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"How the solo self-employed mitigate lower income with their personality in order to manifest well-being."

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Declaration

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

Signed:_____

Date:_____

Abstract

How do the world's almost 1 billion 'solos' mitigate lower income with their personality in order to manifest well-being? (Solos are individuals operating non-employer businesses, lower income and classed 'vulnerably-employed' by the UN - over 75% of UK and US businesses in 2013/14). The British Household Panel Survey (BHPS) is utilised in a novel and positivist approach to answering this question in the case of the UK population. Using structural equation modelling (SEM) this thesis simultaneously examines the income, hedonic and eudemonic well-being, and personality of the solo. Well-being is usually measured in terms of hedonic cognitive responses such as life satisfaction, or happiness, or, less frequently, affect. The thesis emphasizes that well-being has, two components, hedonic and eudemonic – where the functional eudemonic can cause 'healthy' hedonic responses. Modern eudaimonia research includes dimensions such as purpose, relationships or autonomy, seen as critical to high functioning, and the latter in particular, to entrepreneurship. Connecting income to eudaimonia, hedonic and traits lead to a model with 6 direct paths and 4 mediation relationships. All models were well fit with SRMR of less than 0.08. Solos were found to have the lowest income, highest affect and happiness compared to the employed and self-employed with employees. Solos were shown to derive the most hedonic and eudaimonic well-being from income compared to other employment types. Income was found to be positively associated with all personality traits. The analysis confirmed the relationship between traits and hedonic well-being. Agreeability and extroversion traits were also found to be positively linked to eudaimonia. Eudaimonia was found to be strongly positively associated with hedonic well-being, and, notably, stronger than both traits and income. The analysis also demonstrated a mediation, not moderation, relationship between income and hedonic well-being and both traits and eudaimonia. Notably, income was shown to be more important than traits or eudaimonia in raising negative affect for those solos who were more conscientious, introverted or disagreeable. Finally, for the positive affect, neuroticism had a large indirect effect, emphasizing that mental health could be more important than income (or even eudaimonia) for raising hedonic well-being for those with neurotic traits. The findings have important implications for the domains of economic well-being and raises questions regarding a solo's place in the domain of entrepreneurship (less than 20 academics have published on the almost 1 billion solos and none on their well-being). Solos and practitioners supporting solos are provided with a mechanism for examining appropriate personality and eudaimonic responses to changes in income and how these can be utilised to raise 'healthy' hedonic well-being.

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As is my way, I will reach out directly, rather than do so publicly here.

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Dedication

For my Mother.

Chapter 1. Introduction

1.1 Introduction

This chapter presents the thesis's research question (1.2), topic and core concepts (1.3), research approach and methods (1.4), structure (1.5) and the search methodology for the literature review (1.6).

1.2 Research Question

At the highest level, this thesis asks:

- How do the vulnerably employed solo self-employed mitigate lower income with their personality to manifest well-being?

The solo self-employed (solos) are important for societal well-being due to their large population. Self-employment became the largest source of employment growth in the UK in the 5 years to 2014 with over 500,000 new self-employed since the recession (ONS, 2014), and 76% of the total 5.3 million businesses in the UK in 2014 had no employees.

Solos are also important for the economy, combined this group had £231 billion in turnover in 2014. While they make up only 6.7% of total economic output at £231 billion of the total £3.5 trillion earned by UK businesses as a whole, they comprised 17% of the total employed population in 2014 (White, 2015). In the US, in 2013, the total was 75%, or 23 million non-employer firms (US Census, 2014). In the US, some 7.4 million firms (non-solos) employed 115.9 million people, however, 23 million people, or 17%, employed themselves. The non-solos earned $32.6 trillion in revenues whereas the US solos earned $1.05 trillion in revenues (or 3% of total earnings for the US in 2013).

The 'Beyond GDP' report (Stiglitz et al., 2009) is a prominent recent policy document to call for a shift away from purely economic measures and focus on "subjective well-being". Income has been shown to be a robust but small predictor of "subjective well-being" (SWB) (Stevenson and Wolfers, 2008, Easterlin, 1974, Blanchflower and Oswald, 2004). However, the term subjective well-being is often used loosely. Ryff (1989) has led an effort to examine the original intent of Aristotelian well-being, by separating well-being into hedonic and cognitive well-being. Hedonic well-being, comprised of affect and cognitive well-being measures such

as happiness and satisfaction, are not commonly looked at separately as part of a wider a system of hedonic well-being. Eudaimonia, which is an important component of well-being comprising sense of purpose, relationships, autonomy and environmental mastery, is not considered in the above SWB studies. However, to look at well-being in its entirety is far more useful, especially for policymakers in the context of this thesis – for example, it enables discussions of income intervention informed by traits, such as neuroticism, and eudemonic dimensions such as autonomy, in order to raise average hedonic well-being. The trait relationship is important, as personality has been shown to be the strongest predictor of SWB, even stronger than income (Boyce et al., 2012; Diener and Lucas, 1999). However, looking at traits as part of a system that includes both types of well-being, eudaimonic and hedonic, and income for solos, this has not been done, but is essential if we are to support this important and fast-growing socio-economic group, the solo self-employed.

1.3 Thesis Topic and Core Concepts

- The thesis title and topic is: How do the vulnerably employed solo self-employed mitigate lower income with their personality to manifest well-being?

As such it covers the following four core concepts:

- Solo Self-Employed
- Income
- Well-Being
- Personality

A brief description of each concept is provided below; these are expanded on in the literature review Chapters that follow.

1.3.1 Solo Self-Employed

The solos self-employed (solos) are non-employer businesses, those with no employees. They comprised 76% of the 5.3 million businesses in the UK in 2014, and as a whole, they comprised 17% of the total UK employee population (White, 2015; Department for Business Innovation and Skills, 2015). 75% of US businesses (or 23 million) in 2013 were solos (US Census, 2014). Solos are often conflated and classified as those that hire 0 – 10 people, even though adding even a single additional staff member adds human causal factors not present when working alone. Carter (2011) argues that, due to expediency, labour economists, restricted by

occupational categories in large datasets that do not include entrepreneurship, treat all self-employed as if they were entrepreneurs. Similar to Carter (2011), Shane (2009) argued that while most start-ups are not innovative, wealth-generating job creators - this is due in part to government interventions which allow founders to create wage substitutions (Shane describes this as characteristic of self-employment rather than entrepreneurship) rather than fast-growing businesses. The implication is that low-income businesses that are not innovative are not entrepreneurial – despite all categories of self-employment enjoying higher autonomy and endure the longer-term risk associated with uncertainty of customer demand and control over supply inputs (Hébert and Link, 1989, Kirzner, 1979, Cantillon et al., 1931, Knight, 1921). Solos are directly responsible for sales without the safety apparatus inherent in a large established organisation such as the capacity to absorb the macroeconomic shock of recession. In fact, the United Nations (2017) classifies "own account" workers as, in part, "vulnerable employment", drawing on a definition by the International Labour Organization (2017).

