooding Reflective Pondering Problem Solving	--
Prospective Analyses					
Stenzel et al., 2020	Defeat	Total entrapment	No Effect (7 day EMA)	**Multilevel Models** --	--
Cleare, 2019	Defeat	Total entrapment	Positive (2.5 months)	Self-compassion Self-Judgement Isolation Depressive symptoms	--
van Ballegooijen et al., 2022	Defeat	Total entrapment	Positive (3 hours only)	**Multilevel vector** Autocorrelative effects	--
Holler et al., 2021	Defeat	Internal/External Entrapment	No Effect (1 year)	**Multilevel Models** **--**	--

Appendix 7: Outcomes of studies investigating the Entrapment-Suicidal ideation association

Authors & year	Predictor (s)	Outcome variable	Direction of effect	Statistical analyses and additional Variables	Control Variables
Cross-sectional Analyses					
Branley-Bell et al., 2019	Total Entrapment	Suicidal Ideation	Positive	**Hierarchial Linear Regression** Defeat	Previous Ideation Age Gender Employment
Dhingra et al., 2016a	Total Entrapment	Suicidal Ideation	Positive (Females only)	**Multiple Regressions** Defeat Brooding rumination Goal disengagement Goal reengagement Suicide resilience 1: Internal Protective Suicide resilience 2: Emotional Stability Suicide resilience 3: External Protective Burdensomeness Belongingness Hopelessness 1: Feelings about the Future Hopelessness 2: Loss of Motivation Hopelessness 3: Future Expectation Anxiety Depression	Age Relationship Sexual orientation

Forkmann & Teismann, 2017	Total Entrapment	Suicidal Ideation	Positive	**Stepwise linear regression analysis** Perceived burdensomeness Thwarted belongingness	
Li et al., 2020	Total Entrapment	Suicidal Ideation	Positive	**Hierarchical Regression Analysis** Suicide Resilience: Internal protection Suicide Resilience: Emotional stability Suicide Resilience: External protection Perceived burdensomeness Thwarted Belongingness	Gender Age Depression
Ordóñez-Carrasco et al., 2020a	Total Entrapment	Suicidal Ideation	Positive	**Multiple Regression Analysis** Thwarted Belongingness Perceived Burdensomeness Thwarted Belongingness x Perceived Burdensomeness	
Ordóñez-Carrasco et al., 2020b	Total Entrapment	Suicidal Ideation	Positive	**Multiple Regression Analysis** Psychological pain	
Parra et al., 2021	Total Entrapment	Suicidal Ideation	Positive	**Moderated Mediation Analysis** Homophobic Violence Social belongingness (subscales)	Sexual Attraction Outness Psychological Distress Age Gender Education
Ren et al., 2019	Total	Suicidal	Positive	**Moderated mediation model**	Depression

	Entrapment	Ideation		Low Self-Esteem Reasons for Living	Gender Age
Yasdiman et al., 2022	Total Entrapment	Suicidal Ideation	Positive	**Moderated regression Analysis** Post traumatic growth	Depression Anxiety
Shelef et al., 2016	Total Entrapment	Suicidal Ideation	Positive	**Hierarchical Regression Analysis** Army Stress Subjective Stress Problem Solving Social Support Entrapment	Age Gender Military Tenure
Xu et al., 2022	Total Entrapment	Suicidal Ideation	Positive	**Multivariate Logistic Regression** Age Group Sexual Orientation disclosure High Risk sexual behaviour Defeat Interpersonal Needs	
Holler & Forkmann, 2022	Total Entrapment	Suicidal Ideation	No Effect	**Multiple Linear Regression** Burnout Assessment – Core & Secondary Hopelessness Depression Anxiety Stress Thwarted Belongingness Perceived Burdensomeness Agitation Defeat Lifetime attempt Working hours	

				Contact to people with Covid-19	
Saint-Cyr et al., 2021	Total Entrapment	Suicidal Ideation	No Effect	**Linear Regression** Desire for control – Leadership Desire for control – Decision Avoidance Desire for control – Destiny Control	Depression Anxiety
McClelland et al., 2021	Total Entrapment	Suicidal Ideation	No Effect	**Moderation Analysis** Loneliness	
Ordóñez-Carrasco et al., 2021b	Total Entrapment	Suicidal Ideation	Not directly linked (Network analysis)	**Network Analysis** Psychache Hopelessness Perceived Burdensomeness Thwarted belongingness Defeat	
Brown, 2019	Total Entrapment	Suicidal Ideation	Positive	**Cross-Lagged Analyses** --	
		Suicidal Intent	Positive	**Cross-Lagged Analyses** --	
Cleare, 2019	Total Entrapment	Suicidal Ideation	Positive	**Mediation analyses** Self-compassion Self—kindness Self-judgement Isolation	
Rozario-Hernandez et al., 2018	Total entrapment	Suicidal Ideation	Positive	**Structural equation model** Defeat	

				Rumination Workplace bullying	
Teismann & Forkman, 2017	Total entrapment	Suicidal Ideation	Positive	**Mediation Model** Rumination	Depression Anxiety Stress
Ng et al., 2016	Total entrapment	Suicidal Ideation	Positive	**Moderation Analyses** Suicidal flash forwards	Gender, Age, Marital status, Suicide-related outcome group, History of psychiatric illness.
Lucht et al., 2020	Total/Internal/ External Entrapment	Suicidal Ideation	Positive	**Moderation Analyses** Thwarted Belongingness x Perceived Burdensomeness	
Nukala et al., 2021	Total/Internal/ External Entrapment	Suicidal Ideation	Positive	**Correlational Analysis** --	
Moscardini et al., 2021	Internal/External Entrapment	Suicidal Ideation	Positive	**Moderation Analyses** Reasons for Living Presence of life meaning Search for life Meaning	
Scowcroft et al., 2019	Internal/External Entrapment	Suicidal Ideation	Positive	**Simple Linear Regression** -- **Moderation Analyses (internal entrapment only)** Perceived burdensomeness Resilience and Coping appraisals	Hopelessness

				Attitude to suicide	
Oakey-frost et al., 2021	Internal Entrapment	Suicidal Ideation	Positive	**Moderated Mediation Model** Post Traumatic Disorder Symptoms Fearlessness about death	Military Status
	External Entrapment		No Effect	**Moderated Mediation Model** Post Traumatic Disorder Symptoms Fearlessness about death	Military Status
Miller, 2015	Internal Entrapment	Suicidal Ideation	Positive	**Moderation Analyses** Goal Re-engagement	
	External Entrapment		No Effect	**Moderation Analyses** Goal Re-engagement	
Holler et al., 2021	Internal Entrapment	Suicidal Ideation	Positive	**Multilevel Models** Defeat	
	External Entrapment		No Effect	**Multilevel Models** Defeat	
Holler et al., 2022	Internal Entrapment	Suicidal Ideation	Positive	**Mediation Analyses** Hopelessness	
	External Entrapment		Positive	**Mediation Analyses** Hopelessness	

de Beurs et al., 2019	Internal Entrapment	Suicidal Ideation	Positive	**Network Analyses** Mental Wellbeing Stress Depressive symptoms Defeat Social Support Perceived Burdensomeness Thwarted belongingness Perfectionism Goal disengagement Goal Reengagement Impulsivity Optimism Resilience Acquired Capability Mental Imagery Exposure to suicide History of suicide attempt History of suicidal ideation Current suicidal ideation	
	External Entrapment		Not directly linked (network analysis)		
Prospective Analyses					
Branley-Bell et al., 2019	Total Entrapment	Suicidal Ideation	Positive (3 & 6 Months)	Defeat	Age Gender Previous Ideation
Brown, 2019	Total Entrapment	Suicidal Ideation	No Effect (2 Months)	**Prospective Cross-Lagged Analyses** --	
	Total Entrapment	Suicidal Intent	Positive (2 Months)	**Prospective Cross-Lagged Analyses** --	
Wang et al., 2023	Total Entrapment	Suicidal Ideation	Positive (1 year)	**Logistic Regression** --	Sex Age Parents' income

					Academic performance Defeat Loneliness Depression Interpersonal needs Social support
van Ballegooijen et al., 2022	Total Entrapment	Suicidal Ideation	Positive (3, 6, 9 & 12 hours)	**Multilevel vector autoregression** Defeat	
Cleare, 2019	Total Entrapment	Suicidal Ideation	No effect (2.5 months)	**Multivariate Regression Analyses** Depressive symptoms Defeat Self-compassion Stress Self-criticism Social comparison Mindfulness Resilience	
Holler et al., 2021	Internal Entrapment	Suicidal Ideation	Positive (1 year)	**Multilevel Models** Defeat	
	External Entrapment		No Effect (1year)	**Multilevel Models** Defeat	
Wetherall et al., 2021	Internal Entrapment	Suicidal Ideation	Positive (1 year)	**Multiple Linear Regression** Thwarted Belongingness Perceived burdensomeness Defeat External Entrapment	Depressive symptoms
	External		No Effect	**Multiple Linear Regression**	Depressive

	Entrapment		(1 year)	Thwarted Belongingness Perceived burdensomeness Defeat Internal Entrapment	symptoms
Russell, 2020b	Internal Entrapment	Suicida Ideation	Positive (same day, no effect next day)	Defeat	External Entrapment
	External Entrapment		No Effect	Defeat	Internal Entrapment

Appendix 8: Outcomes of studies investigating the Defeat-Entrapment-Suicidal ideation association

Authors & year	Predictor (s)	Mediator (s)	Outcome variable	Indirect effect	Statistical analyses and additional Variables	Control Variables
Cross-sectional Analyses						
Wetherall et al., 2018a	Defeat	Total Entrapment	Suicidal ideation	Positive	**Moderated mediation analyses** Resilience	Depressive symptoms
Zortea et al., 2020	Defeat	Total Entrapment	Suicidal ideation	Positive	**Moderated mediation analyses** Resilience Coping	Depressive symptoms
Clement et al., 2023	Defeat	Total Entrapment	Suicidal ideation	Positive	**Simple Mediation and Moderated mediation analyses** Racial Rejection Sensitivity	--
Branley-bell et al., 2019	Defeat	Total Entrapment	Suicidal ideation	Positive	--	Age Gender Previous Ideation
Tucker et al., 2016	Defeat	Total Entrapment	Suicidal ideation	No Indirect effect	**Moderated mediation analyses** Brooding Reflection Hope	
Hollingsworth, 2012	Defeat	Total Entrapment	Suicidal ideation	No Indirect effect	**Moderated mediation analyses** Brooding	Depressive symptoms

					Perceived burdensomeness	
Sardarzehi et al., 2023	Defeat	Total Entrapment	Suicidal ideation	No Indirect effect	**Structural Equation Model** Threat-to-self moderators (Selected Items from self-blame, other blame, rumination, and catastrophising scale) Motivational moderators (Thwarted belongingness and perceived burdensomeness)	
Ng et al., 2016	Defeat	Total Entrapment	Suicidal ideation	No Indirect effect	**Structural Equation Model** --	Age, Gender, Marital status, History of psychiatric illness, Suicidal group status.
Lucht et al., 2020	Defeat	Total/Internal/External Entrapment	Suicidal ideation	Positive	**Mediation Analysis** --	
Prospective Analyses						
Branley-bell et al., 2019	Defeat	Total Entrapment	Suicidal ideation	Positive (1 & 4 months) No Indirect Effect (6 months)	**Mediation Analysis**	Age Gender Previous Ideation
Ng et al., 2016	Defeat	Total Entrapment	Suicidal ideation	No Indirect effect	**Structural Equation Model** --	Age, Gender, Marital status, History of psychiatric illness, Suicidal group status.

Owen et al., 2017	Defeat	Total/Internal Entrapment	Suicidal ideation	Positive (4 months)	**Hierarchical Regression Analysis**	Hopelessness Depression
	Defeat	External Entrapment		No Indirect Effect (4 months)	**Hierarchical Regression Analysis**	Hopelessness Depression
Wetherall et al., 2021	Defeat	Internal Entrapment	Suicidal ideation	Positive (12 months)	**Moderated Mediation model** Thwarted belongingness Perceived burdensomeness	Depressive symptoms Suicidal ideation

Appendix 9: Outcomes of studies investigating the Suicidal ideation-Suicidal behaviour association

Authors & year	Predictor (s)	Outcome variable	Direction of effect	Additional Variables included in analyses	Control variables
Cross-sectional Analyses					
Li et al., 2020	Suicidal ideation	Suicidal behaviour	Positive	**Hierarchical Regression Analysis** Fearlessness about death Pain tolerance	Gender Age Depression
Scowcroft et al., 2019	Suicidal ideation	Suicidal behaviour	Positive	**Simple Linear Regressions** --	Hopelessness
Jiang et al., 2020	Suicidal ideation	Suicidal behaviour	Positive	**Path Models** Depression Childhood trauma Overgeneral memory	--
Chelmardi et al., 2021	Suicidal ideation	Suicidal behaviour	Positive	**Structural equation modelling** Non-Suicidal Self Injury Perceived capacity Intention of death Implementation Sexual abuse Exposure to Family suicide Psychache Hopelessness	--

				Interpersonal needs Depression
Lekkas et al., 2021	Suicidal ideation	Suicidal behaviour	No Effect	**Network Analyses** Defeat and Entrapment Coping strain Thwarted belongingness Physical or Emotional Trauma Planning and Preparation Information sharing Pro-choice suicide attitude Perceived burdensomeness Previous Suicide attempt Value Strain Self-harm
Okado et al., 2021	Suicidal Ideation	Suicidal behaviour	Positive	**Structural equation modelling** -- Victimisation Disinhibition Academic grades Depression
Prospective Analyses				
Ribeiro et al., 2021	Suicidal Ideation	Suicidal behaviour	Positive (28 days)	**Logistic Regression** Imagery Affect misattribution

				Fearlessness about death
Muehlenkamp et al., 2022	Suicidal Ideation	Suicidal behaviour	Positive (6 and 12 months)	**Latent Growth analyses** --
de Beurs et al., 2017	Suicidal ideation duration	Suicidal behaviour	Not directly linked (15 month network analysis)	**Network Analyses** Arrangements after death Attitude towards suicidal behaviour Concealment about ideation Control over action Courage for actual behaviour Cry for help versus Cry for pain Desire for active attempt Deterrents of attempt Wish to die
	Suicidal ideation frequency		Not directly linked (15 months network analysis)	Duration of suicide ideation Expectancy of actual attempt frequency of suicide ideation Wish to live Availability of methods Suicide note

				Passive desire Actual planning Actual preparation Reasons for living Repeat suicidal attempt	
Linthicum & Ribeiro, 2022	Detailed suicide plan Past week plan Plan involving methods Lifetime plans	Suicidal behaviour	Positive (28 days) Positive (28 days) No Effect (28 days) No Effect (28 days)	**Univariate Logistic Regression** --	
O'Connor et al., 2012a	Suicidal Ideation	Suicidal behaviour	Positive	**Univariate/ Multivariate Logistic Regression** Age Goal reengagement / disengagement	Past 10 year self-harm hospitalisation
O'Connor et al., 2013	Suicidal Ideation	Suicidal behaviour	Positive in Univariate analyses No Effect in Multivariate analyses	**Univariate/ Multivariate Logistic Regression** Previous attempt Defeat Entrapment Suicidal Ideation Hopelessness	

Appendix 10: NIH Quality Assessment results for Observational Cohort and Cross-sectional studies

Authors	Year	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14
Rasmussen et al.,	2021	Yes	No	CD	NR	Yes	No	No	Yes	Yes	No	No	No	NA	No
Macrynikola,	2022	Yes	No	CD	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes
Hong & Shin,	2021	Yes	Yes	NR	Yes	Yes	No	No	Yes	Yes	No	Yes	No	NA	No
Wetherall et al.,	2018a	Yes	Yes	NR	Yes	No	No	No	Yes	Yes	No	Yes	No	NA	Yes
Zortea et al.,	2020	Yes	No	CD	Yes	Yes	No	No	Yes	Yes	No	Yes	No	NA	No
Moscardini et al.,	2022	Yes	No	CD	NR	No	No	No	Yes	Yes	No	Yes	No	NA	Yes
Bradford et al.,	2021	Yes	Yes	CD	Yes	Yes	No	No	Yes	Yes	No	Yes	No	NA	Yes
Russell et al.,	2018	Yes	No	NR	NR	No	No	No	Yes	Yes	No	No	No	NA	No
Russell,	2020a	Yes	No	NR	No	Yes	Yes	Yes	Yes	No	Yes	No	NA	No	Yes
Russell,	2020b	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No	Yes
Russell et al.,	2020c	Yes	Yes	NR	Yes	No	Yes	Yes	NR	NR	Yes	No	No	Yes	No
Rosario-Hernandez et al.,	2018	Yes	No	NR	NR	Yes	No	No	Yes	Yes	No	Yes	No	NA	No
Lekkas et al.,	2023	Yes	CD	NA	No	No	No	No	No	No	No	No	No	NA	No
Branley-bell et al.,	2019	Yes	No	CD	NR	Yes	Yes	Yes	Yes	Yes	No	Yes	No	NR	Yes
McClelland et al.,	2021	Yes	Yes	CD	Yes	Yes	No	No	Yes	Yes	No	Yes	No	NA	No
Pollak et al.,	2021	Yes	No	CD	NR	Yes	Yes	Yes	Yes	Yes	No	Yes	No	NR	No
Holler et al.,	2021	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NR	Yes	No	NR	No
Miller,	2015a	Yes	No	CD	NR	Yes	Yes	Yes	Yes	Yes	No	No	No	NR	Yes
Ren et al.,	2019	Yes	No	Yes	NR	Yes	No	No	Yes	Yes	No	No	No	NA	Yes
Tiesmann & Forkman,	2017	Yes	Yes	NR	No	Yes	No	No	Yes	Yes	No	Yes	No	NA	No
Dhingra et al.,	2016a	Yes	Yes	CD	Yes	Yes	No	No	Yes	Yes	No	Yes	No	NA	No
Stenzel et al.,	2020	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	NA	Yes
Ordóñez-Carrasco et al.,	2020a	Yes	No	NR	No	Yes	No	No	Yes	Yes	No	Yes	No	NA	No
Ordóñez-Carrasco et al.,	2020b	Yes	No	NR	No	Yes	No	No	Yes	Yes	No	Yes	No	NA	No
Xu et al.,	2022	Yes	No	NR	No	Yes	No	No	Yes	Yes	No	No	No	NA	No
Holler et al.,	2022	Yes	Yes	CD	Yes	Yes	No	No	Yes	Yes	No	Yes	No	NA	No