Here is the U.N.'s full definition:

- "Vulnerable employment is defined as the sum of the employment status groups of own-account workers and contributing family workers. They are less likely to have formal work arrangements and are therefore more likely to lack decent working conditions, adequate social security and 'voice' through effective representation by trade unions and similar organizations. Vulnerable employment is often characterized by inadequate earnings, low productivity and difficult conditions of work that undermine workers' fundamental rights." (p.1)

Forming a firm is different from operating alone. Macro-level, industry destructive, innovation (Schumpeter, 1942, Bentham, 1952) which defines new product categories clearly cannot be a dominant characteristic of the individual solo.

Given that the literature on solo-self-employment is relatively new, most academics in business and even in the entrepreneurship domain are likely unaware that there are almost 1 billion solo-self-employed, i.e., a quarter of the 4 billion adult population capable of work (Wolfram|Alpha, 2016) including 98.7% of Indian entrepreneurship activity. van Stel and de Vries (2015) in their literature review of solo-self-employment focus on heterogeneity and the recent rise in the population. Van Stel et al. (2014) demonstrated that of 26 OECD countries in 2008, the UK had the highest levels of solo-self-employment. They describe (citing a publication by

Burke, editor of article's Journal. Note, the Burke publication is also cited directly by this thesis in the following section, 1.3.2) a highly heterogeneous population in terms of productivity and describe a spectrum of ranging from: more "innovative, flexible and agile, able to manage entrepreneurial risk, and capable of prospering despite greater market uncertainty (Burke, 2012, p. 6)" (p.78); to a "relatively less productive solo self-employed who turned to self-employment for a lack of alternative employment options" (p.78) - this has clear connections to the classification of necessity and opportunity (GEM, 2001).

1.3.2 Income

Income in this thesis refers to annual income earned that is measured in surveys via receipts collected. Concepts related to income such as income underreporting, income inequality and relative income, are discussed in Chapter 2.

van Stel and de Vries (2015) in their review of the income literature in relation to the solo-self-employed cite only 2 papers that focus on income in two locations, the Netherlands (De Vries and Dekker, 2015) and Germany (Sorgner et al., 2014). The German paper they cite as evidence that the higher educated and more able solo-self-employed do better financially than if they had chosen employment and that the lower educated have "no significant income differences between paid employees and solo self-employed" (p.81).

At this point, it is important to highlight that this thesis is not focused on those high earning "freelancers" who are known to earn "150% more than equivalent employees" (Burke, 2012., p2 (i.v.)) according to IPSE. Burke uses SOC codes 1, 2 and 3 which include managers and freelancers who are professional and technical. It is possible that those freelancers who are employees who employers have sought to "cynically seek to reclassify" as "freelancers in a bid to avoid paying employer taxes" (Burke, 2012., p2 (i.v.)). This thesis reviews SOC codes and also compares average earnings to determine if freelancers are included in the samples examined.

1.3.3 Well-Being

Well-Being in this thesis refers to the Aristotelian derivation which encompasses two subtypes of Well-Being, Hedonic and Eudaimonia. Hedonic Well-Being also contains two subtypes, cognitive well-being and affect. Cognitive Well-Being is usually measured by self-reported life satisfaction or happiness and can also be referred to as Subjective Well-Being, a phrase

which can use these two measures interchangeably. Affect refers to both positive affect and negative affect, the latter usually being a measured on a scale of lack of negative affect. Eudaimonia is often referred to as 'sense of purpose', but it also encapsulates dimensions of autonomy, relationships, self-acceptance, environmental mastery and personal growth. In this thesis, eudaimonia is viewed as a determinant of hedonic well-being.

1.3.4 Personality

Personality in this thesis, methodologically, is based on a nomothetic approach. The so-called "Big 5" or five-factor-model of traits, is the most dominant approach to personality research in psychology and is adopted here. The Big 5 assumes that all human traits can be measured through 5 orthogonal traits based on surveys. The alternative approaches such as the lexical approach are discussed in the literature review section, Chapter 3. The Big 5 are an openness to ideas, conscientiousness, extroversion, agreeableness and neuroticism. The neuroticism trait is the most controversial trait, people scoring low on this trait tend to exhibit emotional stability and those who score high can exhibit mental health and behavioural problems.

1.4 Research Approach and Methods

To investigate the research question an extensive literature review was conducted using a systematic literature review. Gaps in the literature were identified in relation to the subject population, the solo self-employed. Then, a theoretical model was developed based on existing known relationships and extrapolating the existence of new relationships and latent variables. The theoretical model had 6 paths and 4 mediation relationships in its most general form - this led to the formalisation of 10 general hypotheses to be tested. The sample chosen was the British Household Panel Survey. Constructs were operationalised using known methodologies and practices within the field.

The theoretical model was analysed using structural equation modelling which involved the analysis of over 300 relationship paths given the variations of latent variables and comparisions to employment and self-employment groups conducted for robustness. Statistical approaches such as means testing were used to examine the dataset and to validate additional hypotheses outside of the theoretical model such as the hypothesis that solo self-employed earn the least. The results of all structural equation models were then collated and examined to ensure fit. An analysis and discussion were then conducted to examine the relative strengths of findings compared to other employment groups, i.e. the employed and self-employed. Rejected

hypotheses were also analysed. Each of the 6 main paths of the general model were examined in terms of each of the Big 5 traits with difference analyses being conducted in order to comment comprehensively on hypothesis support.

A discussion and analysis of mediation hypotheses were also conducted which involved, for further robustness, isolation of the mediation paths in separate structural equation models and a full discussion of the strength of indirect effects compared to control groups. Each of the 10 general hypotheses is reviewed. Each of the first 6 hypotheses is commented on in terms of the strongest and weakest findings and the comparison between solos and the other employment types. The most important conclusions regarding areas for further research as well as policy implications were also raised.