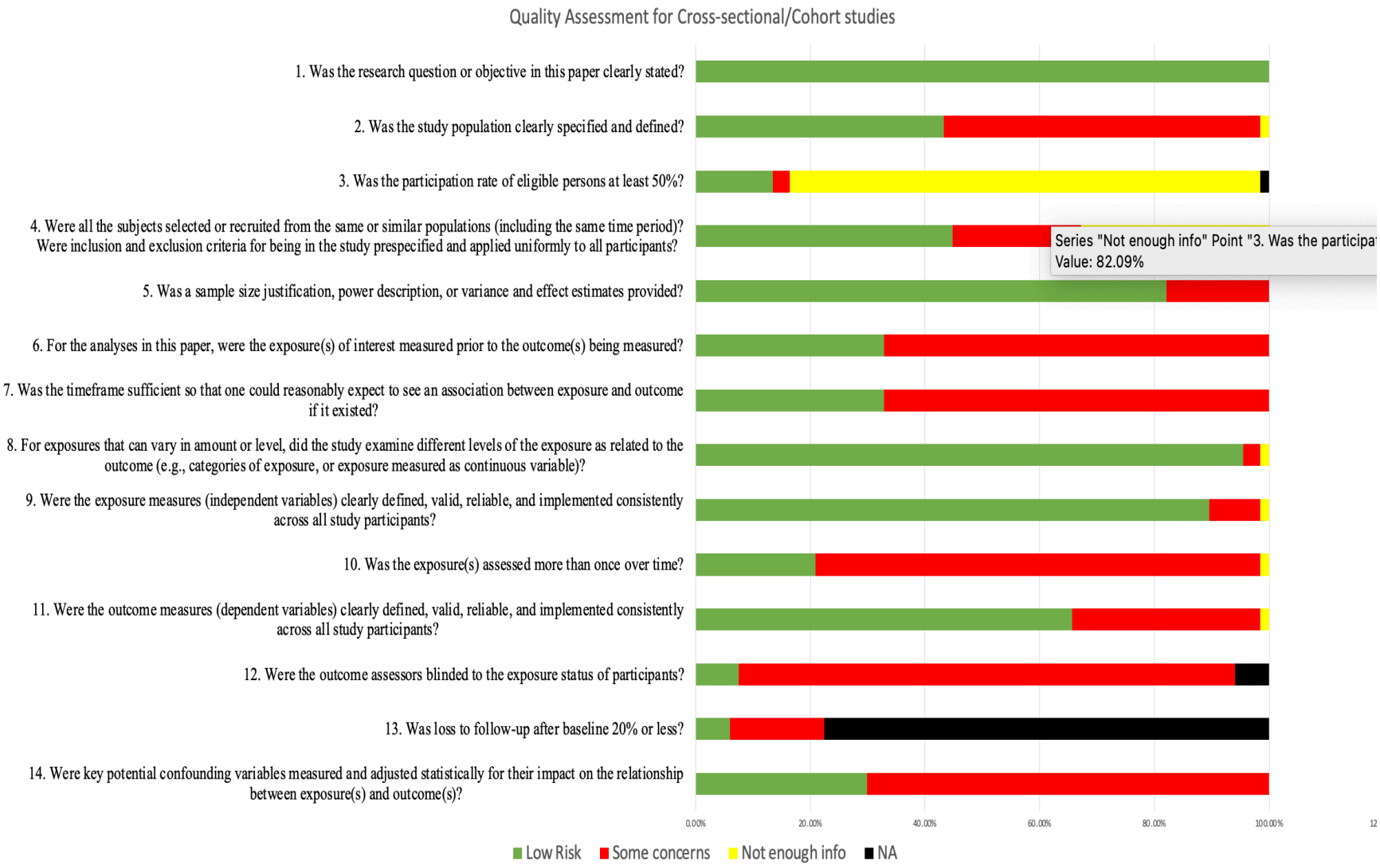
Wang et al.,	2023	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	NA	No	Yes
Sardarzehi et al.,	2023	Yes	No	CD	NR	Yes	No	No	No	No	No	Yes	No	NA	No
van Ballegooijen et al.,	2022	Yes	Yes	CD	Yes	No	Yes	Yes	Yes	No	Yes	No	NA	No	No
McClelland et al.,	2023	Yes	Yes	CD	Yes	Yes	No	No	Yes	Yes	No	Yes	No	NA	No
Nukala et al.,	2021	Yes	Yes	NR	Yes	No	No	No	Yes	Yes	No	Yes	Yes	NA	No
Wetherall et al.,	2021	Yes	Yes	NR	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No
Scowcroft et al.,	2019	Yes	Yes	NR	Yes	Yes	No	No	Yes	Yes	No	Yes	No	NA	Yes
Lucht et al.,	2020	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	No	NA	Yes
Teismann & Brailovskaia,	2020	Yes	Yes	CD	Yes	Yes	No	No	Yes	Yes	No	Yes	No	N.A	No
Brown,	2019a	Yes	No	NR	NR	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No
Moscardini et al.,	2021	Yes	No	NR	No	Yes	No	No	Yes	Yes	No	Yes	No	NA	No
Parra et al.,	2021	Yes	Yes	CD	Yes	No	No	No	Yes	No	No	No	No	NA	Yes
Saint-Cyr et al.,	2021	Yes	No	CD	Yes	Yes	No	No	Yes	Yes	No	Yes	No	NA	Yes
Bannister,	2018	Yes	No	CD	NR	Yes	No	No	Yes	Yes	No	Yes	No	NA	No
Ordóñez-Carrasco et al.,	2021a	Yes	No	NR	No	Yes	No	No	Yes	Yes	No	Yes	No	NA	No
Clement et al.,	2020	Yes	No	CD	NR	No	No	No	Yes	Yes	No	Yes	No	NA	No
Hollingsworth & Polanco-Roman,	2022	Yes	No	NR	NR	Yes	No	No	Yes	Yes	No	Yes	No	NA	No
Yasdiman et al.,	2022	Yes	No	CD	NR	Yes	No	No	Yes	Yes	No	Yes	No	No	No
Dhingra et al.,	2016b	Yes	No	CD	NR	Yes	No	No	Yes	Yes	No	No	No	NA	No
Forkmann & Tiesmann,	2017	Yes	Yes	CD	Yes	Yes	No	No	Yes	Yes	No	Yes	No	NA	No
Tucker et al.,	2016	Yes	No	NR	No	Yes	No	No	Yes	Yes	No	Yes	No	NA	No
Hollingsworth,	2012	Yes	No	CD	No	Yes	No	No	Yes	Yes	No	Yes	No	NA	Yes
Owen et al.,	2017	Yes	No	CD	NR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes
Oakey-Frost et al.,	2021	Yes	Yes	NR	Yes	Yes	No	No	Yes	Yes	No	Yes	No	NA	No
Shelef et al.,	2016	Yes	Yes	NR	Yes	Yes	No	No	Yes	Yes	No	Yes	No	NA	No
Littlewood et al.,	2018	Yes	Yes	NR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Holler & Forkmann.,	2022	Yes	Yes	CD	Yes	Yes	No	No	Yes	Yes	No	Yes	No	NA	No
Ordóñez-Carrasco et al.,	2021b	Yes	No	NR	No	Yes	No	No	Yes	Yes	No	No	No	NA	No

Cleare,	2019	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	NA	No
Li et al.,	2020	Yes	No	NR	NR	No	No	No	Yes	Yes	No	No	No	NA	No
De Beurs et al.,	2019	Yes	Yes	NR	No	Yes	No	No	Yes	Yes	No	Yes	No	NA	No
De Beurs et al.,	2017	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	NA	No
Roland et al.,	2022	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	No	NR	No	NA	No
Jiang et al.,	2020	Yes	No	CD	No	Yes	No	No	Yes	Yes	No	No	No	NA	No
Chelmardi et al.,	2021	Yes	No	NR	NR	No	No	No	Yes	Yes	No	No	No	NA	No
Ribeiro et al.,	2021	Yes	No	CD	NR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Linthicum & Ribeiro,	2022	Yes	No	CD	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Muehlenkamp et al.,	2022	Yes	No	NR	NR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
O'Connor et al.,	2012a	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	NA	Yes
O'Connor et al.,	2013	Yes	No	Yes	NR	Yes	Yes	Yes	Yes	Yes	No	No	Yes	NA	Yes
Okado et al.,	2021	Yes	Yes	NR	Yes	No	No	No	Yes	Yes	No	No	No	NA	No

Note. CD – Can't determine, NR – Not reported, NA – Not applicable.

Q1 - Stated the research question/objective, Q2 – Defined the study population, Q3 – Participant rate above 50%, Q4 – Selected subjects from similar study populations/applied eligibility criteria uniformly, Q5 - Justified sample size or provided power, variance/effect estimate, Q6 - Measured exposure (s) before outcome, Q7 - Sufficient timeframe between measuring exposure and outcome, Q8 - Measured different levels of exposure, Q9 - Used defined, reliable and valid measures consistently for exposure, Q10- Assessed exposure more than once, Q11 - Used defined, reliable and valid measures consistently for outcome, Q12 - Blinded outcome assessors, Q13 - Attrition lower than 20%, Q14 - Accounted for and justified confounders

Appendix 11: Quality assessment for Cross-sectional/Cohort studies



Appendix 12: NIH Quality Assessment results for Case-control studies

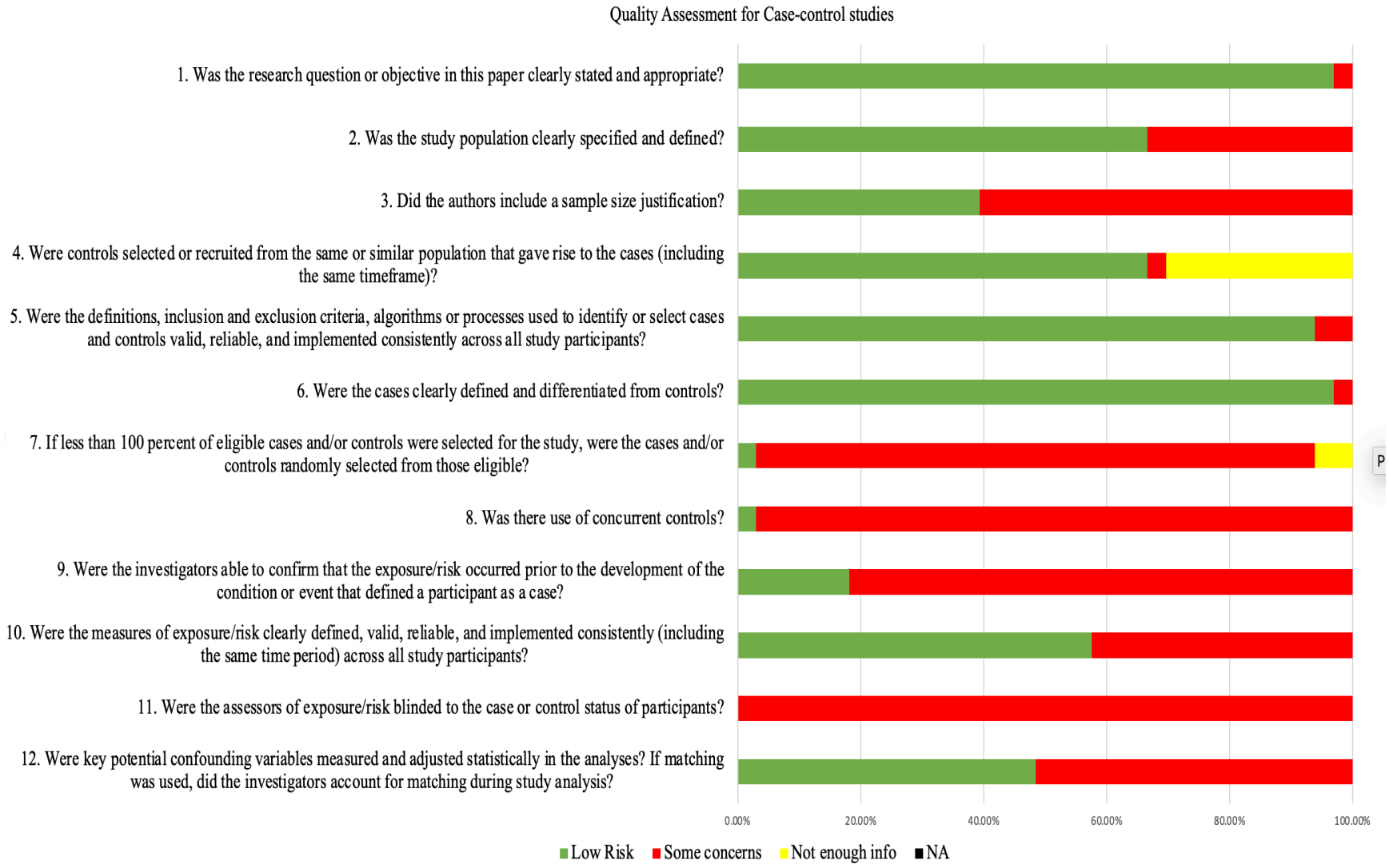
Authors	Year	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Del Carpio et al.,	2020	Yes	No	No	No	Yes	Yes	No	No	Yes	No	No	Yes
Dhingra et al.,	2015	Yes	No	No	NR	Yes	Yes	No	No	No	No	No	Yes
Mars et al.,	2019a	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	No	Yes
Mars et al.,	2019b	Yes	Yes	No	Yes	Yes	Yes	No	No	Yes	No	No	Yes
Melson & O'Connor.,	2019	Yes	Yes	No	Yes	Yes	Yes	No	No	No	Yes	No	No
O'Connor et al.,	2012b	Yes	Yes	No	Yes	Yes	Yes	No	No	No	No	No	Yes
Kirtley,	2015b	Yes	No	No	NR	Yes	Yes	NR	No	No	Yes	No	No
Kirtley,	2015a	Yes	No	Yes	NR	Yes	Yes	NR	No	No	Yes	No	Yes
Kirtley,	2015c	Yes	No	Yes	NR	Yes	Yes	No	No	No	Yes	No	No
Burke et al.,	2018	Yes	No	No	NR	Yes	Yes	No	No	No	Yes	No	No
Rath et al.,	2021	Yes	No	Yes	NR	Yes	Yes	No	No	No	Yes	No	No
Rossi,	2019	Yes	Yes	No	Yes	Yes	Yes	No	No	No	No	No	No
Pachkowski,	2017	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes	No	Yes
Sherifi,	2022	No	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	No	Yes
Schombs,	2020	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	No	No
Stewart et al.,	2019	Yes	Yes	No	Yes	Yes	Yes	No	No	No	Yes	No	Yes
Stoliker,	2020	Yes	Yes	No	Yes	Yes	Yes	No	No	No	No	No	No
Stoliker & Aberhalden,	2023	Yes	Yes	No	Yes	Yes	Yes	No	No	No	No	No	No
Holler,	2020	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	No	No
Wetherall,	2018b	Yes	Yes	No	Yes	Yes	Yes	No	No	No	No	No	No
Rogers et al.,	2021	Yes	No	No	NR	Yes	Yes	No	No	No	Yes	No	No
Richardson et al.,	2023	Yes	Yes	No	Yes	Yes	Yes	No	No	No	No	No	No
You et al.,	2020	Yes	No	Yes	NR	Yes	Yes	No	No	No	Yes	No	Yes
Porras-Segovia,	2023	Yes	Yes	No	Yes	No	Yes	No	No	Yes	No	No	No
Xu et al.,	2023	Yes	No	Yes	NR	Yes	Yes	No	No	No	Yes	No	No
Seidler et al.,	2023	Yes	Yes	No	Yes	Yes	Yes	No	No	No	Yes	No	No

Harrison et al.,	2018	Yes	No	Yes	NR	Yes	Yes	No	No	Yes	No	No	Yes
Nestor et al.,	2021	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	No	Yes
Vergara et al.,	2019	Yes	Yes	No	Yes	Yes	Yes	No	No	No	Yes	No	Yes
Perez et al.,	2017	Yes	Yes	No	Yes	Yes	Yes	No	No	No	Yes	No	Yes
Lange et al.,	2021	Yes	Yes	No	Yes	Yes	Yes	No	No	No	No	No	Yes
Ng et al.,	2016	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Hsu et al.,	2022	Yes	Yes	No	Yes	Yes	Yes	No	No	No	No	No	No

Note. CD – Can't determine, NR – Not reported, NA – Not applicable.

Q1 – Stated the research question/objective, Q2 – Defined the study population, Q3 – Justified sample size or provided power, Q4 – Selected controls and cases from similar study populationsm, Q5 – Valid, reliable, and consistent selection criteria for controls and cases, Q6 – Cases clearly defined and differentiated from controls, Q7 – Random selection from eligible population, Q8 – Used concurrent controls, Q9 – Confirmed occurance of exposure before outcome, Q10 – Used defined, reliable and valid measures consistently for exposure, Q11 – Blinded outcome assessors, Q12 – Accounted for and justified confounders/matching.

Appendix 13: Quality assessment for case-control studies



Appendix 14: Results of case-control studies comparing group differences between control, ideation, and enactment groups

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Social Perfectionism								
O'Connor et al., 2012b *Cross-sectional*	C < I	--	NS	--	C < E	--	**Univariate multinomial logistic regression analyses** Age, Mood, and Gender	--
Branley-bell et al., 2019 *Cross-sectional*	C < I	--	NS	--	C < E	--	**ANOVA** --	--
Early adversity								
Richardson et al., 2023 *Cross-sectional*	--	--	--	I < E	--	--	**Multivariate multinomial logistic regression** None	Demographic variables, Heath, Smoking history, Mental health diagnosis, Hospital admission, Trauma, & Social support.
Mars et al., 2019a *Prospective (21 years)*	--	--	NS	--	--	--	**Multinomial logit model** Sex, SES	--
Being Bullied								
Mars et al., 2019b *Prospective (4 years)*	C < I	--	NS	--	C < E	--	**Multinomial logit model** Sex, SES	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Household Cruelty								
Mars et al., 2019b *Prospective - (16 years)*	C < I	--	NS	--	C < E	--	**Multinomial logit model** Sex, SES	--
Childhood Emotional Abuse								
Burke et al., 2018 *Cross-sectional*	--	--	--	I < E	--	--	**MANOVA** None	Childhood maltreatment variables
Childhood Emotional Neglect								
Burke et al., 2018 *Cross-sectional*	--	--	--	NS	--	--	**MANOVA** None	Childhood maltreatment variables
Childhood Sexual Abuse								
Burke et al., 2018 *Cross-sectional*	--	--	--	NS	--	--	**MANOVA** None	Childhood maltreatment variables
Mars et al., 2019b *Prospective (16 years)*	NS	--	NS	--	NS	--	**Multinomial logit model** Sex, SES	--
Childhood Physical Abuse								
Burke et al., 2018	--	--	--	I < E	--	--	**MANOVA** None	Childhood maltreatment variables

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Cross-sectional								
Childhood Physical Neglect								
Burke et al., 2018 *Cross-sectional*	--	--	--	I < E	--	--	**MANOVA** None	Childhood maltreatment variables
Caregivers received welfare								
Stoliker, 2020 *Cross-sectional*	--	--	--	NS	--	--	**Multinomial logistic regression** None	Demographics, Psychological disorder diagnosis, Hopelessness, Emotional dysregulation, Sleep disturbances, Social disconnectedness, Alcohol dependence, Number of drugs used, Physical health issues, Victimisation, Family and caregiver factors.
Caregivers abused substances								
Stoliker, 2020 *Cross-sectional*	--	--	--	NS	--	--	**Multinomial logistic regression** None	Demographic variables, Psychological disorder diagnosis, Hopelessness, Emotional dysregulation, Sleep disturbances, Social disconnectedness, Alcohol dependence, Substance use, Physical health issues, Victimisation, Family & caregiver factors.

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Life events								
Mars et al., 2019a *Prospective (5 years)*	--	--	NS	--	--	--	**Logistic regression analyses** Sex, SES	--
Mars et al., 2019b *Prospective (8 years)*	C < I	--	I < E	--	C < E	--	**Multinomial logit model** Sex, SES	--
Defeat								
Dhingra et al., 2015 *Cross-sectional*	C < I	Step 2: NS Step 3: C < I	I < E	Step 2 & 3: NS	C < E	Step 2: C < E Step 3: NS	**ANOVA & Hierarchical Multinomial logistic regression** Depression, Anxiety, Age, Sexual Orientation, Ethnicity, Relationship status	Entrapment, Brooding rumination, Goal disengagement, Goal reengagement, Burdensomeness, Belongingness, Discomfort tolerance, Fearlessness about death, Impulsivity, & Exposure to suicide.
Pollak et al., 2021 *Cross-sectional*	C < I	--	NS	--	--	--	**T-test** None	--
Holler et al., 2020 *Cross-sectional*	C < I [a]	--	--	--	--	--	**T-test** None	--
Branley-bell et al., 2019	C < I	--	NS	--	C < E	--	**ANOVA** Age, Gender, employment group, previous ideation	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Cross-sectional								
Wetherall et al., 2018b *Cross-sectional*	C < I	C < I	I < E	NS	C < E	C < E	**Univariate and multivariate multinomial regression** Age, Gender, Marital status, Ethnicity & Economic activity, Depressive symptoms	Depressive symptoms, Entrapment, Burdensomeness, Belongingness, Goal disengagement and Reengagement, Social support, Resilience, Acquired capability, Impulsivity, Mental images, & Exposure to suicide.
Kirtley, 2015a *Cross-sectional (Sample 1)*	C < I	--	NS	--	NS	--	**Univariate multinomial logistic regression analyses** Depressive symptoms	
Cleare, 2019 *Cross-sectional*	C < I	NS	--	--	--	--	**Univariate binary logistic regression analyses and multivariate regression analyses** Depressive symptoms	Sexual orientation, Entrapment, Self-compassion, Stress, Self-criticism, Social comparison, Mindfullness, & Resilience.
Ng et al., 2016 *Cross-sectional*	C < I	--	--	--	--	--	**ANCOVA** Marital status, Psychiatric illness	--
Del Carpio et al., 2020 *Cross-sectional*	NS	NS	NS	NS	C < E	NS	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety.	Entrapment, Maladaptive coping, Social support - family, & Suicide stigma - glorification/normalisation.

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Cleare, 2019 *Prospective (2.5 months)*	C < I	NS	--	--	--	--	**Univariate binary logistic regression analyses and multivariate regression analyses** Baseline Suicidal ideation	Depressive symptoms, Entrapment, Self-compassion, Stress, Self-criticism, Social comparison, Mindfulness, & Resilience
Del Carpio et al., 2020 *Prospective (6 month)*	NS	--	NS	--	NS	--	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	--
Ng et al., 2016 *Prospective (7 weeks)*	C < I	--	--	--	--	--	**ANCOVA** Marital status, Psychiatric illness	--
Humiliation								
Kirtley, 2015a *Cross-sectional (Sample 1)*	NS	--	NS	--	NS	--	**Univariate multinomial logistic regression analyses** Depressive symptoms	--
Stewart et al., 2019 *Cross-sectional (Acute)*	NS	--	NS	--	NS	--	**Negative binomial regression analyses** Abuse, Psychiatric disorders, Depressive symptoms, Hopelessness, Suicidal ideation	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Stewart et al., 2019 *Cross-sectional (Chronic)*	NS	--	NS	--	C <E	--	**Negative binomial regression analyses** Abuse, Psychiatric disorders, Depressive symptoms, Hopelessness, Suicidal ideation	--
Entrapment								
Schombs, 2020 *Cross-sectional*	NS	--	NS	--	C < E	--	**ANOVA** None	--
Dhingra et al., 2015 *Cross-sectional*	C < I	Step 2: C < I Step 3: C < I	I < E	Step 2: NS Step 3: NS	C < E	Step 2: C < E Step 3: C < E	**ANOVA & Hierarchical Multinomial logistic regression** Depression, Anxiety, Age, Sexual Orientation, Ethnicity, Relationship status	Defeat, Brooding rumination, Goal disengagement, Goal reengagement, Burdensomeness, Belongingness, Discomfort tolerance, Fearlessness about death, Impulsivity, & Exposure to suicide.
Holler et al., 2020 *Cross-sectional*	C < I[a]	--	--	--	--	--	**T-test** None	--
Del Carpio et al., 2020 *Cross-sectional*	C < I	NS	NS	NS	C < E	NS	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	Defeat, Maladaptive coping, Social support - family, Suicide stigma - glorification/normalisation.

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Stewart et al., 2019 *Cross-sectional (Acute)*	NS	--	NS	--	NS	--	**Negative binomial regression analyses** Abuse, Psychiatric disorders, Depressive symptoms, Hopelessness, Suicidal ideation	--
Stewart et al., 2019 *Cross-sectional (Chronic)*	NS	--	NS	--	NS	--	**Negative binomial regression analyses** Abuse, Psychiatric disorders, Depressive symptoms, Hopelessness, Ideation.	--
Wetherall et al., 2018b *Cross-sectional*	C < I	NS	I < E	NS	C < E	NS	**Univariate and multivariate multinomial regression** Age, Gender, Marital status, Ethnicity & Economic activity, Depressive symptoms	Depressive symptoms, Defeat, Burdensomeness, Belongingness, Goal disengagement and reengagement, Social support, Resilience, Acquired capability, Impulsivity, Mental images, & Exposure to suicide.
Cleare, 2019 *Cross-sectional*	C < I	C < I	--	--	--	--	**Univariate binary & multivariate logistic regression analyses** Depressive symptoms	Sexual orientation, Defeat, Self-compassion, Stress, Self-criticism, Social comparison, Mindfullness, & Resilience.
Pollak et al., 2021 *Cross-sectional*	C < I	--	NS	--	--	--	**T-test** None	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Ng et al., 2016 *Cross-sectional*	C < I	--	--	--	--	--	**ANCOVA** Marital status, Psychiatric illness	--
Kirtley, 2015a *Cross-sectional (Sample 1)*	NS	--	NS	--	C < E	--	**Univariate multinomial logistic regression analyses** Depressive symptoms	--
Cleare, 2019 *Prospective (2.5 months)*	C < I	NS	--	--	--	--	**Univariate binary logistic regression analyses and multivariate regression analyses** Baseline suicidal ideation	Depressive symptoms, Defeat, Self-compassion, Stress, Self-criticism, Social comparison, Mindfulness, & Resilience.
Del Carpio et al., 2020 *Prospective (6 month)*	NS	--	NS	--	NS	--	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	--
Ng et al., 2016 *Prospective*	C < I	--	--	--	--	--	**ANCOVA** Marital status, Psychiatric illness	--
External Entrapment								
Branley-bell et al., 2019 *Cross-sectional*	C < I	--	NS	--	C < E	--	**ANOVA** Age, Gender, Employment group, Previous ideation	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Cleare, 2019 *Cross-sectional*	C < I	--	--	--	--	--	**Univariate binary logistic regression analyses** Depressive symptoms	--
Kirtley, 2015a *Cross-sectional (Sample 1)*	NS	--	NS	--	C < E	--	**Univariate multinomial logistic regression analyses** Depressive symptoms	--
Cleare, 2019 *Prospective (2.5 months)*	C < I	--	--	--	--	--	**Univariate binary logistic regression analyses** Baseline suicidal ideation	--
Internal Entrapment								
Branley-bell et al., 2019 *Cross-sectional*	C < I	--	NS	--	C < E	--	**ANOVA** Age, Gender, Employment group, Previous ideation	--
Cleare, 2019 *Cross-sectional*	C < I	--	--	--	--	--	**Univariate binary logistic regression analyses** Depressive symptoms	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Kirtley, 2015a *Cross-sectional (Sample 1)*	NS	--	NS	--	C < E	--	**Univariate multinomial logistic regression analyses** Depressive symptoms	--
Cleare, 2019 *Prospective (2.5 months)*	C < I	--	--	--	--	--	**Univariate binary logistic regression analyses** Baseline suicidal ideation	--
Brooding Rumination								
Dhingra et al., 2015 *Cross-sectional*	C < I	Step 2 & 3: C < I	I < E	Step 2 & 3: NS	C < E	Step 2 & 3: NS	**Anova & Hierarchical Multinomial logistic regression** Depression, Anxiety, Age, Sexual Orientation, Ethnicity, Relationship status	Defeat, Entrapment, Goal disengagement, Goal reengagement, Burdensomeness, Belongingness, Discomfort tolerance, Fearlessness about death, Impulsivity, & Exposure to suicide.
Schombs, 2020 *Cross-sectional*	NS	--	I < E	--	C < E	--	**ANOVA** None	--
O'Connor et al., 2012b *Cross-sectional*	C < I	--	NS	--	C < E	--	**Univariate multinomial logistic regression analyses** Age, Mood, and gender	--
Adaptive Coping								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Del Carpio et al., 2020 *Cross-sectional*	NS	--	NS	--	NS	--	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	--
Del Carpio et al., 2020 *Prospective (6 month)*	NS	--	NS	--	NS	--	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	--
Maladaptive Coping								
Del Carpio et al., 2020 *Cross-sectional*	C < I	C < I	NS	NS	C < E	C < E	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	Defeat, Entrapment, Social support - family, & Suicide stigma - glorification/normalisation.
Del Carpio et al., 2020 *Prospective (6 month)*	NS	--	NS	--	NS	--	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	--
Active coping								
Lange et al., 2022 *Cross-sectional (sexual minority population)*	--	**Life-time SI**: Step 1 & 2: C > I, Step 3: NS **Past year**	--	--	--	--	**Logistic regression analysis** Age and sex assigned at birth	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
		SI: C > I						
Lange et al., 2022 *Cross-sectional (Gender minority population)*	--	**Past year SI** Step 1 & 2: C > I, Step 3: NS	--	--	--	--	**Logistic regression analysis** Age and sex assigned at birth	--
Avoidant Coping								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Lange et al., 2022 *Cross-sectional (sexual minority population)*	--	**Life-time SI** Step 2: C < I, Step 3: C > I **Past year SI**- Step 2: C < I, Step 3: NS	--	--	--	--	**Logistic regression analysis** Age and sex assigned at birth	--
Lange et al., 2022 *Cross-sectional (Gender minority population)*	--	**Life-time SI:** NS **Past year SI** Step 2: C < I, Step 3: NS	--	--	--	--	**Logistic regression analysis** Age and sex assigned at birth	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Seidler et al., 2023 *Cross-sectional*	C < I	C < I	--	--	--	--	**Multinomial logistic regression** None	Demographics, Covid era employment status, Social support (family, friends, significant other), Coping (problem-focussed, emotion-focussed), & Resilience.
Passive coping								
Lange et al., 2022 *Cross-sectional (Sexual minority population)*	--	Step 3: C < I	--	--	--	--	**Logistic regression analysis** Age and sex assigned at birth	--
Lange et al., 2022 *Cross-sectional (Gender minority population)*	--	Step 3: C < I	--	--	--	--	**Logistic regression analysis** Age and sex assigned at birth	--
Problem-focussed coping								
Seidler et al., 2023 *Cross-sectional*	NS	NS[b]	--	--	--	--	**Multinomial logistic regression** None	Demographics, Covid era employment status, Social support (family, friends, significant other), Coping (emotion-focussed, avoidant), & Resilience.
Emotion focussed coping								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Seidler et al., 2023 *Cross-sectional*	C > I[c]	C > I[c]	--	--	--	--	**Multinomial logistic regression** None	Demographics, Covid era employment status, Social support (family, friends, significant other), Coping (problem-focussed, avoidant), & Resilience.
Social support								
Melson & O'Connor, 2019 *Cross-sectional*	C > I	--	I < E	--	NS	--	**Hierarchical multinomial logistic regressions** Age, Gender, Depressive symptoms	--
Branley-bell et al., 2019 *Cross-sectional*	C > I	--	NS	--	C > E	--	**ANOVA** Age, Gender, Employment group, Previous ideation	--
Wetherall et al., 2018b *Cross-sectional*	C > I	NS	I > E	NS	C > E	NS	**Univariate and multivariate multinomial regression** Age, Gender, Marital status, Ethnicity & Economic activity, Depressive symptoms	Depressive symptoms, Defeat, Entrapment, Burdensomeness, Belongingness, Goal disengagement and reengagement, Resilience, Acquired capability, Impulsivity, Mental images, & Exposure to suicide.

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Stoliker et al., 2023 *Cross-sectional*	C > I	C > I	NS	NS	--	--	**Bivariate and multivariate regression models** None	Demographics, Hopelessness, family history (suicide and crime), Violent/sexual offence, alcohol/substance use, No wish to live, social support, loneliness, sleep quantity, Aggression, Self-harm
Nestor et al., 2022 *Cross-sectional*	--	C > I	--	NS	--	--	**Longitudinal adjacent-category logit model** Age, Sex, Ethnic minority, Exposure to suicide, and Depression	Prior suicidal ideation & behaviour
Schombs, 2020 *Cross-sectional*	C < I	--	--	--	C < E	--	**ANOVA** None	--
Richardson et al., 2023 *Cross-sectional*	--	--	--	I > E	--	--	**Multivariate multinomial logistic regression** None	Demographics, Heath, Smoking history, Mental health diagnosis, Hospital admission, Childhood adversity, & Trauma.
Hsu et al., *Cross-sectional*	NS	--	--	--	--	--	**T-Test** None	--
Nestor et al., 2022 *Prospective (2 years)*	--	C > I	--	NS	--	--	**Longitudinal adjacent-category logit model** Age, Sex, Ethnic minority, Exposure to suicide, and Depression.	Prior suicidal ideation & behaviour

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Social Support - Family								
Del Carpio et al., 2020 *Cross-sectional*	C > I	C > I	NS	NS	C > E	C > E	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	Defeat, Entrapment, Maladaptive coping, & Suicide stigma - glorification/normalisation.
Seidler et al., 2023 *Cross-sectional*	C > I	NS	--	--	--	--	**Multinomial logistic regression** None	Demographics, Covid era employment status, Social support (significant other & friends), Coping (problem-focussed, emotion-focussed, avoidant), & Resilience.
Del Carpio et al., 2020 *Prospective (6 month)*	NS	NS	NS	NS	C > E	NS	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	Suicide stigma - stigmatisation and glorification/normalisation & Self-harm ideation at baseline.
Social Support - Friends								
Del Carpio *Cross-sectional*	NS	--	NS	NS	NS	NS	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	--
Seidler et al., 2023 *Cross-sectional*	C > I	NS	--	--	--	--	**Multinomial logistic regression** None	Demographics, Covid era employment status, Social support (significant other & family), Coping (problem-focussed, emotion-focussed, avoidant), & Resilience.

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Del Carpio et al., 2020 *Prospective (6 month)*	NS	--	NS	--	NS	--	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	--
Social Support - Significant Other								
Del Carpio et al., 2020 *Cross-sectional*	NS	--	NS	NS	NS	NS	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	--
Seidler et al., 2023 *Cross-sectional*	C > I	NS	--	--	--	--	**Multinomial logistic regression** None	Demographics, Covid era employment status, Social support (friends & family), Coping (problem-focussed, emotion-focussed, avoidant), & Resilience.
Del Carpio et al., 2020 *Prospective (6 month)*	NS	--	NS	--	NS	--	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	--
Goal disengagement								
Dhingra et al., 2015 *Cross-sectional*	C < I	Step 2 & 3: NS	NS	Step 2 & 3: NS	NS	Step 2 & 3: NS	**Anova & Hierarchical Multinomial logistic regression** Depression, Anxiety, Age, Sexual Orientation, Ethnicity, Relationship status	Defeat, Entrapment, Brooding rumination, Goal reengagement, Burdensomeness, Belongingness, Discomfort tolerance, Fearlessness about death, Impulsivity, & Exposure to suicide

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Wetherall et al., 2018b *Cross-sectional*	C < I	NS	NS	NS	NS	NS	**Univariate and Multivariate multinomial regression** Age, Gender, Marital status, Ethnicity & Economic activity, Depressive symptoms	Defeat, Entrapment, Burdensomeness, Belongingness, Goal disengagement and reengagement, Social support, Resilience, Acquired capability, Impulsivity, Mental images, & Exposure to suicide.
Goal Reengagement								
Dhingra et al., 2015 *Cross-sectional*	C > I	Step 2 & 3: NS	I > E	Step 2 & 3: NS	C > E	Step 2 & 3: NS	**Anova & Hierarchical Multinomial logistic regression** Depression, Anxiety, Age, Sexual Orientation, Ethnicity, Relationship status	Defeat, Entrapment, Brooding rumination, Goal disengagement, Burdensomeness, Belongingness, Discomfort tolerance, Fearlessness about death, Impulsivity, & Exposure to suicide
Wetherall et al., 2018b *Cross-sectional*	C < I	NS	I < E	NS	C < E	NS	**Univariate and Multivariate multinomial regression** Age, Gender, Marital status, Ethnicity & Economic activity, Depressive symptoms	Defeat, Entrapment, Burdensomeness, Belongingness, Goal disengagement, Social support, Resilience, Acquired capability, Impulsivity, Mental images, & Exposure to suicide.
Burdensomeness								
Dhingra et al., 2015 *Cross-sectional*	C < I	Step 2 & 3: C < I	I < E	Step 2 & 3: NS	C < E	Step 2 & 3: C < E	**ANOVA & Hierarchical Multinomial logistic regression** Depression, Anxiety, Age, Sexual Orientation, Ethnicity, Relationship status	Defeat, Entrapment, Brooding rumination, Goal disengagement, Goal reengagement, Belongingness, Discomfort tolerance, Fearlessness about

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
								death, Impulsivity, & Exposure to suicide.
Branley-bell et al., 2019 *Cross-sectional*	C < I	--	NS	--	C < E	--	**ANOVA** Age, Gender, Employment group, Previous ideation	--
Wetherall et al., 2018b *Cross-sectional*	C < I	C < I	I < E	NS	C < E	C < E	**Univariate and Multivariate multinomial regression** Age, Gender, Marital status, Ethnicity & Economic activity, Depressive symptoms	Defeat, Entrapment, Belongingness, Goal disengagement and reengagement, Social support, Resilience, Acquired capability, Impulsivity, Mental images, & Exposure to suicide.
Thwarted belongingness								
Dhingra et al., 2015 *Cross-sectional*	C > I	Step 2 & 3: C > I	I > E	Step 2 & 3: NS	C > E	Step 2 & 3: C > E	**Anova & Hierarchical Multinomial logistic regression** Depression, Anxiety, Age, Sexual Orientation, Ethnicity, Relationship status	Defeat, Entrapment, Brooding rumination, Goal disengagement, Goal reengagement, Burdensomeness, Discomfort tolerance, Fearlessness about death, Impulsivity, & Exposure to suicide.

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Wetherall et al., 2018b *Cross-sectional*	C < I	NS	I < E	NS	C < E	NS	**Univariate and Multivariate multinomial regression** Age, Gender, Marital status, Ethnicity & Economic activity, Depressive symptoms	Defeat, entrapment, burdensomeness, goal disengagement and reengagement, social support, resilience, acquired capability, impulsivity, mental images, & exposure to suicide.
Branley-bell et al., 2019 *Cross-sectional*	C < I	--	NS	--	C < E	--	**ANOVA** Age, Gender, employment group, previous ideation	--
Descriptive norms								
O'Connor et al., 2012b *Cross-sectional*	C < I	--	I < E	--	C < E	NS	**Univariate & Multivariate multinomial logistic regression analyses** Age, Mood, and gender	Family and friend self harm, Impulsitivity, & Stress.
Suicide Stigma - Stigmatisation								
Del Carpio et al., 2020 *Cross-sectional*	NS	--	NS	--	NS	--	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	--
Del Carpio et al., 2020 *Prospective (6 month)*	NS	--	NS	NS	C > E	C > E	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	Social support - family, Suicide stigma - glorification/normalisation, & Self-harm ideation at baseline.
Suicide Stigma - Isolation/Depression								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Del Carpio et al., 2020 *Cross-sectional*	NS	--	NS	--	NS	--	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	--
Del Carpio et al., 2020 *Prospective (6 month)*	NS	--	NS	--	NS	--	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	--
Suicide Stigma - Normalisation/Glorification								
Del Carpio et al., 2020 *Cross-sectional*	NS	NS	I > E	I > E	NS	NS	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	Defeat, Entrapment, Maladaptive coping, & Social support - family.
Del Carpio et al., 2020 *Prospective (6 month)*	NS	C < I	NS	NS	C > E	C > E	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	Social support - family, Suicide stigma - stigmatisation, & Self-harm ideation at baseline.
Resilience								
Branley-bell et al., 2019 *Cross-sectional*	C > I	--	NS	--	C < E	--	**ANOVA** Age, Gender, Employment group, Previous ideation	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Wetherall et al., 2018b *Cross-sectional*	C > I	NS	I > E	NS	C > E	NS	**Univariate and multivariate multinomial regression** Age, Gender, Marital status, Ethnicity & Economic activity, Depressive symptoms	Defeat, Entrapment, Burdensomeness, Belongingness, Goal disengagement and reengagement, Social support, Acquired capability, Impulsivity, Mental images, & Exposure to suicide.
Cleare, 2019 *Cross-sectional*	C > I	C < I	--	--	--	--	**Univariate binary logistic regression analyses and multivariate regression analyses** Depressive symptoms	Sexual orientation, Depressive symptoms, Defeat, Entrapment, Self-compassion, Stress, Self-criticism, Social comparison, Mindfullness, Resilience.
Schombs, 2020 *Cross-sectional*	NS	--	--	--	C > E	--	**ANOVA** None	--
Seidler et al., 2023 *Cross-sectional*	C > I	C > I	--	--	--	--	**Multinomial logistic regression** None	Demographics, Covid era employment status, Social support (significant other, family, & friends), Coping (problem-focussed, Emotion-focussed, avoidant).
Xu et al., 2023 *Cross-sectional*	C > I	--	--	--	--	--	**T-test** None	--
Hsu et al., 2022	C > I	--	--	--	--	--	**T-test** None	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Cross-sectional								
Cleare, 2019 *Prospective (2.5 months)*	C > I	NS	--	--	--	--	**Univariate binary logistic regression analyses & multivariate regression analyses** Baseline suicidal ideation	Suicidal ideation, Depressive symptoms, Defeat, Entrapment, Self-compassion, Stress, Self-criticism, Social comparison, & Mindfulness.
Resilience - Goal focus								
Xu et al., 2023 *Cross-sectional*	--	--	--	--	--	--	**T-test** None	--
Resilience - Emotional control								
Xu et al., 2023 *Cross-sectional*	C > I	--	--	--	--	--	**T-test** None	--
Resilience - Positive cognition								
Xu et al., 2023 *Cross-sectional*	NS	--	--	--	--	--	**T-test** None	--
Resilience - Family support								
Xu et al., 2023 *Cross-sectional*	C > I	--	--	--	--	--	**T-test** None	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Resilience - Interpersonal assistance								
Xu et al., 2023 *Cross-sectional*	C > I	--	--	--	--	--	**T-test** None	--
Impulsivity								
O'Connor et al., 2012b *Cross-sectional*	C < I	--	I < E	--	C < E	NS	**Univariate & Multivariate multinomial logistic regression analyses** Age, Mood, and Gender	Family and friend self harm, Descriptive norms, Impulsitivity, Negative life stress.
Branley-bell et al., 2019 *Cross-sectional*	C < I	--	I < E	--	C < E	--	**ANOVA** Age, Gender, Employment group, Previous ideation	--
Dhingra et al., 2015 *Cross-sectional*	NS	NS	I < E	I < E	C < E	NS	**ANOVA & Hierarchical Multinomial logistic regression** Depression, Anxiety, Age, Sexual Orientation, Ethnicity, Relationship status	Defeat, Entrapment, Rumination, Goal disengagement & reengagement, Burdensomeness, Belongingness, Discomfort tolerance, Fearlessness about death, & Exposure to suicide.