The 4 mediation hypotheses are commented on in terms with the strongest and most compelling conclusions for the thesis highlighted. Included in the last mediation hypothesis is an extrapolation of that model's findings in monetary terms i.e. a cost-benefit analysis in British pounds (£) and average hedonic well-being and eudemonic well-being for a solo over one year – this is a demonstration of how the findings can be directly useful to policymakers wishing to raise average well-being levels in this population.

The conclusion summarises the findings, first in a simplified manner focusing just on the solo group, a broader drawing of conclusions then expand, included a comparison between employment groups, including the self-employed with employees. Limitations are discussed. Finally, future research projects are proposed.

1.5 Structure of Dissertation

The dissertation takes a traditional structure; there are 10 Chapters, these include:

1. Introduction
2. Well-Being and Income (Literature Review)
3. Personality (Literature Review)
4. Theoretical Model
5. Methodology
6. Results
7. Discussion
8. Conclusion

9. Appendices
10. References

1.6 Search Methodology

1.6.1 Introduction

The literature review search was conducted using Harzing's "Publish or Perish" software created by Professor Ann-Wil Harzing of Middlesex University, publisher of the Harzing Journal Quality list. What is useful about this software is that it returns advanced search results on specific keywords. It allows the researcher to view search results in order of the number of citations and provides other metrics related to journal quality and rankings.

The research methodology for the two literature review chapters (Chapter 2, Well-Being and Income; and, Chapter 3, Personality) are now detailed. Note the more explanatory detail is provided for the first literature review chapter only, to reduce repetition.

1.6.2 Income and Well-Being

The following search string was used for the income and well-being component of the literature review:

- "income" OR "incomes" AND "well-being" OR "satisfaction" OR "happiness".

The approach taken in this literature review is that papers are chosen primarily based on metrics along with some judgement by the author - in line with his research philosophy. The literature review has been written several times over the 4 year period of the PhD, and this has resulted in insights regarding the literature that informs and could bias the results. Therefore, in the final literature review, presented here, care has been taken to reduce the bias through a systematic literature review process while also accounting for experience and judgement gained through vast reading over these years. For example, in the above search phrase, the author knows that satisfaction and happiness are sometimes used interchangeably with subjective well-being in the literature and are therefore included as synonyms in the search. Also, "subjective well-being" is implicitly included in a search for "well-being", as is, "psychological well-being", a field the author knows is growing rapidly.

The Google Scholar database was selected to perform the search - this database is the largest that exists (e.g. it is larger than ABI/Inform or Proquest). However, the Google Scholar search

function can return lower quality and irrelevant articles - the Harzing software search replaces the Google Scholar search and returns the broadest and highest quality search possible. See Harzing (2017) for information on why Google Scholar is now considered a "Serious Alternative to Web of Science" for more information on its validity as a search methodology.

The above search string in the Harzing Google Scholar search system returned over 2,400 search results. However, the top 3 indicate that the search string is accurate:

Cites	Per year	Rank	Authors	Title
h 2697	122.59*	33	RA Easterlin	Will raising the incomes of all increase the happiness of all?
h 2630	125.24*	31	AE Clark, AJ Oswald	Satisfaction and comparison income
h 2357	147.31*	34	RA Easterlin	Income and happiness: Towards a unified theory

Harzing with Google Scholar

The seminal paper by Easterlin on income and subjective well-being - i.e., the paper upon which much of the "Easterlin paradox" debate is derived - ranks first. For example, the author feels confident that Easterlin is the dominant author on the topic of income and well-being based on extensive PhD reading over 4 years, and this is confirmed by the metric chosen above.

Table 1.1

Self-employment is reviewed separately as this severely narrows the search results and risks missing the broader literature on SWB and income. Also, adding "self-employment" OR "self-employed" OR "entrepreneur" OR "entrepreneurial", reduces the sample dramatically, to only 58, and, as a useful reality check, the paper by Sara Carter (the author's second supervisor) on "The Rewards of Entrepreneurship" ranked 3rd in terms of the number of citations.

Cites	Per year	Rank	Authors	Title
h 1064	44.33*	2	E Diener, E Sandvik, L Seidlitz, M Diener	The relationship between income and subjective well-being: Relative or absolute?
h 120	13.33*	1	B Headey, R Muffels, M Wooden	Money does not buy happiness: Or does it? A reassessment based on the combined effec
h 119	19.83*	4	S Carter	The rewards of entrepreneurship: Exploring the incomes, wealth, and economic well-being

Harzing Self Employment

The target set for each of the two literature review chapters was 10,000 words each, not including the introduction and this description. On average, the author has 30 words per sentence, and each sentence contains approximately 1 reference on average, but approximately 10% of all sentences have 3 or more references. With 10,000 words, there are approximately 333 sentences. 10% of this is 33, so 99 references or more for those 33 sentences. The remaining 300 sentences would contain 300 references. However, it is likely that each of these references is referred to more than once, i.e., drawing different points from the same paper. If the assumption is that the 300 references are referred to at least three times, then this reduces

the reference pool to 100 papers. The same could be said for the sentences with 3 or more references, i.e., this would 33 references, not 99. Therefore, the target reference count regarding unique papers for each literature review chapter is approximately 133 papers - this seems consistent in comparison to other PhD theses the author has reviewed.

With this target guideline in mind, it becomes necessary to determine how to reduce the number of papers returned in the broad search. In this regard, the primary quantitative determinate is the number of citations which indicates the author and paper's impact and, ultimately, and most importantly in the view of the author: where the debate is being held in the field. It is more important for a paper to be widely cited and discussed than not - this is not a judgement as to whether the paper or concept presented is "right" or whether it contains flaws, it is an assumption that the topics that are being discussed by fellow academics are where the "state of the art" is.

The concern in this approach is that "radical" or "experimental" papers or papers with important findings that are not being published by "well-known" authors are missed. In this regard, Harzing also includes an H-Index which provides guidelines on the quantity and quality of an author - an author who has one paper with lots of citations will not have a high H-Index if they do not publish consistently over time. The underlying assumption in this system is always that this system results in higher quality research being ranked higher. The problem with this is that a paper with excellent research that has many citations (or low citations) but where authors and journals that have low rankings are missed. In this regard, the author takes the position that higher quality journals as determined by Harzing citations and rankings model, present higher quality research. However, a subjective approach to selectively choosing articles and topics from the authors reading along with discussions from fellow academics in the field at conferences and so forth is used to supplement the dominant ranking system approach.

For the first search described above (excluding self-employment and entrepreneur), there were 16 papers with more than 500 citations. A second level search was also performed based on those same keywords but searching for papers that use those 16 papers as citations. The search string is, therefore:

- "income" OR "incomes", "well-being" OR "satisfaction" OR "happiness" [Citing Works]

The search for this is not restricted to "Document Title". Therefore the search results are less refined in that sense. However, it does show a second level discussion which, while less

focused on those keywords, does provide an important gauge as to where those papers have taken the discussion. For example, important papers, in the author's opinion, by Frey and Stutzer, along with Blanchflower and Oswald, which do not show up in the first level search, are returned in this search. A similar second level search was performed on the second search which included self-employment for further completeness.

1.6.2.2 Summary

Four searches were run.

- "income" OR "incomes" AND "well-being" OR "satisfaction" OR "happiness".
- 1a. "income" OR "incomes", "well-being" OR "satisfaction" OR "happiness" [Citing Works]
- "income" OR "incomes" AND "well-being" OR "satisfaction" OR "happiness"AND "self-employment" OR "self-employed" OR "entrepreneur" OR "entrepreneurial"
- 2a."income" OR "incomes" AND "well-being" OR "satisfaction" OR "happiness"AND "self-employment" OR "self-employed" OR "entrepreneur" OR "entrepreneurial" [Citing Works]

For search string 1, the broadest search, papers with more than 100 citations were chosen, this resulted in 111 papers. For the second level search which included citations of the top 16 papers ([Citing Works]), search 1a, papers with more than 500 citations were chosen, this resulted in 71 papers. For search string 2 which included self-employed and entrepreneur variant terms, only 29 papers were returned with more than 1 citation; these were included. For 2a, the second level search included the top 8 papers from search 2 being cited ([Citing Works]), papers with more than 100 citations were chosen, this resulted in 129 papers - this resulted in 340 papers in total. There were 44 duplicates found which reduced the number down to 296.

Next, irrelevant papers were removed. These included papers not in English, those with irrelevant variables or topics, for example, a paper on the origins of terrorism was removed because even though it did look at socioeconomic determinants, the paper was not directly focused on well-being, income or self-employment. Other papers were too focused on tax or tariffs and were excluded, while others do look at economic constructs, such as preferences, which were left in as the topic of behavioural economics were discussed. Some papers were

also included as they had adjacent variables that were deemed important, such as those related to health, culture, biology, marriage and gender. The total papers removed were 55.

This reduced the pool of papers reviewed for this chapter down to 241. The next step was to sort the papers in terms of variables examined and methodologies used. During this process a further 26 papers were found to be irrelevant, this reduced the final number of papers reviewed to 215.

Each paper was coded based on identifiable variables, the level of analysis and geography from the title of each paper. This resulted in 52 categories of relevance to the domain. Of the 215 papers, 92 had income in the title. Income, well-being, happiness and subjective were, as expected, the most frequent terms.

Only 1% of papers had entrepreneur, self-employed or micro-entrepreneur in the title.

In order to boost the number of papers that include self-employment or entrepreneurship above 1%, a separate search was conducted to search for the string listed above (i.e. "income" OR "incomes" AND "well-being" OR "satisfaction" OR "happiness" AND "self-employment" OR "self-employed" OR "entrepreneur" OR "entrepreneurial") in the abstract field, rather than just the title. Duplicate papers were removed, and only those papers with self-employment or entrepreneurship in the title were kept - this left 145 papers in the entrepreneurship /self-employment category. These papers were then categorised. A further 44 papers were removed during this process - this left 316 papers in total to be reviewed.

There were 14 new categories identified which related to entrepreneurship only.

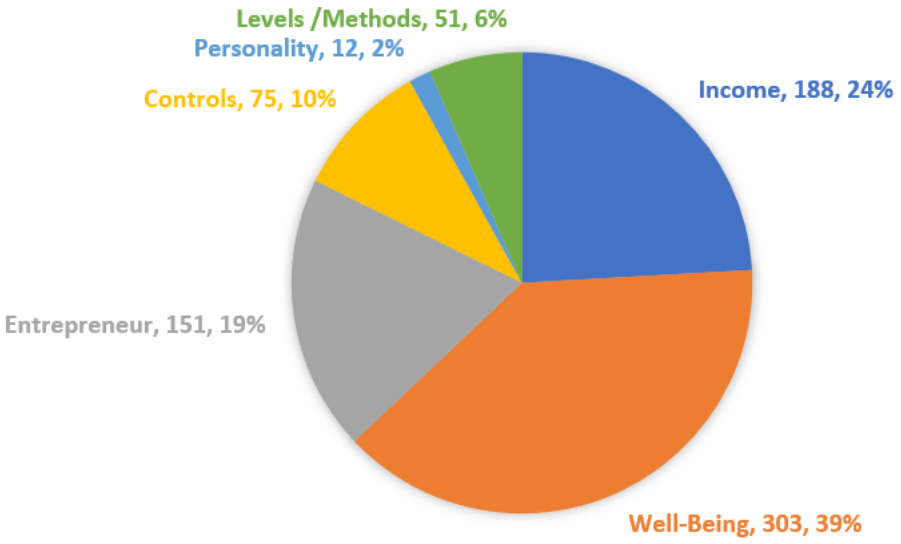
Meta-categories were then created. These are listed in the table below, the number to the right represents the frequency of occurrence in the literature reviewed.

Income			well-being			Entrepreneur	
Income	106		well-being	76		Self Employment	55
Economics	26		Happiness	71		Entrepreneur	52
Poverty	14		Subjective well-being	47		Solo-Entrepreneur	1
Relative Income	12		Satisfaction	35		Autonomy	10
Wealth	11		Psychology	17		Performance	4
Inequality	10		Job Satisfaction	11		Entrepreneurial Behaviour	4
Relative vs Absolute Income	9		Quality of Life	9		Intentions	4
Total	188		Aspirations	6		Decision	4
			Emotion	5		Entrepreneurial Orientation	3

Controls			Motivation	5		Job	3
Health	13		Hedonism	3		Necessity	3
Children	11		Behavioural Economics	3		Job Characteristics	2
Sex	9		Preferences	4		Work	2
Culture	7		Utility	3		Stress	2
Social	6		Cognitive	2		Human Capital	1
Unemployment	5		Affective	1		Returns	1
Marriage	4		Esteem	1		Total	151
Age	4		Loss Aversion	1			
Ethnicity	3		Prospect	1		Levels /Methods	
Family	3		Altruism	1		National Level	15
Education	2		Primacy	1		Measurements	8
Sustainability	2		Total	303		Panel	7
Institutions	2					UK	6
Biology	2		Personality			USA	5
Politics	2		Personality or Traits	11		Individual Level	3
Total	75		Need for Achievement	1		Household Level	3
			Total	12		Neighbourhood	4
						Total	51

Figure 1.1 Meta Categories of Lit Review

The following pie chart shows the distribution of the meta categories.