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Wetherall et al., 2018b *Cross-sectional*	C < I	NS	I < E	I < E	C < E	C < E	**Univariate & multivariate multinomial regression** Age, Gender, Marital status, Ethnicity & Economic activity, Depressive symptoms	Defeat, Entrapment, Burdensomeness, Belongingness, Goal disengagement and reengagement, Social support, Resilience, Acquired capability, Mental images, & Exposure to suicide.
You et al., 2020 *Cross-sectional*	--	C < I	--	NS	--	C < E	**ANCOVA** MDD history	--
Schombs, 2020 *Cross-sectional*	NS	--	--	--	C < E	--	**Welch's test** None	--
Kirtley, 2015a *Cross-sectional (Sample 1)*	NS	--	I < E	I < E	NS	--	**Univariate & Multivariate multinomial logistic regression analyses** Depressive symptoms	Social modelling of self harm
Kirtley, 2015a *Cross-sectional (Sample 2)*	NS	--	NS	--	NS	--	**Univariate multinomial regression analyses** Depressive symptoms	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Porras-Segovia et al., 2023 *Prospective (6 weeks, GENESE cohort)*	--	--	NS	--	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Change of antidepressant at baseline, Suicidal ideation, Depression and anxiety, & Insomnia.
Mars et al., 2019a *Prospective (5 years)*	--	--	NS	--	--	--	**Logistic regression analyses** Sex, SES	--
Mars et al., 2019b *Prospective (6 years)*	NS	--	I < E	--	NS	--	**Multinomial logit model** Sex, SES	--
Impulsivity: relative difference over follow-up								
Porras-Segovia et al., 2023 *Prospective (6 weeks, GENESE cohort)*	--	--	NS	--	--	--	**Univariate logistic regression** Demographic characteristics	
Response inhibition								
You et al., 2020 *Stop signal task*[d]	--	NS	--	NS	--	NS	**ANCOVA** MDD history	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Negative Urgency								
Melson & O'Connor, 2019 *Cross-sectional (Alcohol-related)*	NS	NS	I < E	I < E	C < E	C < E	**Univariate multinomial logistic regression** Age, Gender, Depressive symptoms	Demographic variable, alcohol use variables, self-harm.
You et al., 2020 *Cross-sectional*	C < I	--	I < E	--	--	--	ANCOVA	--
Sherifi, 2022 *Cross-sectional*	--	--	NS	--	--	--	**Univariate hurdle models** Age, Race, BPD symptoms, Substance use severity, Mental disorders and medication	--
Positive Urgency								
Sherifi, 2022 *Cross-sectional*	--	--	NS	--	--	--	**Univariate hurdle models** Age, Race, BPD symptoms, Substance use severity, Mental disorders and medication	--
Impulsivity: Lack of premeditation								
Sherifi, 2022 *Cross-sectional*	--	--	I < E	--	--	--	**Univariate hurdle models** Age, Race, BPD symptoms, Substance use severity,	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
							Mental disorders and medication	
Impulsivity: Lack of Perseverance								
Sherifi, 2022 *Cross-sectional*	--	--	I < E[e]	--	--	--	**Univariate hurdle models** Age, Race, BPD symptoms, Substance use severity, Mental disorders and medication	--
Impulsivity: Prepotent Response Inhibition								
Sherifi, 2022 *Cross-sectional*	--	--	NS	--	--	--	**Univariate hurdle models** Age, Race, BPD symptoms, Substance use severity, Mental disorders and medication	--
Impulsivity: Resistance to Distractor Interference								
Sherifi, 2022 *Cross-sectional*	--	--	NS	--	--	--	**Univariate hurdle models** Age, Race, BPD symptoms, Substance use severity, Mental disorders and medication	--
Impulsivity: Resistance to Proactive Interference								
Sherifi, 2022 *Cross-sectional*	--	--	NS	--	--	--	**Univariate hurdle models** Age, Race, BPD symptoms, Substance use severity, Mental disorders and medication	--
Impulsivity: Delay discounting								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Sherifi, 2022 *Cross-sectional*	--	--	NS	--	--	--	**Univariate hurdle models** Age, Race, BPD symptoms, Substance use severity, Mental disorders and medication	--
Impulsivity: Shifting								
Sherifi, 2022 *Cross-sectional*	--	--	NS	--	--	--	**Univariate hurdle models** Age, Race, BPD symptoms, Substance use severity, Mental disorders and medication	--
Sensation seeking								
Sherifi, 2022 *Cross-sectional*	--	--	NS	--	--	--	**Univariate hurdle models** Age, Race, BPD symptoms, Substance use severity, Mental disorders and medication	--
Sensation seeking (intensity)								
Mars et al., 2019b *Cross-sectional*	C < I	--	I < E	--	C < E	--	**Multinomial logit model** Sex, SES	--
Mars et al., 2019a *Prospective (5 years)*	--	--	NS	--	--	--	**Logistic regression analyses** Sex, SES	--
Sensation seeking (novelty)								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Mars et al., 2019b *Cross-sectional*	C < I	--	NS	--	NS	--	**Multinomial logit model** Sex, SES	--
Mars et al., 2019a *Prospective (5 years)*	--	--	NS	--	--	--	**Logistic regression analyses** Sex, SES	--
Acquired capability for suicide								
Burke et al., 2018 *Cross-sectional*	--	--	NS	--	--	--	**ANOVA** None	--
Wetherall et al., 2018b *Cross-sectional*	C < I	NS	I < E	mo	C < E	NS	**Univariate and multivariate multinomial regression** Age, Gender, Marital status, Ethnicity & Economic activity, Depressive symptoms	Defeat, Entrapment, Burdensomeness, Belongingness, Goal disengagement and Reengagement, Social support, Resilience, Impulsivity, Mental images, & Exposure to suicide
Branley-bell et al., 2019 *Cross-sectional*	NS	--	I < E	--	NS	--	**ANOVA** Age, Gender, Employment group, Previous ideation	--
Fearlessness about death								
Schombs, 2020	NS	--	NS	--	NS	--	**ANOVA** None	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Cross-sectional								
Dhingra et al., 2015 *Cross-sectional*	NS	NS	I < E	I < E	C < E	C < E	**Anova & Hierarchical Multinomial logistic regression** Depression, Anxiety, Age, Sexual Orientation, Ethnicity, Relationship status	Defeat, Entrapment, Brooding rumination, Goal disengagement, Goal reengagement, Burdensomeness, Belongingness, Discomfort tolerance, Impulsivity, & Exposure to suicide.
Burke et al., 2018 *Cross-sectional*	--	--	NS	--	--	--	ANOVA None	--
Discomfort/Pain tolerance								
Dhingra et al., 2015 *Cross-sectional*	NS	NS	NS	NS	NS	NS	**Anova & Hierarchical Multinomial logistic regression** Depression, Anxiety, Age, Sexual Orientation, Ethnicity, Relationship status	Defeat, Entrapment, Brooding rumination, Goal disengagement, Goal reengagement, Burdensomeness, Belongingness, Fearlessness about death, Impulsivity, & Exposure to suicide
Schombs, 2020 *Cross-sectional*	NS	--	NS	--	NS	--	**ANOVA** None	--
Pain tolerance (algometer)								
Rogers et al., 2021	--	--	NS	--	--	--	**T-tests** Order of tasks	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Cross-sectional								
Pain tolerance (cold pressor)								
Rogers et al., 2021 *Cross-sectional*	--	--	NS	--	--	--	**T-tests** Order of tasks	--
Pain tolerance (shock)								
Rogers et al., 2021 *Cross-sectional*	--	--	NS	--	--	--	**T-tests** Order of tasks	--
Pain tolerance (heat)								
Rogers et al., 2021 *Cross-sectional*	--	--	NS	--	--	--	**T-tests** Order of tasks	--
Physical pain tolerance (time): under stress								
Kirtley, 2015a *Cross-sectional (Sample 2)*	NS	--	I < E	--	NS	--	**Univariate multinomial regression analyses** Depressive symptoms	--
Physical pain tolerance (time): no stress								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Kirtley, 2015a *Cross-sectional (Sample 2)*	NS	--	NS	--	NS	--	**Univariate multinomial regression analyses** Depressive symptoms	--
Physical pain tolerance (pressure): under stress								
Kirtley, 2015a *Cross-sectional (Sample 2)*	NS	--	NS	--	NS	--	**Univariate multinomial regression analyses** Depressive symptoms	--
Physical pain tolerance (pressure): no stress								
Kirtley, 2015a *Cross-sectional (Sample 2)*	NS	--	NS	--	NS	--	**Univariate multinomial regression analyses** Depressive symptoms	--
Emotional pain sensitivity (Self report)								
Kirtley, 2015b *Cross-sectional*	C < I	--	I < E	--	C < E	--	**Jonckheere-Terpstra** Prior suicide attempt	--
Kirtley, 2015c *Cross-sectional*	C < I	--	I < E	--	C < E	--	**Jonckheere-Terpstra** None	--
Emotional pain sensitivity (behavioural)								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Kirtley, 2015c *Cross-sectional*	NS	--	NS	--	NS	--	**Jonckheere-Terpstra** None	--
Physical pain sensitivity (Self report)								
Kirtley, 2015b *Cross-sectional*	C < I[e]	--	I < E[e]	--	C < E[e]	--	**Jonckheere-Terpstra** Prior suicide attempt	--
Kirtley, 2015c *Cross-sectional*	NS	--	NS	--	NS	--	**Jonckheere-Terpstra** None	--
Behavioural physical pain sensitivity (threshold/tolerance based on pressure/time)								
Kirtley, 2015c *Cross-sectional*	NS	--	NS	--	NS	--	**Jonckheere-Terpstra** None	--
Physical pain threshold (time): stress								
Kirtley, 2015a *Cross-sectional (Sample 2)*	NS	--	NS	--	NS	--	**Univariate multinomial regression analyses** Depressive symptoms	--
Physical pain threshold (time): no stress								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Kirtley, 2015a *Cross-sectional (Sample 2)*	NS	--	NS	--	NS	--	**Univariate multinomial regression analyses** Depressive symptoms	--
Physical pain threshold (pressure): stress								
Kirtley, 2015a *Cross-sectional (Sample 2)*	NS	--	NS	--	NS	--	**Univariate multinomial regression analyses** Depressive symptoms	--
Physical pain threshold (pressure): no stress								
Kirtley, 2015a *Cross-sectional (Sample 2)*	NS	--	NS	--	NS	--	**Univariate multinomial regression analyses** Depressive symptoms	--
Pain threshold (algometer)								
Rogers et al., 2021 *Cross-sectional*	--	--	NS	--	--	--	**T-tests** Order of tasks	--
Pain threshold (cold pressor)								
Rogers et al., 2021 *Cross-sectional*	--	--	I < E (NS for NSSI)	--	--	--	**T-tests** Order of tasks	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Pain threshold (shock)								
Rogers et al., 2021 *Cross-sectional*	--	--	NS	--	--	--	**T-tests** Order of tasks	--
Pain threshold (heat)								
Rogers et al., 2021 *Cross-sectional*	--	--	NS	--	--	--	**T-tests** Order of tasks	--
Pain persistance (algometer)								
Rogers et al., 2021 *Cross-sectional*	--	--	NS	--	--	--	**T-tests** Order of tasks	--
Pain persistance (cold pressor)								
Rogers et al., 2021 *Cross-sectional*	--	--	NS	--	--	--	**T-tests** Order of tasks	--
Pain persistance (shock)								
Rogers et al., 2021 *Cross-sectional*	--	--	NS	--	--	--	**T-tests** Order of tasks	--
Pain persistance (heat)								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Rogers et al., 2021 *Cross-sectional*	--	--	NS	--	--	--	**T-tests** Order of tasks	--
Physical pain distress (Self report)								
Kirtley, 2015b *Cross-sectional*	C < I	--	I < E	--	C < E	--	**Jonckheere-Terpstra** Prior suicide attempt	--
Kirtley, 2015c *Cross-sectional*	C < I	--	I < E	--	C < E	--	**Jonckheere-Terpstra** None	--
Positive mood score (over time conducting pain tolerance tasks)								
Kirtley, 2015c *Cross-sectional*	--	NS	--	NS	--	NS	**Mixed measures ANOVA** None	--
Negative mood score (over time conducting pain tolerance tasks)								
Kirtley, 2015c *Cross-sectional*	--	NS	--	NS	--	C < E	**Mixed measures ANOVA** None	--
Exposure (Family)								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Dhingra et al., 2015 *Cross-sectional*	--	C < I	--	I < E	--	C < E	**Anova & Hierarchical Multinomial logistic regression** Depression, Anxiety, Age, Sexual Orientation, Ethnicity, Relationship status	Defeat, Entrapment, Brooding rumination, Goal disengagement, Goal reengagement, Burdensomeness, Belongingness, Discomfort tolerance, Fearlessness about death, Impulsivity, & Exposure to suicide.
Del Carpio et al., 2020 *Cross-sectional*	NS	--	I < E	--	NS	--	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	--
Mars et al., 2019b *Cross-sectional*	C < I	--	I < E	--	C < E	--	**Multinomial logit model** Sex, SES	
Wetherall et al., 2018b *Cross-sectional*	C < I	C < I	I < E	I < E	C < E	C < E	**Univariate and multivariate multinomial regression** Age, Gender, Marital status, Ethnicity & Economic activity, Depressive symptoms	Defeat, Entrapment, Burdensomeness, Belongingness, Goal disengagement and reengagement, Social support, Resilience, Acquired capability, Impulsivity, Mental images, & Exposure to suicide.

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Stoliker et al., 2023 *Cross-sectional*	C < I	C < I	NS	NS	--	--	**Bivariate and multivariate regression models** None	Demograhic, Hopelessness, family history (suicide and crime), Violent/sexual offence, substance use (alcohol and drug), No wish to live, social support, loneliness, sleep quantity, Aggression (Interpersonal violence/intoxicated and use intimidation), Self-harm
Nestor et al., 2022 *Cross-sectional*	--	C < I	--	NS	--	--	**Longitudinal adjacent-category logit model** Age, Sex, Ethnic minority, Exposure to suicide, and Depression	Prior suicidal ideation & Behaviour & perceived support
O'Connor et al., 2012b *Cross-sectional*	C < I	--	I < E	--	C < E	C < E	**Univariate & Multivariate multinomial logistic regression analyses** Age, Mood, and gender	Friend self harm, Descriptive norms, Impulsitivity, & Stress.
Hsu et al., 2022 *Cross-sectional*	NS	--	--	--	--	--	**T-Test** None	--
Del Carpio et al., 2020 *Prospective (6 month)*	NS	--	NS	--	NS	--	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Nestor et al., 2022 *Prospective (2 years)*	--	C < I	--	NS	--	--	**Longitudinal adjacent-category logit model** Age, Sex, Ethnic minority, Exposure to suicide, and Depression	Prior suicidal ideation & behaviour, Exposure to suicide & perceived support
Mars et al., 2019a *Prospective (5 years)*	--	--	NS	--	--	--	**Logistic regression analyses** Sex, SES	--
Mars et al., 2019b *Prospective (16 years)*	C < I	--	NS	--	C < E	--	**Multinomial logit model** Sex, SES	--
Exposure (Friend)								
Dhingra et al., 2015 *Cross-sectional*	--	C < I	--	I < E	--	C < E	**Anova & Hierarchical Multinomial logistic regression** Depression, Anxiety, Age, Sexual Orientation, Ethnicity, relationship	Defeat, Entrapment, Brooding rumination, Goal disengagement, Goal reengagement, Burdensomeness, Belongingness, Discomfort tolerance, Fearlessness about death, Impulsivity, Exposure to suicide (family).
Del Carpio et al., 2020 *Cross-sectional*	NS	--	NS	--	NS	--	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Mars et al., 2019b *Cross-sectional*	C < I	--	I < E	--	C < E	--	**Multinomial logit model** Sex, SES	--
Wetherall et al., 2018b *Cross-sectional*	C < I	C < I	I < E	I < E	C < E	C < E	**Univariate and multivariate multinomial regression** Age, Gender, Marital status, Ethnicity & Economic activity, Depressive symptoms	Defeat, Entrapment, Burdensomeness, Belongingness, Goal disengagement and reengagement, Social support, Resilience, Acquired capability, Impulsivity, Mental images, Sxposure to suicide.
Nestor et al., 2022 *Cross-sectional*	--	C < I	--	NS	--	--	**Longitudinal adjacent-category logit model** Age, Sex, Ethnic minority, Exposure to suicide, and Depression	Prior suicidal ideation & behaviour, exposure (family), & perceived support
O'Connor et al., 2012b *Cross-sectional*	C < I	--	I < E	--	C < E	C < E	**Univariate & Multivariate multinomial logistic regression analyses** Age, Mood, and gender	Family self-harm, Descriptive norms, Impulsitivity, & Stress.
Del Carpio et al., 2020 *Prospective (6 month)*	NS	--	NS	--	NS	--	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Nestor et al., 2022 *Prospective (2 years)*	--	NS	--	NS	--	--	**Longitudinal adjacent-category logit model** Age, Sex, Ethnic minority, Exposure to suicide, and Depression	Prior suicidal ideation & behaviour, exposure to suicide, & perceived support
Mars et al., 2019a *Prospective (5 years)*	--	--	NS	--	--	--	**Logistic regression analyses** Sex, SES	--
Exposure (Family or friend)								
Mars et al., 2019b *Cross-sectional (Family OR friend)*	C < I	--	I < E	--	C < E	--	**Multinomial logit model** Sex, SES	--
Mars et al., 2019b *Cross-sectional (Family & friend)*	C < I	--	I < E	--	C < E	--	**Multinomial logit model** Sex, SES	--
Del Carpio et al., 2020 *Cross-sectional*	NS	--	NS	--	NS	--	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Branley-bell et al., 2019 *Cross-sectional*	NS	--	I < E	--	C < E	--	**ANOVA** Age, Gender, Employment group, Previous ideation	--
Wetherall et al., 2018b *Cross-sectional*	C < I	NS	I < E	NS	C < E	NS	**Univariate and multivariate multinomial regression** Age, Gender, Marital status, Ethnicity & Economic activity, Depressive symptoms	Defeat, Entrapment, Burdensomeness, Belongingness, Goal disengagement and reengagement, Social support, Resilience, Acquired capability, Impulsivity, & Mental images.
Kirtley, 2015a *Cross-sectional (Sample 1)*	NS	--	I < E	I < E	C < E	--	**Univariate & Multivariate multinomial logistic regression analyses** Depressive symptoms	Impulsitivity
Kirtley, 2015a *Cross-sectional (Sample 2)*	NS	--	NS	--	C < E	--	**Univariate multinomial regression analyses** Depressive symptoms	--
Del Carpio et al., 2020 *Prospective (6 month)*	NS	--	NS	--	NS	--	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	--
Roland et al., 2021	--	--	--	NS	--	--	**MANOVA** None	Exposure to suicide

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Prospective (12 months)								
Prior suicidal ideation								
You et al., 2020 *Cross-sectional*	--	--	I < E	--	--	--	**T-test** MDD history	--
Porras-Segovia et al., 2023 *Prospective (6 weeks, GENESE cohort)*	--	--	I < E	--	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Insomnia, Change of antidepressant at baseline, Suicidal behaviour, Depression & Anxiety.
Porras-Segovia et al., 2023 *Prospective (6 weeks, LUEUR cohort)*	--	--	I < E	--	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Change of antidepressant at baseline, Suicidal behaviour, Depression & Anxiety.
Del Carpio et al., 2020 *Prospective (6 month)*	C > I	C > I	NS	--	C > E	C > E	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	Social support - family, Suicide stigma - stigmatisation & glorification/normalisation, & Self-harm ideation at baseline.

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Nestor et al., 2022 *Prospective (2 years)*	--	C < I	--	I < E	--	--	**Longitudinal adjacent-category logit model** Age, Sex, Ethnic minority, Exposure to suicide, and Depression	Prior suicidal behaviour & Perceived support.
Prior Suicide ideation > 4								
Porras-Segovia et al., 2023 *Prospective (6 weeks, GENESE cohort)*	--	--	NS	NS	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Insomnia, Change of antidepressant at baseline, Suicidal behaviour, Depression and Anxiety.
Porras-Segovia et al., 2023 *Prospective (6 weeks, LUEUR cohort)*	--	--	I < E	NS	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Change of antidepressant at baseline, Suicidal behaviour, Depression and Anxiety.
Suicide ideation: relative difference in over follow-up								
Porras-Segovia et al., 2023 *Prospective (6 weeks, GENESE cohort)*	--	--	I < E	I < E	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Insomnia, Change of antidepressant at baseline, Suicidal behaviour, Depression & Anxiety.

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Porras-Segovia et al., 2023 *Prospective (6 weeks, LUEUR cohort)*	--	--	I < E	NS	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Change of antidepressant at baseline, Suicidal behaviour, Depression & Anxiety.
Suicidal plans								
Mars et al., 2019a *Prospective (5 years)*	--	--	NS	--	--	--	**Logistic regression analyses** Sex, SES	--
Prior Self harm								
Perez et al., 2017 *Cross-sectional*	--	C < I	--	NS	--	C < E (Past year, not life)	**MANCOVAS** Age	Hopelessness (total and subscales), Borderline symptoms, Emotional regulation difficulties, Purpose in life subscales, Non-suicidal self-injury
Stoliker et al., 2023 *Cross-sectional*	C < I	C < I	I < E	NS	--	--	**Bivariate and multivariate regression models** None	Demographics, Hopelessness, family history (suicide and crime), Violent/sexual offence, Substance use (alcohol and drug), No wish to live, Social support, Loneliness, Sleep quantity, Aggression, Self-harm

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Porras-Segovia et al., 2023 *Prospective (6 weeks, GENESE cohort)*	--	--	I < E	I < E	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, mental health symptoms, associated treatment, insomnia, change of antidepressant at baseline, suicidal ideation, depression and anxiety.
Porras-Segovia et al., 2023 *Prospective (6 weeks, LUEUR cohort)*	--	--	I < E	I < E	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Change of antidepressant at baseline, Suicidal ideation, Depression & Anxiety.
Porras-Segovia et al., 2023 *Prospective (6 weeks, GENESE cohort)*	--	--	NS	--	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Insomnia, Change of antidepressant at baseline, Suicidal ideation, Depression & Anxiety.
Nestor et al., 2022 *Prospective (2 years)*	--	NS	--	I < E	--	--	**Longitudinal adjacent-category logit model** Age, Sex, Ethnic minority, Exposure to suicide, and Depression	Prior suicidal ideation & behaviour, & Perceived support
Non-suicidal self-harm (Frequency)								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Burke et al., 2018 *Cross-sectional*	--	--	I < E	--	--	--	**ANOVA** None	--
Mars et al., 2019a *Prospective (5 years)*	--	--	NS	--	--	--	**Logistic regression analyses** Sex, SES	--
Non-suicidal self-harm (Method)								
Mars et al., 2019a *Prospective (5 years)*	--	--	NS	--	--	--	**Logistic regression analyses** Sex, SES	--
Past year NSSI > 5								
Perez et al., 2017 *Cross-sectional*	--	C > I	--	E > I (past year, not life)	--	C < E (past year, not life)	**MANCOVAS** Age	Hopelessness (total and subscales), Borderline symptoms, Emotional regulation difficulties, Purpose in life subscales, & Non-suicidal self-injury
Mental Images								
Wetherall et al., 2018b *Cross-sectional*	C < I	C < I	I < E	I < E	C < E	C < E	**Univariate and multivariate multinomial regression** Age, Gender, Marital status, Ethnicity & Economic activity, Depressive symptoms	Defeat, Entrapment, Burdensomeness, Belongingness, Goal disengagement and reengagement, Social support, Resilience, Acquired capability, Impulsivity, & Exposure to suicide.

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Suicidal flash-forwards								
Ng et al., 2016 *Cross-sectional & Prospective (7 weeks)*	C < I[f]	--	--	--	--	--	**ANCOVA** Marital status, Psychiatric illness	--
Death/suicide implicit association test								
Harrison et al., 2018 *Cross-sectional*	--	--	NS	--	--	--	**Binary logistic regression** Suicide attempts at baseline	--
Rath et al., 2021 *Cross-sectional*	--	--	--	NS	--	--	**ANOVA** None	--
Emotional Regulation								
Melson & O'Connor, 2019 *Cross-sectional*	C > I	--	I < E	--	NS	--	**Univariate multinomial logistic regression** Age, Gender, Depressive symptoms	--
Perez et al., 2017 *Cross-sectional*	--	C < I	--	NS	--	C < E	**MANCOVAS** Age	Hopelessness (total and subscales), Borderline symptoms, Purpose in life subscales, & Non-suicidal self-injury.