Equation 1.1 Meta Categories of Lit Review

Of the 316 papers that were reviewed, the well-being category had the most occurrences at 39%, income had 24%, entrepreneur or self-employment had 19%, controls had 10%, levels or methods had 6%, and personality had only 2%.

1.6.2.3 Structure

The literature review chapter is structured as follows. First, the topics of well-being and income are reviewed. Those papers with the highest citations and with no other foci (i.e., they did not focus on more than one topic in the title) are reviewed first - this provides a deeper understanding of the definitions. Then, the topic of income and subjective well-being together are examined together, with papers focusing exclusively on those two categories. Next, a review of both the entrepreneurship and self-employment literature are examined separately and then also as they relate to the income and well-being. Finally, a summary of the gaps in literature is identified.

While 316 papers were reviewed, only 192 papers (i.e. this is more than the 133 target) of relevance are cited within the first literature review chapter.

1.6.3 Personality

Constructing the SLR for the Personality Chapter was more intuitive as it consisted of a narrowing based on insights gained in the Well-Being and Income chapter. For example, Well-Being searches required looking for two types of well-being, Eudaimonia and Hedonic. Eudaimonia searches included searches for the 4 main types of eudaimonia examined in self-determination theory, including autonomy, relationships, environmental mastery along with purpose or meaning. Hedonic well-being searches involved looking for cognitive well-being terms, especially satisfaction and happiness, along with affect. Income searches were as before, with the addition of economics and behavioural economics. Narrowing by type of employment included as before, entrepreneurship, self-employment and solo self-employment. Finally, personality involved a search for the following terms:

- Personality
- Traits
- Factor
- Big 5
- Big Five
- Five Factor

The latter 4 on the list related to the Big 5 factor model of personality, which dominates personality research and is the focus of the trait aspect of this thesis. The Big 5 factors include the five traits, agreeability, openness, extroversion, neuroticism and conscientiousness.

Also, personality research involved searches relating to direct paths and mediation combinations related to the above search terms. These included:

- trait and hedonic well-being
- trait and eudaimonia
- trait and income
- trait, income and eudaimonia
- trait, income and hedonic well-being
- trait and self-employment

In running search terms trait also included the other personality synonyms listed above separated by an "OR" operator. Also, each search was run on each of the five traits, for example, agreeable and hedonic well-being. Also, each of the hedonic well-being and eudaimonia subcategories (e.g. cognitive, satisfaction, autonomy or relationships) were similarly included using "OR" operators.

The search strings were:

- "personality" OR "traits" OR "big 5" OR "big five" OR "five factor"
- "agreeability" OR "agreeableness" OR "conscientious" OR "conscientiousness" OR "openness" OR "extroversion" OR "extraversion" OR "neuroticism" OR "neurotic"
- "hedonic" OR "cognitive" OR "affect" OR "satisfaction" OR "happiness" OR "happy"
- "eudaimonia" OR "autonomy" OR "relationships" OR "environmental mastery" OR "purpose" OR "meaning"
- "income" OR "incomes" OR "economics" OR "behavioural economics" OR "behavioral economics"
- "entrepreneurship" OR "solo" OR "self" OR "employment" OR "self employed"

There were over 500 papers on personality alone. It was important not to allow the personality chapter to dominate the thesis as it forms only one of the 4 main components of the thesis question (i.e. the other three are income, well-being and the solo self-employed). To limit the scope of the search, to start, a focus was chosen on papers relating to the history of personality. Reviewing those papers allowed for a clearer understanding that the five-factor model was the

dominant form of personality research. Following this, an analysis of the leading papers by number of citations relating to the paths identified above (including the mediations of income, well-being and trait), were run, which all refer to the five-factor model.

The searches run also correspond to the sections within the chapter. Expanded in full the searches are:

- **trait and hedonic well-being**

"personality" OR "traits" OR "big 5" OR "big five" OR "five factor"

AND

"hedonic" OR "cognitive" OR "affect" OR "satisfaction" OR "happiness" OR "happy"

This search returned over 500 papers, to restrict the search the top 100 by citation were reviewed, only 22 were deemed relevant. These included 9 related to affect, 11 related to cognitive well-being including satisfaction and happiness, 3 related to hedonic well-being in general and 1 related to openness and 1 to the eudaimonia dimension, purpose – the purpose was outside of the scope of the search but relevant to the Chapter.

It is necessary to run the individual trait string separately to allow the search engine to perform correctly. Therefore, this search was also run:

"agreeability" OR "openness" OR "extroversion" OR "neuroticism" OR "conscientiousness"

AND

"hedonic" OR "cognitive" OR "affect" OR "satisfaction" OR "happiness" OR "happy"

This resulted in 136 papers with at least 10 citations. Of these, 12 were deemed relevant including 6 related to affect, 4 to happiness, 1 to agreeableness, 11 to neuroticism and 8 to extroversion.

(Also, subsequent to the initial search, to add **self-employment**, this was included:

AND

"entrepreneurship" OR "self employed" OR "self employment" OR "entrepreneur"

)

This returned no papers of interest.

The remainder of this section lists the search parameters only. The selection process chosen was similar to the above, all terms had more than 500 responses, all were reduced down to 50 – 30 or less selected for inclusion. In variations relating to self-employment, few to no papers were returned in relation to the self-employment and entrepreneurship domain – this is unsurprising given the shift away from the topic in the domain as will be detailed in the literature review.

- **trait and eudaimonia**

"personality" OR "traits" OR "big 5" OR "big five" OR "five factor"

AND

"eudaimonia" OR "autonomy" OR "relationships" OR "environmental mastery" OR "purpose" OR "meaning"

For the individual trait string variations:

"agreeability" OR "openness" OR "extroversion" OR "neuroticism" OR "conscientiousness"

AND

"eudaimonia" OR "autonomy" OR "relationships" OR "environmental mastery" OR "purpose" OR "meaning"

(Also, subsequent to the initial search, to add **self-employment**, this was included:

AND

"entrepreneurship" OR "solo" OR "self" OR "employment" OR "self employed"

)

- **trait and income**

"personality" OR "traits" OR "big 5" OR "big five" OR "five factor"

OR

"agreeability" OR "openness" OR "extroversion" OR "neuroticism" OR "conscientiousness"

AND

“income” OR “incomes” OR “economics” OR “behavioural economics” OR “behavioral economics”

(Also, subsequent to the initial search, to add **self-employment**, this was included:

AND

“entrepreneurship” OR “self employed” OR “self employment” OR “entrepreneur”

)

- **trait, income and hedonic well-being**

“personality” OR “traits” OR “big 5” OR “big five” OR “five factor”

OR

“agreeability” OR “openness” OR “extroversion” OR “neuroticism” OR “conscientiousness”

AND

“income” OR “incomes” OR “economics” OR “behavioural economics” OR “behavioral economics”

AND

“hedonic” OR “cognitive” OR “affect” OR “satisfaction” OR “happiness” OR “happy”

(Also, subsequent to the initial search, to add **self-employment**, this was included:

AND

“entrepreneurship” OR “self employed” OR “self employment” OR “entrepreneur”

)

- **trait, income and eudaimonia**

“personality” OR “traits” OR “big 5” OR “big five” OR “five factor”

OR

“agreeability” OR “openness” OR “extroversion” OR “neuroticism” OR “conscientiousness”

AND

"income" OR "incomes" OR "economics" OR "behavioural economics" OR "behavioral economics"

AND

"eudaimonia" OR "autonomy" OR "relationships" OR "environmental mastery" OR "purpose" OR "meaning"

(Also, subsequent to the initial search, to add **self-employment**, this was included:

AND

"entrepreneurship" OR "self employed" OR "self employment" OR "entrepreneur"

)

In addition, the field of entrepreneurial personality was also examined via the following search:

- **trait and self-employment**

"personality" OR "traits" OR "big 5" OR "big five" OR "five factor"

OR

"agreeability" OR "openness" OR "extroversion" OR "neuroticism" OR "conscientiousness"

AND

"entrepreneurship" OR "self employed" OR "self employment" OR "entrepreneur"

1.6.4 Theoretical Model

The Theoretical Model Chapter, 4, acted as a conclusion to the literature review chapters, in that it brought together the findings in a coherent model. The model consisted of 6 direct paths and 4 mediation relationships, all working together, simultaneously. This was a reinterpretation and refinement of the paths identified in the Personality Chapter, 3. These were:

- HG 1. Income is positively related to hedonic well-being
- HG 2. Income is positively related to eudaimonic well-being
- HG 3. Income is positively related to personality

- HG 4. Personality is positively related to hedonic well-being
- HG 5. Personality is positively related to eudaimonic well-being
- HG 6. Eudaimonia is positively related to hedonic well-being
- HG 7. Personality mediates Income and hedonic well-being
- HG 8. Personality mediates Income and eudaimonic well-being
- HG 9. Eudaimonic well-being mediates Income and hedonic well-being
- HG 10. Eudaimonic well-being mediates personality and hedonic well-being

(Note these are 10 general hypotheses and HG standards for Hypothesis General.).

For each of the hypotheses, the searches were run using combinations of the strings used in the personality section. Citations of papers which support these hypotheses are included in the Theoretical Model Chapter 4.

It should be noted that the full model, i.e. a simultaneous equation featuring all 10 hypotheses, had no papers. In other words, **the full search**, i.e., relating to eudaimonia, hedonic well-being, income and personality, included:

- **eudaimonia, hedonic well-being, income and trait, self-employed**

"self employment" OR "entrepreneur" OR "self employed" OR "entrepreneneurship" AND "agreeability" OR "openness" OR "extroversion" OR "neuroticism" OR "conscientiousness" AND "eudaimonia" OR "autonomy" OR "relationships" OR "environmental mastery" OR "purpose" OR "meaning" AND "hedonic" OR "cognitive" OR "affect" OR "satisfaction" OR "happiness" OR "happy" "income" OR "incomes" OR "economics" OR "behavioural economics" OR "behavioral economics"

Also,

"self employment" OR "entrepreneur" OR "self employed" OR "entrepreneneurship" AND "personality" OR "traits" OR "big 5" OR "big five" OR "five factor" AND "eudaimonia" OR "autonomy" OR "relationships" OR "environmental mastery" OR "purpose" OR "meaning" AND "hedonic" OR "cognitive" OR "affect" OR "satisfaction" OR "happiness" OR "happy" "income" OR "incomes" OR "economics" OR "behavioural economics" OR "behavioral economics"

These both resulted in no findings. Even removing “self employed” from the research resulted in no findings.

Chapter 2. Well-Being and Income

2.1 Introduction

This chapter is the first of two literature review chapters. This chapter is on well-being and income among the self-employed with a focus on solos. It will present the literature on these topics before finishing with a summary of the gaps in knowledge on well-being, income and the self-employed in terms of solos.

The literature review chapter is structured as follows. There are 4 main sections. Each section is grouped into leading theories in the literature with reference to empirical studies and relevant correlates. Well-being (2.2) is looked at first, then income and well-being (2.3) are looked at together. Then an entrepreneurship and self-employment section (2.4), which looks at well-being, income and then well-being and income theories and findings in both the entrepreneur and self-employed populations - both populations are included as there is a crossover between the two and significant debate regarding how they are distinct (as discussed in Chapter 1). The reason well-being is looked at first is that it is the outcome variable. The purpose of this thesis is to determine how the solo-self-employed derive well-being from their income and whether personality traits matter in this regard. Therefore, it is appropriate to examine well-being first. In the entrepreneurship and self-employment section, income is looked at separately as the literature has unique and relevant issues related to income underreporting, risk and entry choices in relation to those populations. A broader examination of income, such as the theoretical foundations of money, are not within the scope of this literature review and are not relevant to the thesis research question. Therefore, income is only looked at in isolation in relation to the entrepreneurship and self-employment populations. Section 2.5 looks at the same variables in a solo self-employment context, and then finally, in section 2.5.4, gaps in the literature are discussed in terms of solos.