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Stoliker, 2020 *Cross-sectional*	--	--	--	NS	--	--	**Multinomial logistic Regression** None	Demographics, Psychological disorder diagnosis, Hopelessness, Sleep disturbances, Social disconnectedness, Alcohol dependence, Substance use, Health, Victimisation, & Family and caregiver factors.
No wish to live								
Stoliker et al., 2023 *Cross-sectional*	C < I	NS	I < E	I < E	--	--	**Bivariate and multivariate regression models** None	Demographics, Hopelessness, Family history (suicide and crime), Violent/sexual offence, Alcohol/substance use, Social support, Loneliness, Sleep quantity, Aggression, & Self-harm.
Loneliness								
Stoliker et al., 2023 *Cross-sectional*	C < I	NS	NS	NS	--	--	**Bivariate and multivariate regression models** None	Demograhic, Hopelessness, Family history (suicide and crime), Violent/sexual offence, Alcohol/substance use, No wish to live, Social support, Sleep quantity, Aggression, & Self-harm.
McClelland et al., 2021 *Cross-sectional*	C < I	C < I	I < E	NS	C < E	NS	**Multinomial logistic regression** Coping, Defeat, Entrapment, Memory, Socially prescribed perfectionism, Social support,	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
							Stress, trauma, Suicidal ideation	
Hsu et al., 2022 *Cross-sectional*	C > I	--	--	--	--	--	**T-test** **None**	--
Social disconnectedness								
Stoliker, 2020 *Cross-sectional*	--	--	--	NS	--	--	**Multinomial logistic Regression** None	Demographic, Psychological disorder diagnosis, Hopelessness, Emotional dysregulation, Sleep disturbances, Alcohol/substance use, Health, Victimisation, Family and caregiver factors.
Subjective social status								
Hsu et al., 2022 *Cross-sectional*	C > I	--	--	--	--	--	**T-test** None	--
Inferiority								
Hsu et al., 2022 *Cross-sectional*	C > I	--	--	--	--	--	**T-test** None	--
Hopelessness								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Mars et al., 2019b *Cross-sectional*	C < I	--	I < E	--	C < E	--	**Multinomial logit model** Sex, SES	--
Branley-bell et al., 2019 *Cross-sectional*	C < I	--	NS	--	C < E	--	**ANOVA** Age, Gender, Employment group, Previous ideation	--
Perez et al., 2017 *Cross-sectional*	--	C < I	--	I < E (past year, not life)	--	C < E	**MANCOVAS** Age	Hopelessness (subscales), Borderline symptoms, Emotional regulation, Purpose in life subscales, & Non-suicidal self-injury
Stoliker et al., 2023 *Cross-sectional*	C < I	NS	NS	NS	--	--	**Bivariate and multivariate regression models** None	Demographic, Family history (suicide and crime), Violent/sexual offence, Alcohol/Substance use, No wish to live, Social support, Loneliness, Sleep quantity, Aggression, & Self-harm.
Stoliker, 2020 *Cross-sectional*	--	--	--	I < E (repeat but not single attempters)	--	--	**Multinomial logistic Regression** None	Demographic, Psychological disorder diagnosis, Hopelessness, Emotional dysregulation, Sleep disturbances, Social disconnectedness, Alcohol/substance use, Health,

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
								Victimisation, Family and caregiver factors.
Schombs, 2020 *Cross-sectional*	NS	--	--	--	C < E	--	**Welch's test** None	--
Kirtley, 2015a *Cross-sectional (Sample 1)*	NS	--	NS	--	NS	--	**Univariate multinomial logistic regression analyses** None	--
Hsu et al., 2022 *Cross-sectional*	C > I	--	--	--	--	--	**T-test** None	--
Porras-Segovia et al., 2023 *Prospective (6 weeks, LUEUR cohort)*	--	--	I < E	--	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Insomnia, Change of antidepressant at baseline, Suicidal ideation & behaviour, Depression & Anxiety.

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Mars et al., 2019a *Prospective (5 years)*	--	--	NS	--	--	--	**Logistic regression analyses** Sex, SES	--
Hopelessness - affective								
Perez et al., 2017 *Cross-sectional*	--	--	--	I < E (past year, not life)	--	C < E (past year, not life)	**MANCOVAS** Age	Hopelessness (total and subscales), Borderline symptoms, Purpose in life subscales, & Non-suicidal self-injury.
Hopelessness - motivational								
Perez et al., 2017 *Cross-sectional*	--	C < I	--	I <E	--	C < E	**MANCOVAS** Age	Hopelessness (total and subscales), Borderline symptoms, Purpose in life subscales, & Non-suicidal self-injury.
Hopelessness - cognitive								
Perez et al., 2017 *Cross-sectional*	--	C < I	--	NS	--	C < E	**MANCOVAS** Age	Hopelessness (total and subscales), Borderline symptoms, Purpose in life subscales, & Non-suicidal self-injury.
Relative difference in hopelessness score over follow-up								
Porras-Segovia et al., 2023 *Prospective (6 weeks, LUEUR cohort)*	--	--	I < E	--	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Insomnia, Change of antidepressant at baseline, Suicidal ideation & behaviour, Depression & Anxiety.

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Dissociation								
Pachkowski, 2017 *Cross-sectional*	C < I[g]		I < E[g] (life time but not past year)		--		**Independent samples t-tests** Belongingness, Emotional dysregulation, BPD symptoms, PTSD symptoms, Suicidal desire, NSSI frequency, Capability for suicide	--
Body dissatisfaction								
Mars et al., 2019b *Prospective (3 years)*	C < I	--	I < E	--	C < E	--	**Multinomial logit model** Sex, SES	--
Mars et al., 2019a *Prospective (8 years)*	--	--	NS	--	--	--	**Logistic regression analyses** Sex, SES	--
Self-esteem								
O'Connor et al., 2012b *Cross-sectional*	C > I	--	NS	--	C > E	--	**Univariate multinomial logistic regression analyses** Age, Mood, and gender	--
Del Carpio et al., 2020 *Cross-sectional*	NS	--	NS	--	NS	--	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Del Carpio et al., 2020 *Prospective (6 month)*	NS	--	NS	--	NS	--	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	--
Eating Restraint								
Burke et al., 2018 *Cross-sectional*	--	--	NS	--	--	--	**ANOVA** None	--
Optimism								
Melson & O'Connor, 2019 *Cross-sectional*	NS	--	I < E	--	NS	--	**Univariate multinomial logistic regression** Age, Gender, Depressive symptoms	--
O'Connor et al., 2012b *Cross-sectional*	C > I	--	NS	--	C > E	--	**Univariate multinomial logistic regression analyses** Age, Mood, and Gender	--
Purpose in life								
Perez et al., 2017 *Cross-sectional*	--	C > I	--	I > E (past year, not life)	--	C > E	**MANCOVAS** Age	Hopelessness (total and subscales), Borderline symptoms, Purpose in life subscales, & Non-suicidal self-injury.
Purpose in life - meaning								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Perez et al., 2017 *Cross-sectional*	--	C > I	--	NS	--	C > E	**MANCOVAS** Age	Hopelessness (total and subscales), Borderline symptoms, Purpose in life subscales, & Non-suicidal self-injury.
Purpose in life - goals								
Perez et al., 2017 *Cross-sectional*	--	C > I	--	I > E (past year, not life)	--	C > E (past year, not life)	**MANCOVAS** Age	Hopelessness (total and subscales), Borderline symptoms, Purpose in life subscales, & Non-suicidal self-injury.
Social comparison								
Cleare, 2019 *Cross-sectional*	C > I	NS	--	--	--	--	**Univariate binary logistic regression analyses and multivariate regression analyses** Depressive symptoms	Sexual orientation, Depressive symptoms, Defeat, Entrapment, Self-compassion, Stress, Self-criticism, Mindfullness, & Resilience.
Cleare, 2019 *Prospective (2.5 months)*	C > I	NS	--	--	--	--	**Univariate binary logistic regression analyses and multivariate regression analyses** Baseline suicidal ideation	Depressive symptoms, Defeat, Entrapment, Self-compassion, Stress, Self-criticism, Mindfulness, & Resilience
Extraversion								
Mars et al., 2019b *Prospective (2 years)*	C < I	--	NS	--	C < E	--	**Multinomial logit model** Sex, SES	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Mars et al., 2019a *Prospective (7 years)*	--	--	NS	--	--	--	**Logistic regression analyses** Sex, SES	--
Agreeableness								
Mars et al., 2019b *Prospective (2 years)*	C < I	--	NS	--	NS	--	**Multinomial logit model** Sex, SES	--
Mars et al., 2019a *Prospective (7 years)*	--	--	NS	--	--	--	**Logistic regression analyses** Sex, SES	--
Conscientiousness								
Mars et al., 2019b *Prospective (2 years)*	C > I	--	I > E	--	C > E	--	**Multinomial logit model** Sex, SES	--
Mars et al., 2019a *Prospective (7 years)*	--	--	NS	--	--	--	**Logistic regression analyses** Sex, SES	--
Emotional stability								
Mars et al., 2019b *Prospective (2 years)*	C > I	--	NS	--	C > E	--	**Multinomial logit model** Sex, SES	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Mars et al., 2019a *Prospective (7 years)*	--	--	NS	--	--	--	**Logistic regression analyses** Sex, SES	--
Intellect/openness								
Mars et al., 2019b *Prospective (2 years)*	C < I	--	NS	--	NS	--	**Multinomial logit model** Sex, SES	--
Mars et al., 2019a *Prospective (7 years)*	--	--	I < E	--	--	--	**Logistic regression analyses** Sex, SES	--
Intelligence quotient								
Mars et al., 2019b *Prospective (8 years)*	C < I	--	I > E	--	NS	--	**Multinomial logit model** Sex, SES	--
Mars et al., 2019a *Prospective (13 years)*	--	--	NS	--	--	--	**Logistic regression analyses** Sex, SES	--
Total self-compassion								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Cleare, 2019 *Cross-sectional*	C > I	C > I	--	--	--	--	**Univariate binary logistic regression analyses & multivariate regression analyses** Depressive symptoms	Sexual orientation, Defeat, Entrapment, Stress, Self-criticism, Social comparison, Mindfullness, & Resilience.
Cleare, 2019 *Prospective (2.5 months)*	C > I	NS	--	--	--	--	**Univariate binary logistic regression analyses and multivariate regression analyses** Baseline suicidal ideation	Depressive symptoms, Defeat, Entrapment, Stress, Self-criticism, Social comparison, Mindfulness, & Resilience.
Self-compassion: self-kindness								
Cleare, 2019 *Cross-sectional*	C > I	C > I[e]	--	--	--	--	**Univariate binary logistic regression analyses & multivariate regression analyses** Depressive symptoms	Self-compassion subscales
Cleare, 2019 *Prospective (2.5 months)*	C > I	NS	--	--	--	--	**Univariate binary logistic regression analyses & multivariate regression analyses** Baseline suicidal ideation	Self-compassion subscales
Self compassion : Common humanity								
Cleare, 2019 *Cross-sectional*	C > I	NS	--	--	--	--	**Univariate binary logistic regression analyses & multivariate regression analyses** Depressive symptoms	Self-compassion subscales

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Cleare, 2019 *Prospective (2.5 months)*	C > I	NS	--	--	--	--	**Univariate binary logistic regression analyses & multivariate regression analyses** Baseline suicidal ideation	Self-compassion subscales
Self compassion : mindfulness								
Cleare, 2019 *Cross-sectional*	C > I	NS	--	--	--	--	**Univariate binary logistic regression analyses & multivariate regression analyses** Depressive symptoms	Self-compassion subscales
Cleare, 2019 *Prospective (2.5 months)*	NS	--	--	--	--	--	**Univariate binary logistic regression analyses** Baseline suicidal ideation	
Self compassion : Self judgement								
Cleare, 2019 *Cross-sectional*	C < I	C < I[e]	--	--	--	--	**Univariate binary logistic regression analyses & multivariate regression analyses** Depressive symptoms	Self-compassion subscales
Cleare, 2019 *Prospective (2.5 months)*	C < I	NS	--	--	--	--	**Univariate binary logistic regression analyses & multivariate regression analyses** Baseline suicidal ideation	Self-compassion subscales

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Self compassion : Isolation								
Cleare, 2019 *Cross-sectional*	C < I	C < I[e]	--	--	--	--	**Univariate binary logistic regression analyses & multivariate regression analyses** Depressive symptoms	Self-compassion subscales
Cleare, 2019 *Prospective (2.5 months)*	C < I	NS	--	--	--	--	**Univariate binary logistic regression analyses & multivariate regression analyses** Baseline suicidal ideation	Self-compassion subscales
Self compassion : over-identification								
Cleare, 2019 *Cross-sectional*	C < I	NS	--	--	--	--	**Univariate binary logistic regression analyses & multivariate regression analyses** Depressive symptoms	Self-compassion subscales
Cleare, 2019 *Prospective (2.5 months)*	NS	--	--	--	--	--	**Univariate binary logistic regression analyses** Baseline suicidal ideation	
Total self criticism								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Cleare, 2019 *Cross-sectional*	C < I	C < I	--	--	--	--	**Univariate binary logistic regression analyses & multivariate regression analyses** Depressive symptoms	Sexual orientation, Defeat, Entrapment, Self-compassion, Stress, Social comparison, Mindfullness, & Resilience.
Cleare, 2019 *Prospective (2.5 months)*	C < I	NS	--	--	--	--	**Univariate binary logistic regression analyses & multivariate regression analyses** Baseline suicidal ideation	Depressive symptoms, Defeat, Entrapment, Self-compassion, Stress, Social comparison, Mindfulness, & Resilience
Self-criticism: reassured self								
Cleare, 2019 *Cross-sectional*	C > I	--	--	--	--	--	**Univariate binary logistic regression analyses** Depressive symptoms	--
Cleare, 2019 *Prospective (2.5 months)*	C > I	--	--	--	--	--	**Univariate binary logistic regression analyses** Baseline suicidal ideation	--
Self criticism : hated self								
Cleare, 2019 *Cross-sectional*	C < I	--	--	--	--	--	**Univariate binary logistic regression analyses** Depressive symptoms	--
Cleare, 2019	C < I	--	--	--	--	--	**Univariate binary logistic regression analyses** Baseline suicidal ideation	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Prospective (2.5 months)								
Self criticism : insecure self								
Cleare, 2019 *Cross-sectional*	C < I	--	--	--	--	--	**Univariate binary logistic regression analyses** Depressive symptoms	--
Cleare, 2019 *Prospective (2.5 months)*	C < I	--	--	--	--	--	**Univariate binary logistic regression analyses** Baseline suicidal ideation	--
Total Mindfulness								
Cleare, 2019 *Cross-sectional*	C > I	NS	--	--	--	--	**Univariate binary logistic regression analyses & multivariate regression analyses** Depressive symptoms	Sexual orientation, Defeat, Entrapment, Self-compassion, Stress, Self-criticism, Social comparison, & Resilience.
Cleare, 2019 *Prospective (2.5 months)*	C > I	NS	--	--	--	--	**Univariate binary logistic regression analyses & multivariate regression analyses** Baseline suicidal ideation	Depressive symptoms, Defeat, Entrapment, Self-compassion, Stress, Self-criticism, Social comparison, & Resilience
Mindfulness: observing								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Cleare, 2019 *Cross-sectional*	NS	--	--	--	--	--	**Univariate binary logistic regression analyses** Depressive symptoms	--
Cleare, 2019 *Prospective (2.5 months)*	NS	--	--	--	--	--	**Univariate binary logistic regression analyses** Baseline suicidal ideation	--
Mindfulness: non reaction								
Cleare, 2019 *Cross-sectional*	C > I	--	--	--	--	--	**Univariate binary logistic regression analyses** Depressive symptoms	--
Cleare, 2019 *Prospective (2.5 months)*	C > I	--	--	--	--	--	**Univariate binary logistic regression analyses** Baseline suicidal ideation	--
Mindfulness: describing								
Cleare, 2019 *Cross-sectional*	C > I	--	--	--	--	--	**Univariate binary logistic regression analyses** Depressive symptoms	--
Cleare, 2019	C > I	--	--	--	--	--	**Univariate binary logistic regression analyses** Baseline suicidal ideation	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Prospective (2.5 months)								
Mindfulness: acting with awareness								
Cleare, 2019 *Cross-sectional*	C > I	--	--	--	--	--	**Univariate binary logistic regression analyses** Depressive symptoms	--
Cleare, 2019 *Prospective (2.5 months)*	NS	--	--	--	--	--	**Univariate binary logistic regression analyses** Baseline suicidal ideation	--
Mindfulness: non-judging								
Cleare, 2019 *Cross-sectional*	C > I	--	--	--	--	--	**Univariate binary logistic regression analyses** Depressive symptoms	--
Cleare, 2019 *Prospective (2.5 months)*	C > I	--	--	--	--	--	**Univariate binary logistic regression analyses** Baseline suicidal ideation	--
Executive functioning - Updating								
Mars et al., 2019b	NS	--	NS	--	NS	--	**Multinomial logit model** Sex, SES	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Prospective (8 years)								
Mars et al., 2019a *Prospective (13 years)*	--	--	NS	--	--	--	**Logistic regression analyses** Sex, SES	--
Executive functioning - Attentional switching								
Mars et al., 2019b *Prospective (8 years)*	NS	--	NS	--	NS	--	**Multinomial logit model** Sex, SES	--
Mars et al., 2019a *Prospective (13 years)*	--	--	NS	--	--	--	**Logistic regression analyses** Sex, SES	--
Executive functioning - Attentional Control								
Mars et al., 2019b *Prospective (8 years)*	NS	--	NS	--	NS	--	**Multinomial logit model** Sex, SES	--
Mars et al., 2019a *Prospective (13 years)*	--	--	NS	--	--	--	**Logistic regression analyses** Sex, SES	--
Goal directed behaviours difficulties								
You et al., 2020	C < I	--	NS	--	C < E	--	**ANCOVA** MDD history	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Cross-sectional								
Stress								
Melson & O'Connor, 2019 *Cross-sectional*	C < I	--	I < E	--	NS	--	**Univariate multinomial logistic regression** Age, Gender, Depressive symptoms	--
O'Connor et al., 2012b *Cross-sectional*	C < I	--	I < E	--	C < E	C < E	**Univariate & Multivariate multinomial logistic regression analyses** Age, Mood, and gender	Family and friend self harm, Descriptive norms, & Impulsitivity.
Cleare, 2019 *Cross-sectional*	C < I	NS	--	--	--	--	**Univariate binary logistic regression analyses and multivariate regression analyses** Depressive symptoms	Sexual orientation, Defeat, Entrapment, Self-compassion, Self-criticism, Social comparison, Mindfullness, & Resilience.
Cleare, 2019 *Prospective (2.5 months)*	C < I	NS	--	--	--	--	**Univariate binary logistic regression analyses and multivariate regression analyses** Baseline suicidal ideation	Suicidal ideation, Depressive symptoms, Defeat, Entrapment, Self-compassion, Self-criticism, Social comparison, Mindfulness, & Resilience
Role Change/Disruption								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Stewart et al., 2019 *Cross-sectional (Acute)*	NS	--	NS	--	NS	--	**Negative binomial regression analyses** Abuse, Psychiatric disorders, Depressive symptoms, Hopelessness, Suicidal ideation	--
Stewart et al., 2019 *Cross-sectional (Chronic)*	C < I	--	NS	--	C < E	--	**Negative binomial regression analyses** Abuse, Psychiatric disorders, Depressive symptoms, Hopelessness, Suicidal ideation	--
Trauma								
Richardson et al., 2023 *Cross-sectional*	--	--	--	I < E	--	--	**Multivariate multinomial logistic regression** None	Demographics, Heath, Smoking history, Mental health diagnosis, Hospital admission, Childhood adversity, & Social support.
Physical danger								
Stewart et al., 2019 *Cross-sectional (Acute)*	NS	--	NS	--	NS	--	**Negative binomial regression analyses** Abuse, Psychiatric disorders, Depressive symptoms, Hopelessness, Suicidal ideation	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Stewart et al., 2019 *Cross-sectional (Chronic)*	NS	--	NS	--	NS	--	**Negative binomial regression analyses** Abuse, Psychiatric disorders, Depressive symptoms, Hopelessness, Suicidal ideation	--
Bereavement/Interpersonal loss								
Stewart et al., 2019 *Cross-sectional (Acute)*	NS	NS	I < E	I < E	C <E	C <E	**Negative binomial regression analyses & Adjusted omnibus multinomial regression analysis** Abuse, Psychiatric disorders, Depressive symptoms, Hopelessness, Suicidal ideation	--
Del Carpio et al., 2020 *Cross-sectional*	NS	--	NS	--	NS	--	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	--
Stewart et al., 2019 *Cross-sectional (Chronic)*	NS	--	NS	--	C <E	--	**Negative binomial regression analyses** Abuse, Psychiatric disorders, Depressive symptoms, Hopelessness, Suicidal ideation	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Del Carpio et al., 2020 *Prospective (6 month)*	NS	--	NS	--	NS	--	**Hierarchical multinomial logistic regressions** Age, Gender, Depression and Anxiety	--
Sleep disturbances								
Stoliker et al., 2023 *Cross-sectional*	NS	NS	NS	NS	--	--	**Bivariate and multivariate regression models** None	Demographics, Hopelessness, family history (suicide and crime), Violent/sexual offence, Alcohol/Substance use, No wish to live, Social support, Loneliness, Aggression, & Self-harm.
Sleep quantity								
Stoliker, 2020 *Cross-sectional*	--	--	--	NS	--	--	**Multinomial logistic Regression** None	Demographics, Psychological disorder diagnosis, Hopelessness, Emotional dysregulation, Sleep disturbances, Social disconnectedness, Substance/alcohol use, Health, Victimisation, Family & caregiver factors.
Insomnia								
Porras-Segovia et al., 2023 *Prospective (6 weeks,*	--	--	NS	NS	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Change of antidepressant at baseline, Suicidal ideation & behaviour, Depression & Anxiety.

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
GENESE cohort)								
Insomnia: relative difference over follow-up								
Porras-Segovia et al., 2023 *Prospective (6 weeks, GENESE cohort)*	--	--	NS	NS	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Change of antidepressant at baseline, Suicidal ideation & behaviour, Depression & Anxiety.
Sleep problems (Waking in the night)								
Mars et al., 2019a *Prospective (6 years)*	--	--	NS	--	--	--	**Logistic regression analyses** Sex, SES	--
Sleep problems (Insufficient sleep)								
Mars et al., 2019a *Prospective (6 years)*	--	--	NS	--	--	--	**Logistic regression analyses** Sex, SES	--
Depression symptoms/diagnosis								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Stoliker, 2020 *Cross-sectional*	--	--	--	I < E (single and repeat attempters)	--	--	**Multinomial logistic Regression** None	Demographics, Psychological disorder diagnosis, Hopelessness, Emotional dysregulation, Sleep disturbances, Social disconnectedness, Alcohol/substance used, Health, Victimisation, Family and caregiver factors.
Vergara et al., 2019 *Cross-sectional*	--	--	NS	--	--	--	**T-test** None	--
Rossi, 2019 *Cross-sectional*	C < I	--	I < E	--	C < E	--	**Binary logistic regression** None	--
Schombs, 2020 *Cross-sectional*	NS	--	I < E	--	C < E;	--	**ANOVA** None	--
Branley-bell et al., 2019 *Cross-sectional*	C < I	--	NS	--	C < E	--	**ANOVA** Age, Gender, Employment group, Previous ideation	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Nestor et al., 2022 *Cross-sectional*	--	C < I	--	I < E	--	--	**Longitudinal adjacent-category logit model** Age, Sex, Ethnic minority, Exposure to suicide, and Depression	Prior suicidal ideation & behaviour, Exposure to suicide & Perceived support
Porras-Segovia et al., 2023 *Prospective (6 weeks, GENESE cohort)*	--	--	NS	--	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Change of antidepressant at baseline, Suicidal ideation & behaviour, Insomnia, Depression & anxiety.
Porras-Segovia et al., 2023 *Prospective (6 weeks, LUEUR cohort)*	--	--	I < E	--	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Change of antidepressant at baseline, Suicidal ideation & behaviour, Insomnia, Depression & Anxiety.
Mars et al., 2019b *Prospective (4 years)*	--	C < I	--	NS	--	C < E	**Multinomial logit model** Sex, SES	--
Mars et al., 2019a *Prospective (5 years)*	--	--	NS	--	--	--	**logistic regression analyses** Sex, SES	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Mars et al., 2019b *Prospective - Depressive (1 years)*	C < I	--	I < E	--	C < E	--	**Multinomial logit model** Sex, SES	--
Nestor et al., 2022 *Prospective (2 years)*	--	NS	--	I < E	--	--	**Longitudinal adjacent-category logit model** Age, Sex, Ethnic minority, Exposure to suicide, and Depression	Prior suicidal ideation & behaviour, Exposure to suicide & Perceived support.
Lifetime number of depressive episodes								
Porras-Segovia et al., 2023 *Prospective (6 weeks, GENESE cohort)*	--	--	NS	--	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Change of antidepressant at baseline, Suicidal ideation & behaviour, Insomnia, Depression & anxiety.
Porras-Segovia et al., 2023 *Prospective (6 weeks, LUEUR cohort)*	--	--	NS	--	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Change of antidepressant at baseline, Suicidal ideation & behaviour, Insomnia & Anxiety.
Age at onset of first depressive episode								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Porras-Segovia et al., 2023 *Prospective (6 weeks, GENESE cohort)*	--	--	NS	--	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Change of antidepressant at baseline, Suicidal ideation & behaviour, Insomnia & Anxiety.
Porras-Segovia et al., 2023 *Prospective (6 weeks, LUEUR cohort)*	--	--	NS	--	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Change of antidepressant at baseline, Suicidal ideation & behaviour, Insomnia & Anxiety.
Duration of current depressive episode (weeks)								
Porras-Segovia et al., 2023 *Prospective (6 weeks, GENESE cohort)*	--	--	NS	--	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Change of antidepressant at baseline, Suicidal ideation & behaviour, Insomnia & Anxiety.

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Porras-Segovia et al., 2023 *Prospective (6 weeks, LUEUR cohort)*	--	--	NS	--	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Change of antidepressant at baseline, Suicidal ideation & behaviour, Insomnia & Anxiety.
Depression score: relative difference over follow-up								
Porras-Segovia et al., 2023 *Prospective (6 weeks, GENESE cohort)*	--	--	I < E	--	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Change of antidepressant at baseline, Suicidal ideation & behaviour, Insomnia & Anxiety.
Porras-Segovia et al., 2023 *Prospective (6 weeks, LUEUR cohort)*	--	--	I < E	--	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Change of antidepressant at baseline, Suicidal ideation & behaviour, Insomnia & Anxiety.
Anxiety disorder/symptoms								
Vergara et al., 2019 *Cross-sectional*	--	--	NS	--	--	--	**T-test** None	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Stoliker, 2020 *Cross-sectional*	--	--	--	NS	--	--	**Multinomial logistic Regression** None	Demographic, Psychological disorder diagnosis, Hopelessness, Emotional dysregulation, Sleep disturbances, Social disconnectedness, Alcohol/substance use, Victimisation, Family and caregiver factors.
Rossi, 2019 *Cross-sectional*	C < I	--	I < E	--	C < E	--	**Binary logistic regression** None	--
Mars et al., 2019b *Prospective - Anxiety (1 years)*	C < I	--	I < E	--	C < E	--	**Multinomial logit model** Sex, SES	--
Anxiety score: baseline								
Porras-Segovia et al., 2023 *Prospective (6 weeks, GENESE cohort)*	--	--	NS	--	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Change of antidepressant at baseline, Suicidal ideation & behaviour, Insomnia & Depression.

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Porras-Segovia et al., 2023 *Prospective (6 weeks, LUEUR cohort)*	--	--	I < E	--	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Change of antidepressant at baseline, Suicidal ideation & behaviour, Insomnia & Depression.
Anxiety score: relative difference over follow-up								
Porras-Segovia et al., 2023 *Prospective (6 weeks, GENESE cohort)*	--	--	I < E	--	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Change of antidepressant at baseline, Suicidal ideation & behaviour, Insomnia & Depression.
Porras-Segovia et al., 2023 *Prospective (6 weeks, LUEUR cohort)*	--	--	I < E	--	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Change of antidepressant at baseline, Suicidal ideation & behaviour, Insomnia & Depression.
Depression and anxiety symptoms/diagnosis								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Porras-Segovia et al., 2023 *Prospective (6 weeks, GENESE cohort)*	--	--	I < E	NS	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Change of antidepressant at baseline, Suicidal ideation & behaviour, Insomnia & Depression.
Porras-Segovia et al., 2023 *Prospective (6 weeks, LUEUR cohort)*	--	--	I < E	NS	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Change of antidepressant at baseline, Suicidal ideation & behaviour, Insomnia & Depression.
Depression and anxiety symptoms/diagnosis: relative difference over follow-up								
Porras-Segovia et al., 2023 *Prospective (6 weeks, GENESE cohort)*	--	--	NS	NS	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Change of antidepressant at baseline, Suicidal ideation & behaviour, & Insomnia.

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Porras-Segovia et al., 2023 *Prospective (6 weeks, LUEUR cohort)*	--	--	I < E	NS	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Demographics, Mental health symptoms, Associated treatment, Change of antidepressant at baseline, Suicidal ideation & behaviour, & Insomnia.
Mood disorder								
Vergara et al., 2019 *Cross-sectional*	--	--	NS	--	--	--	**T-test** None	--
Externalising disorder								
Vergara et al., 2019 *Cross-sectional*	--	--	NS	--	--	--	**T-test** None	--
Bipolar/related diagnosis								
Stoliker, 2020 *Cross-sectional*	--	--	--	I < E (repeat but not single attempters)	--	--	**Multinomial logistic Regression** None	Demographics, Psychological disorder diagnosis, Hopelessness, Emotional dysregulation, Sleep disturbances, Social disconnectedness, Alcohol/substance use, Health, Victimisation, Family and caregiver factors.
Mania								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Rossi, 2019 *Cross-sectional*	C < I	--	I < E	--	C < E	--	**Binary logistic regression** None	--
Schizophrenia/psychotic diagnosis/symptoms								
Stoliker, 2020 *Cross-sectional*	--	--	--	I < E (repeat but not single attempters)	--	--	**Multinomial logistic Regression** None	Demographic, Psychological disorder diagnosis, Hopelessness, Emotional dysregulation, Sleep disturbances, Social disconnectedness, Alcohol/substance use, Health, Victimisation, Family and caregiver factors.
Stoliker, 2020 *Cross-sectional*	--	--	--	I < E (repeat but not single attempters)	--	--	**Multinomial logistic Regression** None	Demographic and psychological disorder diagnosis, hopelessness, emotional dysregulation, sleep disturbances, social disconnectedness, alcohol/substance use, physical health issues, victimisation, family & caregiver factors.
Post-traumatic stress disorder diagnosis								
Stoliker, 2020 *Cross-sectional*	--	--	--	I < E (repeat but not single attempters)	--	--	**Multinomial logistic Regression** None	Demographic, Psychological disorder diagnosis, Hopelessness, Emotional dysregulation, Sleep disturbances, Social disconnectedness, Alcohol/substance use, Physical

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
								health issues, Victimisation, Family and caregiver factors.
Rossi, 2019 *Cross-sectional*	C < I	--	I < E	--	C < E	--	**Binary logistic regression** None	--
Personality disorder diagnosis								
Stoliker, 2020 *Cross-sectional*	--	--	--	NS	--	--	**Multinomial logistic Regression** None	Demographic, Psychological disorder diagnosis, Hopelessness, Emotional dysregulation, Sleep disturbances, Social disconnectedness, Alcohol/substance use, Health, victimisation, Family & caregiver factors.
Borderline Personality								
Rossi, 2019 *Cross-sectional*	C < I	--	I < E	--	C < E	--	**Binary logistic regression** None	--
Borderline symptoms								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Perez et al., 2017 *Cross-sectional*	--	C < I	--	I < E (past year, not life)	--	C < E	**MANCOVAS** Age	Hopelessness (total and subscales), Borderline symptoms, Purpose in life subscales & Non-suicidal self-injury.
Antisocial Personality								
Rossi, 2019 *Cross-sectional*	C < I	--	I < E	--	C < E	--	**Binary logistic regression** None	--
Schizotypal Personality								
Rossi, 2019 *Cross-sectional*	C < I	--	I < E	--	C < E	--	**Binary logistic regression** None	--
Substance use disorder								
Rossi, 2019 *Cross-sectional*	C < I	--	I < E	--	C < E	--	**Binary logistic regression** None	--
Psychiatric disorders								
Vergara et al., 2019 *Cross-sectional*	--	--	NS	--	--	--	**T-test** None	--
Richardson et al., 2023 *Cross-sectional*	--	--	--	I < E	--	--	**Multivariate multinomial logistic regression** None	Demographics, Heath, Smoking history, Hospital admission, Childhood adversity, Trauma, & Social support.

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Mars et al., 2019b *Prospective (1 years)*	C < I	--	I < E	--	C < E	--	**Multinomial logit model** Sex, SES	--
Mars et al., 2019a *Prospective (6 years)*	--	--	NS	--	--	--	**Logistic regression analyses** Sex, SES	--
Mental health - self diagnosis								
Richardson et al., 2023 *Cross-sectional*	--	--	--	I > E	--	--	**Multivariate multinomial logistic regression** None	Demographics, Heath, Smoking history, Mental health diagnosis, Hospital admission, Childhood adversity, Trauma & Social support.
Mental health related hospital admission								
Richardson et al., 2023 *Cross-sectional*	--	--	--	I < E	--	--	**Multivariate multinomial logistic regression** None	Demographics, Heath, Smoking history, Mental health diagnosis, Childhood adversity, Trauma, & Social support.
Patient and clinician prediction of likelihood of suicide attempt								
Harrison et al., 2018 *Cross-sectional*	--	--	NS	--	--	--	**Binary logistic regression** Suicide attempts at baseline	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Harrison et al., 2018 *Prospective (3 months and 6 months)*	--	--	NS	--	--	--	**Binary logistic regression** Suicide attempts at baseline	--
Associated treatment								
Porras-Segovia et al., 2023 *Prospective (6 weeks, GENESE cohort)*	--	--	NS	--	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Mental health symptoms, Change of antidepressant at baseline, Suicidal ideation & behaviour, Insomnia, Depression & anxiety
Porras-Segovia et al., 2023 *Prospective (6 weeks, LUEUR cohort)*	--	--	I < E	I < E	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Mental health symptoms, Change of antidepressant at baseline, Suicidal ideation & behaviour, Insomnia, Depression & anxiety
Antidepressant initiation								
Porras-Segovia et al., 2023 *Prospective (6 weeks,*	--	--	NS	--	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Mental health symptoms, Associated treatment, Suicidal ideation & behaviour, Insomnia, Depression & anxiety.

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
GENESE cohort)								
Porras-Segovia et al., 2023 *Prospective (6 weeks, LUEUR cohort)*	--	--	E < I	NS	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Mental health symptoms, Associated treatment, Suicidal ideation & behaviour, Insomnia, Depression & Anxiety.
Violent/sexual offense or aggression								
Stoliker et al., 2023 *Cross-sectional*	NS	NS	NS	NS	--	--	**Bivariate and multivariate regression models** None	Demographics, Hopelessness, family history (suicide and crime), Alcohol/substance use, No wish to live, Social support, Loneliness, Sleep quantity & Self-harm
Burke et al., 2018 *Cross-sectional*	--	--	NS	--	--	--	**ANOVA** None	--
Rossi, 2019 *Cross-sectional*	C < I	--	I < E	--	C < E	--	**Binary logistic regression** None	--
Intimidation use								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Stoliker et al., 2023 *Cross-sectional*	NS	NS	I < E	I < E	--	--	**Bivariate and multivariate regression models** None	Demographics, Hopelessness, Family history (suicide and crime), Alcohol use, No wish to live, Social support, Loneliness, Sleep quantity & Self-harm
Bullying/Victimization								
Vergara et al., 2019 *Cross-sectional*	--	--	I < E	--	--	--	**T-test** None	--
Stoliker, 2020 *Cross-sectional*	--	--	--	I < E (repeat but not single attempters)	--	--	**Multinomial logistic Regression** None	Demographics, Psychological disorder diagnosis, Hopelessness, Emotional dysregulation, Sleep disturbances, Social disconnectedness, alcohol/substance use, Health, family & caregiver factors.
Stoliker, 2020 *Cross-sectional*	--	--	--	I < E (repeat but not single attempters)	--	--	**Multinomial logistic Regression** None	Demographics, psychological disorder diagnosis, hopelessness, emotional dysregulation, sleep disturbances, social disconnectedness, alcohol/substance use, physical health issues, family and caregiver factors.
Vergara et al., 2019	--	--	I < E	--	--	--	**T-test** None	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Cross-sectional								
Victimisation - Sexual minority population (low and high)								
Lange et al., 2022 *Cross-sectional*	--	C < I (Life, not past year SI)	--	--	--	--	**Logistic regression analysis** Age and sex assigned at birth	--
Victimisation - Gender minority population (low and high)								
Lange et al., 2022 *Cross-sectional*	--	C < I	--	--	--	--	**Logistic regression analysis** Age and sex assigned at birth	--
Internalized homonegativity								
Lange et al., 2022 *Cross-sectional*	--	C < I	--	--	--	--	**Logistic regression analysis** Age and sex assigned at birth	--
Stigma consciousness								
Lange et al., 2022 *Cross-sectional*	--	C < I	--	--	--	--	**Logistic regression analysis** Age and sex assigned at birth	--
Alcohol use/dependence								
Burke et al., 2018 *Cross-sectional*	--	--	NS	--	--	--	**ANOVA** None	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Stoliker et al., 2023 *Cross-sectional*	C < I	NS	NS	NS	--	--	**Bivariate and multivariate regression models** None	Demographic variables, Hopelessness, Family history (suicide and crime), Violent/sexual offence, No wish to live, Social support, Loneliness, Sleep quantity, Aggression & Self-harm
Stoliker, 2020 *Cross-sectional*	--	--	--	NS	--	--	**Multinomial logistic Regression** None	Demographic variables, Psychological disorder diagnosis, Hopelessness, Emotional dysregulation, Sleep disturbances, Social disconnectedness, Alcohol/substance use, Health, Victimisation, Family & caregiver characteristics.
Porras-Segovia et al., 2023 *Prospective (6 weeks, GENESE cohort)*	--	--	NS	--	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Mental health symptoms, Associated treatment, Suicidal ideation & behaviour, Insomnia, Depression & anxiety.

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Porras-Segovia et al., 2023 *Prospective (6 weeks, LUEUR cohort)*	--	--	I < E	--	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Mental health symptoms, Associated treatment, Suicidal ideation & behaviour, Insomnia, Depression & anxiety.
Mars et al., 2019b *Prospective (1 year)*	NS	--	NS	--	C < E	--	**Multinomial logit model** Sex, SES	--
Mars et al., 2019a *Prospective (6 years)*	--	--	NS	--	--	--	**logistic regression analyses** Sex, SES	--
Drinks per week								
Porras-Segovia et al., 2023 *Cross-sectional (GENESE cohort)*	--	--	NS	--	--	--	**Univariate and multivariate logistic regression** Demographic characteristics	Mental health symptoms, Associated treatment, Suicidal ideation & behaviour, Insomnia, Depression & Anxiety.
Heavy Drinking Frequency								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Melson & O'Connor, 2019 *Cross-sectional*	NS	NS	I < E	I < E	C < E	NS	**Univariate multinomial logistic regression** Age, Gender, Depressive symptoms	--
Comprehensive Effects of Alcohol: Sociability								
Melson & O'Connor, 2019 *Cross-sectional*	NS	--	NS	--	NS		**Univariate multinomial logistic regression** Age, Gender, Depressive symptoms	--
Comprehensive Effects of Alcohol: Tension Reduction								
Melson & O'Connor, 2019 *Cross-sectional*	NS	--	NS	--	NS		**Univariate multinomial logistic regression** Age, Gender, Depressive symptoms	--
Comprehensive Effects of Alcohol: Liquid Courage								
Melson & O'Connor, 2019 *Cross-sectional*	NS	--	NS	--	C < E		**Univariate multinomial logistic regression** Age, Gender, Depressive symptoms	--
Comprehensive Effects of Alcohol: Cognitive & Behavioural Impairment								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Melson & O'Connor, 2019 *Cross-sectional*	C < I	--	NS	--	C < E		**Univariate multinomial logistic regression** Age, Gender, Depressive symptoms	--
Comprehensive Effects of Alcohol: Self-Perception								
Melson & O'Connor, 2019 *Cross-sectional*	C < I	NS	I < E	NS	C < E	NS	**Univariate multinomial logistic regression** Age, Gender, Depressive symptoms	--
Comprehensive Effects of Alcohol: Risk & Aggression								
Melson & O'Connor, 2019 *Cross-sectional*	NS	--	NS	--	C < E	--	**Univariate multinomial logistic regression** Age, Gender, Depressive symptoms	--
Alcohol Expectancy: Self-Harm								
Melson & O'Connor, 2019 *Cross-sectional*	C < I	NS	I < E	NS	C < E	C < E	**Univariate multinomial logistic regression** Age, Gender, Depressive symptoms	--
Interpersonal violence/intoxicated								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Stoliker et al., 2023 *Cross-sectional*	C < I	NS	NS	I < E	--	--	**Bivariate and multivariate regression models** None	Demographics, Hopelessness, Family history (suicide and crime), Violent/sexual offence, Alcohol/substance use, No wish to live, Social support, Loneliness, Sleep quantity, Aggression & Self-harm.
Cannabis								
Mars et al., 2019b *Prospective (1 year)*	C < I	--	NS	--	C < E	--	**Multinomial logit model** Sex, SES	--
Mars et al., 2019a *Prospective (6 years)*	--	--	I < E	--	--	--	**logistic regression analyses** Sex, SES	--
Smoking								
Richardson et al., 2023 *Cross-sectional*	--	--	--	I > E	--	--	**Multivariate multinomial logistic regression** None	Demographics, Heath, Mental health diagnosis, Hospital admission, Childhood adversity, Trauma, & Social support.
Mars et al., 2019b *Prospective (1 year)*	C < I	--	I < E	--	C < E	--	**Multinomial logit model** Sex, SES	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Mars et al., 2019a *Prospective (6 years)*	--	--	NS	--	--	--	**logistic regression analyses** Sex, SES	--
Drug use								
Burke et al., 2018 *Cross-sectional*	--	--	NS	--	--	--	**ANOVA** None	--
Stoliker et al., 2023 *Cross-sectional*	C < I	C < I	NS	NS	--	--	**Bivariate and multivariate regression models** None	Demographics, Hopelessness, Family history (suicide and crime), Violent/sexual offence, Alcohol/substance use, No wish to live, Social support, Loneliness, sleep quantity, Aggression, & Self-harm.
Stoliker, 2020 *Cross-sectional*	--	--	--	I < E (single but not repeat attempters)	--	--	**Multinomial logistic Regression** None	Demographis, Psychological disorder, Hopelessness, Emotional dysregulation, Sleep disturbances, Social disconnectedness, Alcohol/ substance use, Health, Victimisation, Family and caregiver factors.
Mars et al., 2019b *Prospective (1 year)*	C < I	--	I < E	--	C < E	--	**Multinomial logit model** Sex, SES	--