2.2 Well-Being

Well-Being in the context of this thesis relates to those concepts within the psychology and behavioural economic domains where there is some crossover. In psychology, well-being has

traditionally referred to subjectively reported happiness or life satisfaction. Behavioural economics is a field which emerged since in the 1970's, where well-being is looked at as an alternative to traditional utilitarian economics - utility in economics refers to what benefits one derives from a good or service (Bentham, 1823). Well-being, in the behavioural economics literature, emerged as a response to the idea that not all activities have economic value.

Ironically, utility, first conceived by Bentham, was originally designed to record increases in 'experienced' happiness from decisions (Read, 2007) – a form of subjective well-being. This experienced utility was later judged impossible to measure (Read, 2007) and abandoned, until Easterlin (1974), Kahneman and Tversky (1979) and others in the behavioural economics and psychology domains, began to legitimise self-reported happiness – for example, establishing discriminant validity for the measure (Sandvik et al., 1993).

Despite this resurgence of a Bentham approach, a widely-cited paper by Clark et al. (2008) warned (p.36) that happiness should be cautiously used as a measure of utility as "there is more to life than happiness". They focus on eudaimonia, which comprises purpose in life and autonomy among other dimensions (Ryff, 1989) which are explored in the next section, Clark et al. (2008) highlight that in the psychology literature, eudaimonia "captures functional aspects of well-being" and that this plays a "separate role to the hedonic part of well-being (happiness or life satisfaction)".

While Aristotle and Epicurus originally distinguished between hedonism and eudaimonia, it is recently that psychological well-being did so theoretically and methodologically. Recently, relative to Aristotle, existential philosopher Sartre (1965) spoke of the individual's personal responsibility to find meaning in life which can be difficult when reality can be harsh or even absurd. Such circumstances may be responded to irrationally or, in the case of Ryff's (1989) 6 dimensions of eudaimonia, the autonomy dimension, a relevant 'utility' for entrepreneurship, may provide a rational argument for giving up "happiness" (Kimball and Willis, 2006), or, related expected utility maximisation.

Subjective well-being (SWB) throughout the literature is a term often used loosely by psychologists and economists (Diener et al., 1999). SWB, as defined in Chapter 1, refers to self-reported well-being and is used interchangeably with happiness, satisfaction and even affect (defined in Chapter 1., explored in section 2.2.2, Hedonic Well-Being, refers to mood and emotional, momentary states).

An examination of the solo-self-employed literature can play an important role in moving the utility debate forward particularly in the context of the income inequality and relative income domains. Their nearness to the inequality, poverty and unemployment domains can provide unique insight. Also, the solo-self-employed could employ differing decision-making models, such as those examined in Prospect Theory. Kahneman and Tversky (1979) do not look at well-being as directly as Easterlin (1974), rather, their Prospect Theory looks at decision making under risk, nonetheless, it is a cousin in the assumption that humans do not act rationally or linearly in attempting to satisfy utility demand.

Bentham (1823) referred to the utility as a hedonic flow of pleasure and pain, what Kahneman and Krueger (2006) call "experienced utility". This definition is the "sum of the momentary utilities over that time period" or the "temporal integral of momentary utility" (2006., p.5). In this, there is a trade-off between choosing one activity over another. Kahneman and Krueger (2006) also distinguish between "experienced utility and remembered utility", which leads to the other challenge with happiness data as a form of utility: not only are most happiness and satisfaction surveys based on memory, a global assessment of life, they are both malleable (Bertrand and Mullainathan, 2001), in that happiness reports can be influenced by positive or negative statements before the respondent answers the question.

2.2.1 Eudaimonia

Eudaimonia has been traced to ancient philosophers Socrates (in Apology 30b), Plato (in Republic and Gorgias), Aristotle (Nicomachean Ethics and the Eudemian Ethics), Epicurus (explained by Lucretius in On the Nature of Things), The Stoics and more recently, Bentham (1823), Nietzche (1883, in Thus Spoke Zarathustra), Maslow (1968) and Ryff (1989) and others. This review examines Aristotle, Epicurus who strongly influenced more recent well-being research, including Bentham and Ryff in particular – the review also touches on Maslow and others. It could be argued that eudaimonia is a component of the distinct field, psychological well-being. However, this differs substantially from the relatively recent positions of leading policy makers and academics, i.e. Stiglitz et al. (2009), and Helliwell et al. (2017) who refer to Aristotelian "eudaimonia" as "a meaning in life, or good psychological functioning" (p.12, of World Happiness Report (2017) showing excerpt from OECD measurement practices (2013)). Also, Keyes et al. (2002) found that eudaimonia and hedonic well-being were correlated but distinct constructs. The more existential components of

eudaimonia (e.g. purpose in life) are especially distinct from affective and cognitive components (life satisfaction) of hedonic well-being.

Eudaimonia is also important for the entrepreneurship domain when looked at through the six dimensions identified by Ryff (1989., p.1079), particularly the autonomy dimension. Ryff undertook an extensive literature review (1989a). Her paper on eudaimonia, which encompasses psychological well-being (1989) posited that well-being research had been restricted by a lack of theoretical rigour in the production or use of well-being indices and that these were biased towards affect and life satisfaction or happiness measures. But, in examining eudaimonia, particularly important to her propositions towards ageing, she found that "researchers attracted to such formulations have been immobilized by the absence of valid measures" (1989, p.1070). Ryff's review revealed that "six dimensions of positive functioning are referred to repeatedly in the literature on life-span development, personal growth, and mental health" (1989a, p.41). Eudaimonia was posited by Ryff to contain distinct elements of "positive functioning" (1989, p.1069) that have not been represented in empirical research. The six dimensions identified include: Self-Acceptance, Positive Relations with Others, Personal Growth, Purpose in Life, Environmental Mastery and Autonomy. The latter three are of particular relevance to this thesis and explored in more detail now. Ryff's (1989., p.1072) Table 1 titled "Definitions of Theory-Guided Dimensions of well-being", identified the high and low score dimensions for each dimension and the three identified as relevant to this thesis are provided in full below. Note spelling below has been changed to British English from the original:

- "Autonomy
    - High scorer: Is self-determining and independent; able to resist social pressures to think and act in certain ways; regulates behaviour from within; evaluates self by personal standards.
    - Low scorer: Is concerned about the expectations and evaluations of others; relies on judgments of others to make important decisions; conforms to social pressures to think and act in certain ways.
- Environmental mastery
    - High scorer: Has a sense of mastery and competence in managing the environment; controls complex array of external activities; makes effective use

of surrounding opportunities; able to choose or create contexts suitable to personal needs and values.