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Mars et al., 2019a *Prospective (6 years)*	--	--	I < E	--	--	--	**logistic regression analyses** Sex, SES	--
General health								
Richardson et al., 2023 *Cross-sectional*	--	--	--	NS	--	--	**Multivariate multinomial logistic regression** None	Demographics, Multimorbidities, Mental health diagnosis, Hospital admission, Smoking, Childhood adversity, Trauma, & Social support.
Stoliker, 2020 *Cross-sectional*	--	--	--	I < E (single and repeat attempters)	--	--	**Multinomial logistic Regression** None	Demographics, Psychological disorder diagnosis, Dopelessness, Emotional dysregulation, Sleep disturbances, Social disconnectedness, Alcohol/substance use, Victimisation, Family and caregiver factors.
Multimorbidities								
Richardson et al., 2023 *Cross-sectional*	--	--	--	I < E	--	--	**Multivariate multinomial logistic regression** None	Demographics, Heath, Smoking history, Mental health diagnosis, Hospital admission, Childhood adversity, Trauma, Social support.
Family history - Crime								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Stoliker et al., 2023 *Cross-sectional*	NS	NS	NS	NS	--	--	**Bivariate and multivariate regression models** None	Demographics, Hopelessness, Family history (suicide and crime), Violent/sexual offence, Alcohol/substance, No wish to live, Social support, Loneliness, Sleep quantity, Aggression, & Self-harm.
Stoliker, 2020 *Cross-sectional*	--	--	--	NS	--	--	**Multinomial logistic Regression** None	Demographics, Psychological disorder diagnosis, Hopelessness, Emotional dysregulation, Sleep disturbances, Social disconnectedness, Alcohol/substance use, Health, Victimisation, Family and caregiver factors.
Covid Era employment status - job loss experienced								
Seidler et al., 2023 *Cross-sectional*	NS[b]	NS[b]	--	--	--	--	**Multinomial logistic regression** None	Demographics, Covid era employment status, Social support (significant other, family, friends), Coping (problem-focussed, emotion-focussed, avoidant), & Resilience.
Tower of Hanoi - Number of errors								
Xu et al., 2023 *Cross-sectional*	C < I (high difficulty)	--	--	--	--	--	**Repeated measures ANOVA** None	Task difficulty
Tower of Hanoi - Completion time								

Variable, Authors/ Design	Control - Ideation		Ideation - Enactment		Enactment - Control		Statistical Analysis & Control Variables	Additional variables included in analysis
	Uni variate	Multi variate	Uni variate	Multi variate	Uni variate	Multi variate		
Xu et al., 2023 *Cross-sectional*	C < I (high difficulty only)	--	--	--	--	--	**Repeated measures ANOVA** None	Task difficulty
Tower of Hanoi - Thinking time								
Xu et al., 2023 *Cross-sectional*	NS	--	--	--	--	--	**Repeated measures ANOVA** None	Task difficulty

Note. NSSI – Non-suicidal self-injury, MDD – Major depressive disorder, SI – Suicidal ideation,

a - For online, outpatient and overall sample but not inpatient sample

b – Control group scored higher than ideation when ideation and planning were outcome.

c – Non significant when outcome ideation and planning.

d – Stop signal tasks were conducted for threat and non-threat contexts with positive and negative valence.

e – Non significant when controlling for covariate

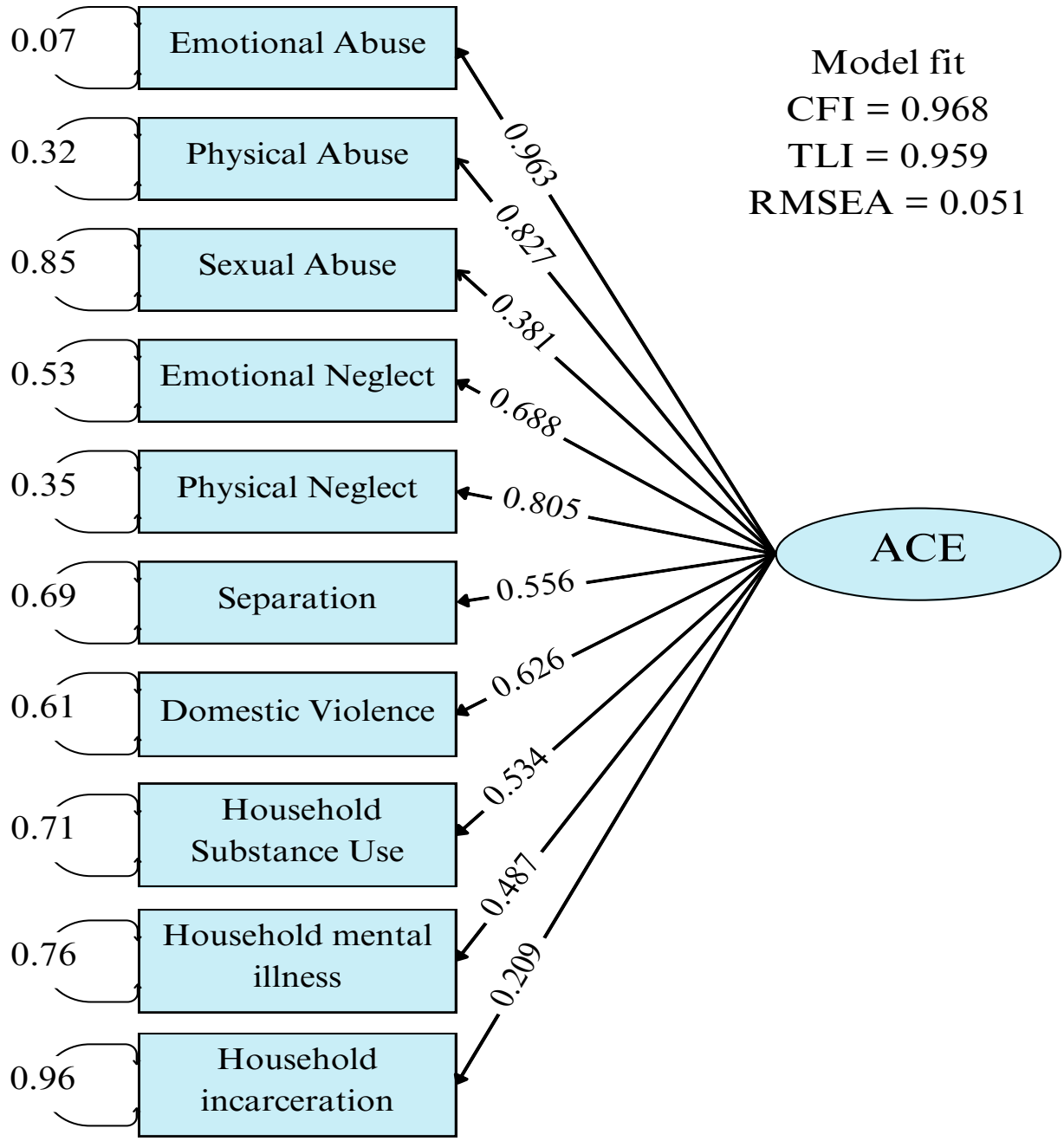
f – Only ideation group reported flash forwards

g – Only in European ethnicity and native English speakers.

Appendix 15: Supplementary materials for study 2 (chapter 4) investigating defeat/entrapment as mediator between ACEs and suicidal thoughts.

Supplementary figure 1

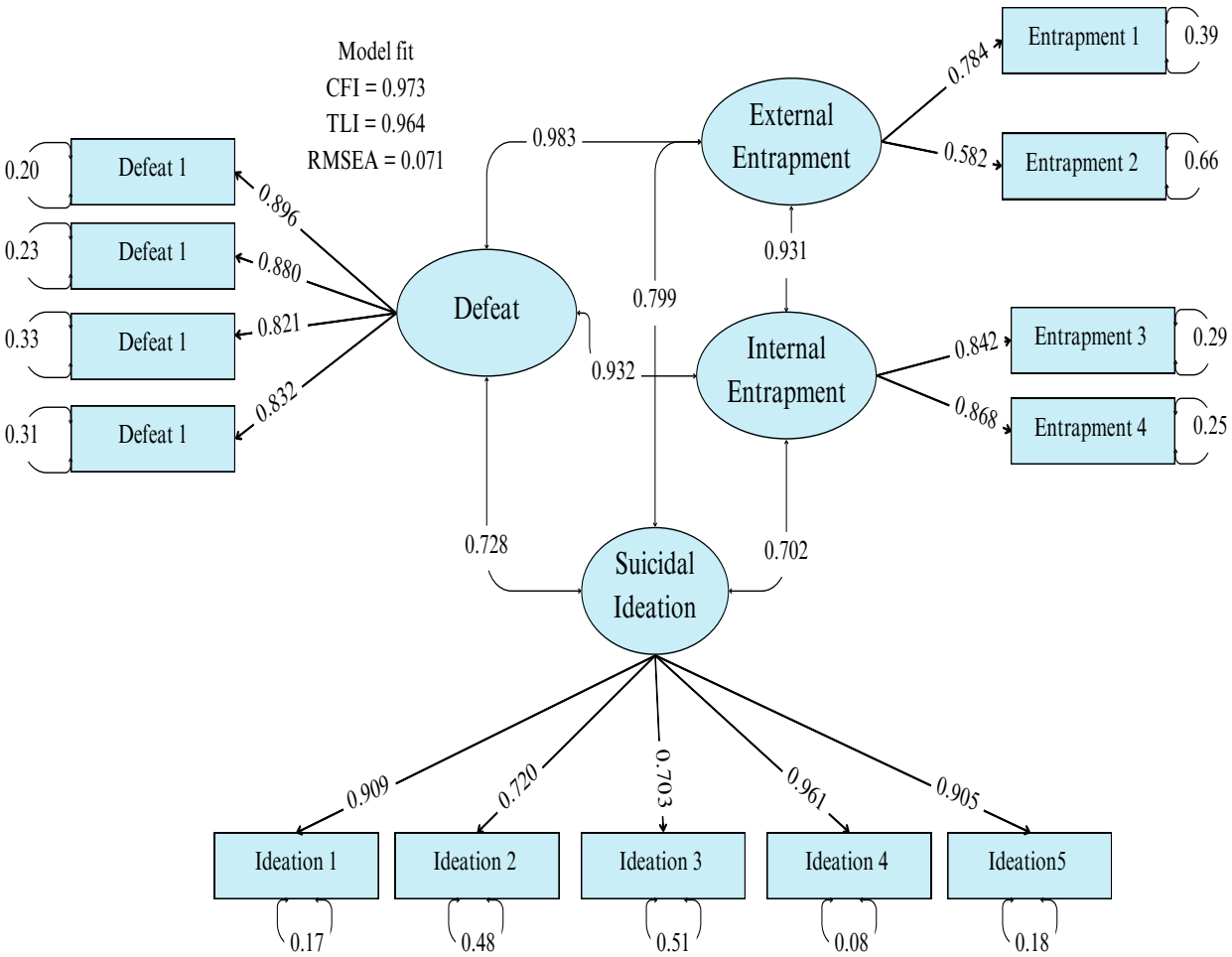
Initial confirmatory factor analysis of the one-factor model for measuring ACEs



Note. Model fit and standardised factor loadings of all items measuring ACEs are illustrated here. ACE Item 10 was dropped due to low factor loadings.

Supplementary figure 2

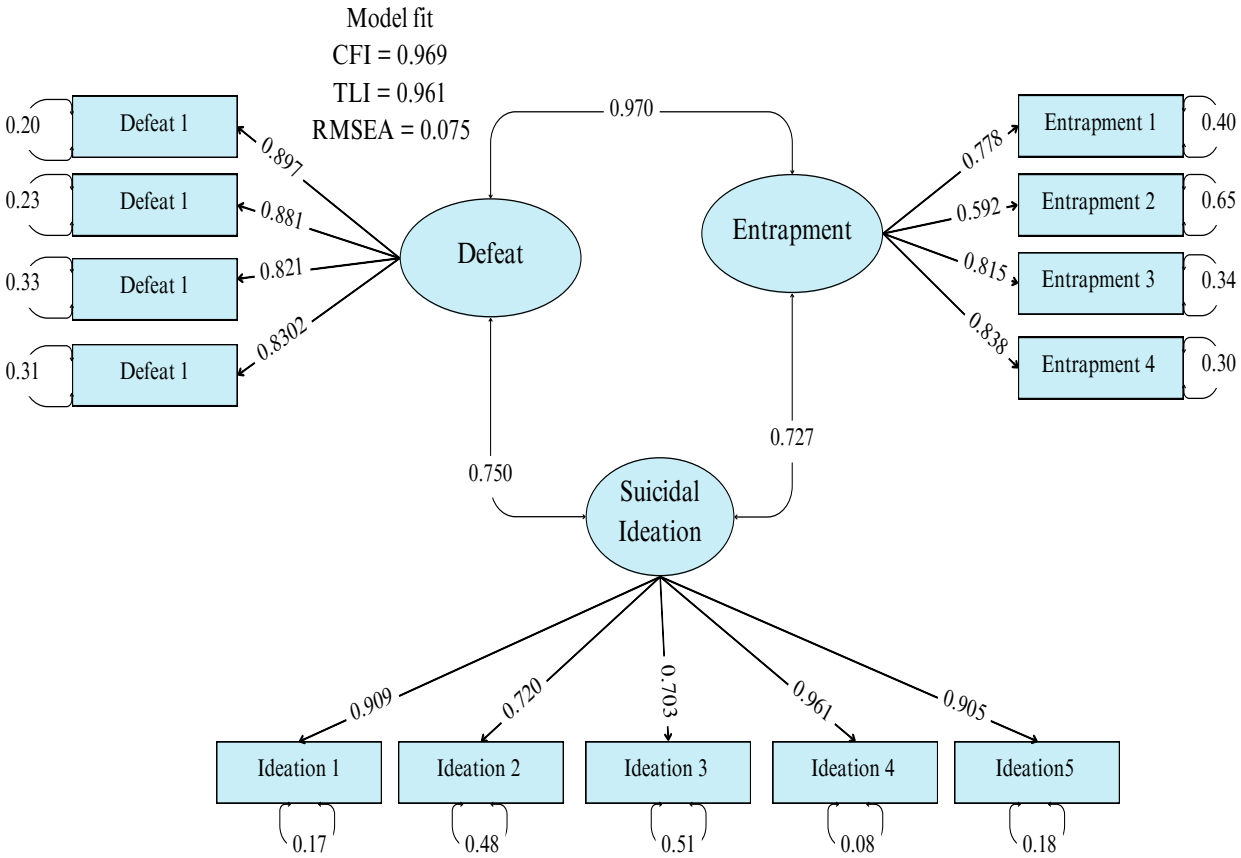
Initial confirmatory factor analysis of the CFA model with defeat, internal entrapment, and entrapment as distinct variables



Note. Model fit and standardised factor loadings of all items measuring defeat, internal entrapment, external entrapment, and suicidal ideation are illustrated here.

Supplementary figure 3

Initial confirmatory factor analysis of the CFA model with defeat and entrapment as distinct variables



Note. Standardised factor loadings of all items measuring defeat, entrapment and suicidal ideation are illustrated here.

Appendix 16: Supplementary materials for study 3 (chapter 5) investigating developmental variables as mediators between threat/deprivation and defeat.

Juvenile Victimisation Questionnaire – 2nd Revision (Adult Retrospective Screener Sum - Adapted)

We would like to know about some of your experiences from your childhood. Thinking about the first 18 years of your life, please answer the following questions.

Physical Violence subscale

In the following questions, we will ask you about instances where you may have been physically harmed.

Item	Item content	Response	
5.	Sometimes people are attacked with sticks, rocks, guns, knives, or other things that would hurt. When you were a child, did anyone hit or attack you on purpose with an object or weapon? Somewhere like: at home, at school, at a store, in a car, on the street, or anywhere else?	Yes	No
6.	When you were a child, did anyone hit or attack you without using an object or weapon?	Yes	No
7.	When you were a child, did someone start to attack you, but for some reason, it didn't happen? For example, someone helped you or you got away?	Yes	No
8.	When you were a child, did someone threaten to hurt you when you thought they might really do it?	Yes	No
9.	When you were a child, have you been hit or attacked because of your skin colour, religion, or where your family comes from? Because of a physical problem you have? Or because someone said you were gay?	Yes	No
10.	When you were a child, did a grown-up in your life hit, beat, kick, or physically hurt you in any way?	Yes	No
11.	When you were a child, did a boyfriend or girlfriend or anyone you went on a date with slap or hit you?	Yes	No
12.	Sometimes groups of kids or gangs attack people. When you were a child, did a group of kids or a gang hit, jump, or attack you?	Yes	No
13.	When you were a child, did any kid, even a brother or sister, hit you? Somewhere like: at home, at school, out playing, in a store, or anywhere else?	Yes	No
14.	When you were a child, did any kids try to hurt your private parts on purpose by hitting or kicking you there?	Yes	No
15.	When you were a child, did any kids, even a brother or sister, pick on you by chasing you or grabbing you or by making you do something you didn't want to do?	Yes	No

Sexual Abuse subscale

In the following questions, we will ask you about instances where you may have experienced sexual abuse.

Item	Item content	Response	
16.	When you were a child, did a grown-up you know touch your private parts when they shouldn't have or make you touch their private parts? Or did a grown-up you know force you to have sex?	Yes	No
17.	When you were a child, did a grown-up you did not know touch your private parts when they shouldn't have, make you touch their private parts or force you to have sex?	Yes	No
18.	Now think about other kids, like from school, a boyfriend or girlfriend, or even a brother or sister. When you were a child, did another child or teen make you do sexual things?	Yes	No
19.	When you were a child, did anyone try to force you to have sex; that is, sexual intercourse of any kind, even if it didn't happen?	Yes	No
20.	When you were a child, did anyone make you look at their private parts by using force or surprise, or by "flashing" you?	Yes	No
21.	When you were a child, did anyone hurt your feelings by saying or writing something sexual about you or your body?	Yes	No
22.	When you were a child, did you do sexual things with anyone 18 or older, even things you both wanted?	Yes	No

Witnessing Violence subscale

The next few questions will be about any events in your childhood where you may have seen or heard about other people who were close to you or in your surroundings experiencing physical violence.

Item	Item content	Response	
23.	"Parents" refer to the person or people who raised you. When you were a child, did you SEE a parent get pushed, slapped, hit, punched, or beat up by another parent, or their boyfriend or girlfriend?	Yes	No
24.	"Parents" refer to the person or people who raised you. When you were a child, did you SEE a parent hit, beat, kick, or physically hurt your brothers or sisters?	Yes	No
25.	When you were a child, in real life, did you SEE anyone get attacked or hit on purpose WITHOUT using a stick, rock, gun, knife, or something that would hurt?	Yes	No
26.	When you were a child, was anyone close to you murdered, like a friend, neighbour, or someone in your family?	Yes	No
27.	When you were a child, were you in any place in real life where you could see or hear people being shot, bombs going off, or street riots?	Yes	No

28.	When you were a child, were you in the middle of a war where you could hear real fighting with guns or bombs?	Yes	No

Multidimensional Neglectful Behaviour Scale, Form A (Adapted)

These questions are about what it was like when you were living with your parents. "Parents" refer to the person or people who raised you. For the following statements, please answer the questions about things your parents did or did not do before you were 18 years old.

Item	Item content	Response	
Emotional needs subscale			
1.	Did not help me when I had problems	Yes, they did not help me	No, they helped me
2.	Did not comfort me when I was upset	Yes, they did not comfort me	No, they comforted me
3.	Did not praise me	Yes, they did not praise me	No, they praised me
4.	Did not tell me they loved me	Yes, they did not tell me	No, they told me
5.	Did things with me just for fun	Yes, they did	No, they did not
Cognitive needs subscale			
6.	Did not help me to do my best	Yes, they did not help me	No, they helped me
7.	Helped me when I had trouble understanding something	Yes, they helped me	No, they did not help me
8.	Did not read books to me	Yes, they did not read to me	No, they read to me
9.	Were not interested in my activities or hobbies	Yes, they were not interested	No, they were interested
10.	Did not help me with homework if I needed help	Yes, they did not help me	No, they helped me
Supervision needs subscale			
11.	Did not make sure I went to school	Yes, they did not make sure	No, they made sure
12.	Did not care if I got into trouble in school	Yes, they did not care	No, they cared
13.	Did not care if I did things like shoplifting	Yes, they did not care	No, they cared
14.	Were not interested in the kind of friends I had	Yes, they were not interested	No, they were interested

15.	Wanted to know what I was doing when I was not at home	Yes, they wanted to know	No, they did not want to know

Benevolent Childhood Experiences Scale

Please answer to the following with respect to the first 18 years of your life.

Growing up, I had…

Item	**Responses**				
	Strongly agree	**Agree**	**Neither agree nor disagree**	**Disagree**	**Strongly disagree**
1. At least one caregiver with whom you felt safe?					
2. At least one good friend					
3. Beliefs that gave you comfort					
4. Enjoyment at school					
5. At least one teacher that cared					
6. Good Neighbours					
7. An adult (not a parent/caregiver or the person from question 1) who could provide you with support or advice					
8. Opportunities to have a good time					
9. Like yourself or feel comfortable with yourself					
10. Predictable home routine, like regular meals and regular bedtime.					

Emotional Reactivity scale – Sensitivity subscale

For the following statements, please indicate the extent to which the statements reflect how you feel.

Item No.	Items	Not at all like me	Not much like me	Somewhat like me	Mostly like me	Completely like me
2	My feelings get hurt easily.					
5.	I tend to get very emotional very easily.					
8.	I often feel extremely anxious.					
9.	Even the littlest things make me emotional.					
12.	I get angry at people very easily					
13.	I am often bothered by things that other people don't react to.					
14.	I am easily agitated.					
15.	My emotions go from neutral to extreme in an instant.					
16.	When something bad happens, my mood changes very quickly. People tell me I have a very short fuse.					
18.	I am a very sensitive person.					

Emotional regulation questionnaire (ERQ)

For the following statements, please indicate the extent to which you agree or disagree with the statements.

Item No.	Items	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
Cognitive Reappraisal								
1.	When I want to feel more *positive* emotion (such as joy or amusement), I *change what I'm thinking about*.							
3.	When I want to feel less negative emotion (such as sadness or anger), I change what I'm thinking about.							
5.	When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm.							
7.	When I want to feel more positive emotion, I change the way I'm thinking about the situation.							
8.	I control my emotions by changing the way I think about the situation I'm in.							
10.	When I want to feel less negative emotion, I change the way I'm thinking about the situation.							
Expressive Suppression								
2.	I keep my emotions to myself.							
4.	When I am feeling positive emotions, I am careful not to express them.							
6.	I control my emotions by not expressing them.							
9.	When I am feeling negative emotions, I make sure not to express them.							

Multiple Ability Self-report Questionnaire

Please rate your ability to perform the activities below according to the following five-point scale. Please indicate 1=never, 2=rarely, 3=sometimes, 4=usually, or 5=always.

Item No.	Item	Never	Rarely	Sometimes	Often	Always
Language abilties subscale						
1.	When talking, I have difficulty conveying precisely what I mean.					
2.	I can follow telephone conversations.					
3.	I find myself searching for the right word to express my thoughts.					
4.	My speech is slow or hesitant.					
5.	I find myself calling a familiar object by the wrong name.					
6.	I find it easy to make sense out of what people say to me.					
7.	People seem to be speaking too fast.					
8.	It is easy for me to read and follow a newspaper story.					
Verbal Memory Subscale						
15.	I forget to mention important issues during conversations.					
16.	I forget important things I was told just a few days ago.					
17.	I am able to recall the details of the evening news report several hours later.					
18.	I forget important events which occurred over the past month.					
19.	I forget the important portions of gossip I have heard.					
20.	I forget to give phone call messages.					
21.	I have to hear or read something several times before I can recall it without difficulty.					
22.	I can recall the names of people who were famous when I was growing up.					
Attention/Concentration Subscale						
31.	I can do simple calculations in my head quickly.					
32.	I ask people to repeat themselves because my mind wanders during conversations.					

33.	I am alert to things going on around me.					
34.	I have difficulty sitting still to watch my favorite TV programs.					
35.	I am easily distracted from my work by things going on around me.					
36.	I can keep my mind on more than one thing at a time.					
37.	I can focus my attention on a task for more than a few minutes at a time.					
38.	I find it difficult to keep my train of thought going during a short interruption.					

Critical Thinking Disposition Scale (CTDS)

In the following section, please indicate the degree to which you agree with the statements.

Item	**Responses**				
	Strongly agree	**Agree**	**Neither agree nor disagree**	**Disagree**	**Strongly disagree**
Critical Openness Subscale					
I usually try to think about the bigger picture during a discussion					
I often use new ideas to shape (modify) the way I do things					
I use more than one source to find out information for myself					
I am often on the lookout for new ideas					
I sometimes find a good argument that challenges some of my firmly held beliefs					
It's important to understand other people's viewpoint on an issue					
It is important to justify the choices I make					
Reflective Scepticism Subscale					
I often re-evaluate my experiences so that I can learn from them					
I usually check the credibility of the source of information before making judgements					
I usually think about the wider implications of a decision before taking action					
I often think about my actions to see whether I could improve them					

The Defeat Scale

Below is a series of statements , which describe how people can feel about themselves. Please read each item carefully and select the response next to the statement that best describes how you have felt in the last seven days.

Item No.	Item	Never	Rarely	Sometimes	Often	Always
1.	I feel that I have not made it in life.					
2.	I feel that I am a successful person					
3.	I feel defeated by life					
4.	I feel that I am basically a winner					
5.	I feel that I have lost my standing in the world					
6.	I feel that life has treated me like a punch bag					
7.	I feel powerless					
8.	I feel that my confidence has been knocked out of me					
9.	I feel able to deal with whatever life throws at me					
10.	I feel that I have sunk to the bottom of the ladder					
11.	I feel completely knocked out of action					
12.	I feel that I am one of life's losers					
13.	I feel that I have given up					
14.	I feel down and out					
15.	I feel that I have lost important battles in life					
16.	I feel that there is no fight left in me					

Appendix 17: Supplementary materials for study 4 (chapter 6) investigating PCEs as moderators of pathways between threat and deprivation.

Results of levene's test comparing equality of variances for each variable between the high and low PCEs groups

Variable	F (df1, df2)	p value
Physical Violence	13.90 (1, 249)	< 0.001
Sexual Abuse	1.32 (1, 249)	0.250
Cognitive Neglect	63.99 (1, 249)	< 0.001
Supervision Neglect	75.56 (1, 249)	< 0.001
Emotional Reactivity	1.103 (1, 249)	0.293
Cognitive Reappraisal	1.93 (1, 249)	0.164
Expressive Suppression	0.044 (1, 249)	0.834
Language abilities	7.68 (1, 249)	0.005
Verbal Memories	3.71 (1, 249)	0.054
Attention/Concentration	5.25 (1, 249)	0.022
Critical Openness	1.04 (1, 249)	0.308
Reflective Scepticism	0.74 (1, 249)	0.390
Defeat	3.91 (1, 249)	0.048

Results of likelihood test ratio and for models with each association constrained and model fit indices

Association constrained	Likelihood ratio test		Model Fit indices					
	Chi square (df)	P value	Chi square (df)	P value	CFI	TLI	RMSEA	SRMR
Physical violence → Reactivity	0.013 (1)	0.908	0.013 (1)	0.908	1.000	1.323	0.000	0.001
Sexual Abuse → Reactivity	0.037 (1)	0.848	0.036 (1)	0.848	1.000	1.316	0.000	0.002
Cognitive Neglect → Reactivity	0.017 (1)	0.896	0.017 (1)	0.897	1.000	1.322	0.000	0.001
Supervision Neglect → Reactivity	0.062 (1)	0.803	0.062 (1)	0.803	1.000	1.307	0.000	0.002
Physical violence → Cognitive reappraisal	0.005 (1)	0.943	0.005 (1)	0.944	1.000	1.326	0.000	0.001
Sexual Abuse → Cognitive reappraisal	0.879 (1)	0.348	0.880 (1)	0.348	1.000	1.039	0.000	0.007
Cognitive Neglect → Cognitive reappraisal	0.877 (1)	0.349	0.875 (1)	0.350	1.000	1.041	0.000	0.007
Supervision Neglect → Cognitive reappraisal	0.206 (1)	0.650	0.205 (1)	0.650	1.000	1.260	0.000	0.003
Physical violence → Expressive suppression	1.107 (1)	0.293	1.102 (1)	0.294	1.000	0.967	0.028	0.008
Sexual Abuse → Expressive suppression	2.506 (1)	0.113	2.502 (1)	0.114	0.995	0.508	0.109	0.011
Cognitive Neglect → Expressive suppression	0.534 (1)	0.465	0.532 (1)	0.466	1.000	1.153	0.000	0.005
Supervision Neglect → Expressive suppression	0.727 (1)	0.394	0.727 (1)	0.394	1.000	1.090	0.000	0.005
Reactivity → Defeat	0.336 (1)	0.562	0.336 (1)	0.562	1.000	1.218	0.000	0.004
Cognitive reappraisal → Defeat	1.734 (1)	0.188	1.727 (1)	0.189	0.997	0.762	0.076	0.007
Expressive suppression → Defeat	0.270 (1)	0.604	0.270 (1)	0.603	1.000	1.239	0.000	0.003
Physical violence → Defeat	0.142 (1)	0.706	0.141 (1)	0.707	1.000	1.282	0.000	0.002
Sexual Abuse → Defeat	8.243 (1)	0.004	8.233 (1)	0.004	0.974	-1.370	0.240	0.015
Cognitive Neglect → Defeat	7.046 (1)	0.008	7.057 (1)	0.008	0.978	-0.985	0.220	0.013
Supervision Neglect → Defeat	0.900 (1)	0.343	0.902 (1)	0.342	1.000	1.032	0.000	0.004

Note. df = degrees of freedom, CFI = Comparative fit index, TLI = Tucker-lewis index, RMSEA = Root mean square error of approximation,

SRMR = Standardised root mean square residual.

Details of model fit and likelihood ratio test for models with each association constrained

Association constrained	Likelihood ratio test		Model Fit indices					
	Chi square (df)	P value	Chi square (df)	P value	CFI	TLI	RMSEA	SRMR
Physical violence → Language abilities	0.317 (1)	0.574	1.555 (3)	0.670	1.000	1.099	0.000	0.011
Sexual Abuse → Language abilities	0.584 (1)	0.445	1.824 (3)	0.610	1.000	1.080	0.000	0.013
Cognitive Neglect → Language abilities	1.967 (1)	0.161	3.206 (3)	0.361	1.000	0.986	0.023	0.016
Supervision Neglect → Language abilities	0.546 (1)	0.460	1.786 (3)	0.618	1.000	1.083	0.000	0.012
Physical violence → Verbal Memories	0.554 (1)	0.457	1.798 (3)	0.615	1.000	1.082	0.000	0.013
Sexual Abuse → Verbal Memories	0.822 (1)	0.365	2.066 (3)	0.559	1.000	1.064	0.000	0.014
Cognitive Neglect → Verbal Memories	0.006 (1)	0.936	1.251 (3)	0.741	1.000	1.119	0.000	0.010
Supervision Neglect → Verbal Memories	0.122 (1)	0.726	1.363 (3)	0.714	1.000	1.112	0.000	0.011
Physical violence → Attention/Concentration	0.119 (1)	0.730	1.361 (3)	0.715	1.000	1.112	0.000	0.011
Sexual Abuse → Attention/Concentration	0.00 (1)	0.99	1.250 (3)	0.741	1.000	1.119	0.000	0.010
Cognitive Neglect → Attention/Concentration	0.135 (1)	0.714	1.376 (3)	0.711	1.000	1.111	0.000	0.011
Supervision Neglect → Attention/Concentration	0.113 (1)	0.737	1.354 (3)	0.716	1.000	1.112	0.000	0.011
Language abilities → Defeat	4.392 (1)	0.036	5.616 (3)	0.132	0.994	0.822	0.083	0.014
Verbal Memory → Defeat	8.941 (1)	0.003	10.289 (3)	0.016	0.983	0.503	0.139	0.018
Attention/Concentration → Defeat	0.200 (1)	0.655	1.448 (3)	0.694	1.000	1.106	0.000	0.011
Physical violence → Defeat	0.156 (1)	0.693	1.402 (3)	0.705	1.000	1.109	0.000	0.011
Sexual Abuse → Defeat	5.443 (1)	0.020	6.709 (3)	0.082	0.992	0.747	0.099	0.017
Cognitive Neglect → Defeat	4.985 (1)	0.026	6.225 (3)	0.101	0.993	0.780	0.093	0.017
Supervision Neglect → Defeat	0.336 (1)	0.562	1.582 (3)	0.663	1.000	1.097	0.000	0.011

Note. df = degrees of freedom, CFI = Comparative fit index, TLI = Tucker-lewis index, RMSEA = Root mean square error of approximation, SRMR = Standardised root mean square residual

Details of model fit and likelihood ratio test for models with each association constrained

Association constrained	Likelihood ratio test		Model Fit indices					
	Chi square (df)	pvalue	Chi square (df)	pvalue	CFI	TLI	RMSEA	SRMR
Physical violence → Critical Openness	0.437 (1)	0.509	1.680 (3)	0.641	1.000	1.137	0.000	0.012
Sexual Abuse → Critical Openness	2.529 (1)	0.112	3.775 (3)	0.287	0.997	0.920	0.045	0.018
Cognitive Neglect → Critical Openness	0.606 (1)	0.436	1.846 (3)	0.605	1.000	1.119	0.000	0.013
Supervision Neglect → Critical Openness	0.013 (1)	0.909	1.254 (3)	0.740	1.000	1.181	0.000	0.010
Physical violence → Reflective Scepticism	1.226 (1)	0.268	2.466 (3)	0.482	1.000	1.055	0.000	0.015
Sexual Abuse → Reflective Scepticism	2.961 (1)	0.085	4.205 (3)	0.240	0.995	0.875	0.057	0.019
Cognitive Neglect → Reflective Scepticism	1.899 (1)	0.168	3.132 (3)	0.372	0.999	0.986	0.019	0.016
Supervision Neglect → Reflective Scepticism	0.988 (1)	0.320	2.231 (3)	0.526	1.000	1.080	0.000	0.014
Critical Openness → Defeat	0.176 (1)	0.674	1.424 (3)	0.700	1.000	1.163	0.000	0.011
Reflective Scepticism → Defeat	0.125 (1)	0.723	1.366 (3)	0.714	1.000	1.169	0.000	0.011
Physical violence → Defeat	0.024 (1)	0.877	1.267 (3)	0.737	1.000	1.179	0.000	0.010
Sexual Abuse → Defeat	7.374 (1)	0.007	8.618 (3)	0.035	0.976	0.419	0.122	0.022
Cognitive Neglect → Defeat	4.220 (1)	0.040	5.451 (3)	0.142	0.989	0.746	0.081	0.018
Supervision Neglect → Defeat	0.269 (1)	0.604	1.512 (3)	0.679	1.000	1.154	0.000	0.011

Note. df = degrees of freedom, CFI = Comparative fit index, TLI = Tucker-lewis index, RMSEA = Root mean square error of approximation,

SRMR = Standardised root mean square residual

Appendix 18: Participant information sheet, consent form, and debrief sheet for studies reported in chapters 5 and 6.

Participant Information Sheet for all participants

Name of department: School of Psychological Sciences and Health

Title of the study: An Investigation of the Relationships between Positive and Negative Childhood Experiences and Suicidal Thoughts in Adulthood

Introduction

We are inviting you to participate in our research study. This study is being conducted by a postgraduate research student, Kenvil Souza (kenvil.souza@strath.ac.uk) under the supervision of Dr Susan Rasmussen (s.a.rasmussen@strath.ac.uk) and Dr Edward Sosu (edward.sosu@strath.ac.uk) at the University of Strathclyde. The following sections will provide you with some information to help you decide if you would like to participate in this study. If you have any questions regarding this study, please contact us and we will be happy to provide further information.

What is the purpose of this research?

The purpose of this study is to look at how positive and negative experiences in childhood are linked with how people can think and feel as an adult. We are interested in suicidal thoughts, but you can participate in this study even if you have never experienced any suicidal thoughts.

Do you have to take part?

No, you do not have to take part, participation is completely voluntary. The questionnaire includes personal questions about potentially upsetting experiences from your childhood and thoughts about suicide. So, we ask you to only take part if you feel comfortable. If you decide to take part, you do not have to answer any questions that you are not comfortable answering. Should you choose not to take part after starting the survey, you can withdraw from the study by closing the webpage. However, you will not be able to withdraw from the study after clicking submit as the survey is anonymous. You can download this information sheet and refer to it later.

What will you do in the project?

This study is an online survey which can be completed at any time or place that suits you. If you would like to stop and complete the survey at a later time, you can do so. If you decide to take part in this study, you can check the tick box on the next page. After you provide consent, you can begin the survey which should take you about 20 minutes to complete. You do not have to complete the survey in a single session. Your responses will be saved, and you will be able to return to the survey and complete it at a later time using the same device. Upon completion, you will be presented with a "submit" button. As this is an anonymous study, you will not be able to withdraw from the study after you click submit or receive personal feedback about your responses.

Why have you been invited to take part?

You are invited to take part if you are aged 18 or above and live in the UK. You do not need to have experienced suicidal thoughts in order to take part.

What are the potential risks to you in taking part?

This survey contains personal and sensitive questions about your childhood experiences and thoughts about suicide. We understand that this can be distressing. Thus, the data collected will be confidential and you will not be asked to provide any information that could identify you. In case you experience any distress, we have provided information about support services that will be available to you. Additionally, you will be provided a debrief sheet at the end of the survey which will outline the contact details of the researchers and contact details for the support services.

What information is being collected in the project?

The survey will contain questions related to your childhood experiences and thoughts about suicide. Some of these will be questions about different types of abuse or neglect you may have experienced as a child. We will ask the ages at which you experienced this, and how often you experienced them. We will also include a space for you to write any additional information, or information about any childhood experiences you would like to share that were not in the survey. We would like to remind you that none of the questions in the survey are mandatory and we will not ask you to provide any information that you do not feel comfortable sharing.

You will also be asked questions about your emotions and how you manage them. Some questions regarding your day-to-day activities such as ability to concentrate on and complete tasks will be included in the study. Finally, some demographic details including your age, race, nationality, gender identity, and sexual orientation will be included.

Who will have access to the information?

The data collected will be confidential and anonymous. No identifiable information will be collected or stored with these data. Only the named researchers: Kenvil Souza, Dr. Susan Rasmussen, and Dr Edward Sosu will initially have access to this data. The anonymous data will then be deposited into a data repository with restricted access, where only registered researchers with permission will be granted access. The data will be used to write up the results of a thesis, published as journal articles, or presented at conferences.

Please note that the results reported, published, or presented will be based on the combined data collected from all of the participants. No individual participants information will be identified or reported as the results of this study.

Where will the information be stored and how long will it be kept for?

The data will be stored on password protected servers for the duration of the project. After completion of the project, the data will be stored on the university data repository "Pure". Due to the sensitive nature of the data, access will be restricted.

What happens next?

You will be directed to the consent form on the next page. Should you decide to take part, you can tick the consent form and proceed with the survey. If you choose to withdraw from the study now or at any point before clicking submit, you can do so by simply closing the page. If you decide not to take part, that is absolutely fine, and we thank you for your attention and time up until this point. If you do not wish to take part in this study, you can simply close this browser at this stage.

Please contact the researchers (contacts below) for any further questions you may have about this study.

Researcher contact details:

University of Strathclyde, UK
Kenvil Souza: kenvil.souza@strath.ac.uk
Dr Susan Rasmussen: s.a.rasmussen@strath.ac.uk
Dr Edward Sosu: edward.sosu@strath.ac.uk

University of Strathclyde,
40 George Street,
G1 1QE.

This research was granted ethical approval by the University of Strathclyde Ethics Committee.

If you have any questions/concerns, during or after the research, or wish to contact an independent person to whom any questions may be directed or further information may be sought from, please contact:

Secretary to the University Ethics Committee
Research & Knowledge Exchange Services
University of Strathclyde
Graham Hills Building
50 George Street
Glasgow
G1 1QE

Telephone: 0141 548 3707
Email: ethics@strath.ac.uk

Support information

The services provided below are free and confidential.

Breathing Space: This is a phone service offering support to anyone in Scotland experiencing low mood, depression, or anxiety.
Contact details: 0800 83 85 87
website: www.breathingspace.scot
Availability: Weekdays (6pm-2am), Weekends (24 hours)

***Local GP*:** You can also contact your local GP for more information about services available to you. **www.nhs.uk/service-search**

NAPAC: The NAPAC helpline provides support to adults recovering from childhood abuse.
Contact details: 0808 801 0331
website: https://napac.org.uk
Availability: Monday-Thursday (10am-9pm), Friday (10am-6pm)

NHS 24: If your GP is not available, you can contact NHS 24 for urgent health advice.
Contact: 111
http://www.nhs24.scot/

Samaritans: This is a phone and web-based service providing support to anyone experiencing emotional distress or suicidal thoughts.
Contact details: 116 123
website: www.samaritans.org
Availability: 24 hours

Shout: This is a text based service that can support people who are struggling to cope.

Text “SHOUT” to 85258

Availability : 24 hours

Consent Form

Name of department: School of Psychological Sciences and Health

Title of the study: An Investigation of the Relationships between Positive and Negative Childhood Experiences and Suicidal Thoughts in Adulthood

- I confirm that I have read and understood the Participant Information Sheet for the above project and the researcher has answered any queries to my satisfaction.
- I understand that my participation is voluntary and that I am free to withdraw from the project at any time, up to the point of completion, without having to give a reason and without any consequences.
- I understand that the data collected in this study will be anonymous (i.e., data that do not identify me personally), and that anonymised data cannot be withdrawn once they have been included in the study.
- I understand that any information recorded in the research will remain confidential and no information that identifies me will be made publicly available.
- I consent to being a participant in the project.

Please tick the following box if you consent to participate in the study

☐ I consent to participating in the study

Debrief Form

Name of department: School of Psychological Sciences and Health

Title of the study: An Investigation of the Relationships between Positive and Negative Childhood Experiences and Suicidal Thoughts in Adulthood

We would like to thank you for taking the time to participate in our study. We have included the information about how this data will be used below. We have also included the researchers' contact details if you have any further questions about the study, as well as information for support organisations that you can contact if you are experiencing distress to this form. You can download this form and keep it for future reference.

What happens to the information in the project? The data we have collected is confidential and anonymous. Therefore, we have not asked you to provide any information that might identify you. This data will only be accessible to the registered researchers with permission for access. This data will be stored on password protected systems for the duration of the study and then deposited into a repository with restricted access. Additionally, the overall findings of this study will be reported in a postgraduate thesis, published in academic journals, or presented at conferences.

What happens next? As this study is anonymous, we are unable to provide feedback on your data individually. However, if you would like to know the outcomes of the study, please contact the researchers (contact details provided below).

If you are feeling distressed, suicidal, or have concerns or worries regarding your own mental health please contact your GP or support organisations whose information is provided below.

Support information

The services provided below are free and confidential.

Breathing Space: This is a phone service offering support to anyone in Scotland experiencing low mood, depression, or anxiety.

Contact details: 0800 83 85 87

website: www.breathingspace.scot

Availability: Weekdays (6pm-2am), Weekends (24 hours)

***Local GP*:** You can also contact your local GP for more information about services available to you. www.nhs.uk/service-search

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Availability: Monday-Thursday (10am-9pm), Friday (10am-6pm)

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Contact: 111

http://www.nhs24.scot/

Samaritans: This is a phone and web-based service providing support to anyone experiencing emotional distress or suicidal thoughts.

Contact details: 116 123

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Text “SHOUT” to 85258

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Researcher contact details:

Kenvil Souza: kenvil.souza@strath.ac.uk

Dr Susan Rasmussen: s.a.rasmussen@strath.ac.uk

Dr Edward Sosu: edward.sosu@strath.ac.uk

Postal address for all researchers:

University of Strathclyde

40 George Street

Glasgow G1 1QE

This investigation was granted ethical approval by the University of Strathclyde 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:

Secretary to the University Ethics Committee Research & Knowledge Exchange Services

University of Strathclyde

Graham Hills Building

50 George Street Glasgow G1 1QE

Telephone: 0141 548 3707

Email: ethics@strath.ac.uk