- Low scorer: Has difficulty managing everyday affairs; feels unable to change or improve surrounding context; is unaware of surrounding opportunities; lacks sense of control over external world.

- Purpose in life
  - High scorer: Has goals in life and a sense of directedness; feels there is meaning to present and past life; holds beliefs that give life purpose; has aims and objectives for living.
  - Low scorer: Lacks a sense of meaning in life; has few goals or aims, lacks sense of direction; does not see the purpose of past life; has no outlook or beliefs that give life meaning."

In the development of this model, Ryff cites several classic theorists: "such works include Maslow's (1968) view of self-actualisation, Roger's (1961) fully functioning person, and Jung's (1933; von Franz, 1964) process of individuation" (1989a., p.40). (For a full treatment on the theoretical development of these dimensions see Ryff's 1982a, 1985a and 1989a.) Comparisons between entrepreneurial theory on autonomy are drawn in this thesis along with the question of intrinsic motivation or being goal agnostic (which relates to environmental mastery) and a sense of purpose in life. These are particularly important to examine in this thesis in relation to the non-pecuniary benefits of entrepreneurship. However, how these and other dimensions, such as risk-taking propensity, or traits, relate to eudaimonia, is unknown.

2.2.2 Hedonic well-being

In addition to the psychological well-being literature just discussed, in most of the economic literature and the limited entrepreneurial studies on well-being, the focus has been almost exclusively on hedonic well-being until very recently (e.g. Ryff, 1989). As discussed in Chapter 1, hedonic well-being refers to both cognitive and affective measures, and most refer to cognitive well-being, i.e. satisfaction or happiness.

Affective measures are looked at less frequently, most likely as they are harder and costlier to measure. Affect refers to both positive affect and negative affect, not just positive affect and an absence of positive affect. Affect can also entail emotion, mood and temperament (Diener et al., 1997). The measurement of affect means a periodic daily measurement of affective state

throughout the day. Cognitive well-being is a global measure of life satisfaction or happiness. Satisfaction can be dissected into satisfactions with life elements such as love, marriage, friendship and job. Diener et al. (2009) define high subjective well-being as a "frequent positive affect" as well as infrequent "negative affect" (p.1) coupled with a global sense of "satisfaction with life".

While total well-being is clearly comprised of both hedonic well-being and eudaimonia, the majority of studies examine the sub-components of hedonic well-being only, i.e. affect and cognitive well-being – and mainly cognitive, i.e. happiness and satisfaction.

2.2.3 Methods, Measurement & Causality

2.2.3.1 General Form of Equation

Dolan et al. (2008) give subjective well-being a general form equation:

$$SWB_{report}=r(h)$$

Equation 2.1 SWB General Form

Where SWB is usually life satisfaction or happiness to some reporting function (r) of "true" SWB (h), where SWB is then predicted by multiple factors in an additive function with Є an error term:

$$SWB_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \ldots + Є_{it}$$

Equation 2.2 SWB Additive Function

They point out that SWB can be analysed either as a cardinal or ordinal variable, the latter using ordered Probit or Logit regressions.

2.2.3.2 Scales of Measurement

The three most common ways to measure SWB are the Positive and Negative Affective Scale (Watson et al., 1988), Satisfaction with Life Scale (Diener et al., 1985) and the General Health Questionnaire or GHQ (Goldberg and Williams, 1988).

2.2.3.3 Discriminant Validity

The widely cited Sandvik et al. (1993) article showed discriminant validity of SWB measures of affect and happiness through low correlations of the SWB component measures. They conclude that "conventional self-report instruments validly measure the SWB construct" (p.1).

2.2.3.4 Endogeneity, Exogeneity and Causality

Clark et al. (2008) argue that endogeneity (in terms of demographics such as income, education; and the reference group) (p.58) is endemic to the nature of the SWB variable. Critical to this thesis they highlight that "natural experiments producing exogenous variation in income" do not occur often which means that direction of causality is harder to establish, i.e. it could be that high well-being (eudaimonia or hedonic well-being or manifestations) could cause income growth. For example, an accurate subjective assessment of environmental mastery should predict income growth - this has not been demonstrated in the case of the solo-self-employed.

2.2.3.5 Panel Surveys & Time invariant individual effects - personality

Dolan et al. (2008) appeared to disagree with Clark et al. (2008) regarding the ability to establish causality, arguing that there were now more papers using "panel data" (p.96) and "control for time-invariant individual effects, such as personality" (p.96).

Kahneman & Krueger (2006) draw a distinction between life satisfaction and affect and in discussing establishing correlate distinctions of predictors in order to determine the "possible causes" and the "possible consequences of well-being," it is necessary to measure "affect" (p.9) over time, an expensive prospect.

The same concerns occur for life satisfaction. Blanchflower (1996) looked at unemployment and life-satisfaction in 23 countries using cross-sectional data. Winkleman and Winkleman (1998) critique this approach in their own study of unemployment and SWB. They note that "the presence of unobserved common determinants of satisfaction and unemployment may lead to a spurious correlation, or omitted variable bias." To resolve this, they advise that a panel survey can be used that can "control for unobserved, but time-invariant, individual specific effects that are correlated with unemployment" (p.2). In most studies of SWB, the causality is assumed to run from predictor to the SWB dependent variable and that "no unobserved variables are correlated with the included explanatory variables" (Dolan et al., 2008, p.95).

2.2.4 Correlates

Kahneman and Krueger (2006) identified the "Correlates of High Life Satisfaction and Happiness" in their Table 1 (p.9) provided in full below:

- “Smiling
- Unfakeable Smile (Smiling with the eyes)
- Ratings of one’s happiness by friends
- Frequent verbal expressions of positive emotions
- Sociability and Extraversion
- Sleep quality
- Self-reported health
- High income, and high-income rank in a reference group
- Active involvement in religion
- Happiness of close relatives
- Recent positive changes of circumstances (increased income, marriage).”

(Sources: Diner and Suh, 1999., Layard, 2005., Frey and Stutzer, 2002)

Smiling is related to positive affect as are verbal expressions of positive emotion and friend’s ratings of happiness. Happiness of close relatives can include marital status, parental status. Financial disagreements are a leading cause of divorce (Lawrence et al., 1993., p.85) and are associated with lower marital satisfaction (Kerkmann et al., 2000., p.55). Aniol and Snyder (1997., p.347) suggest that this link to finances and marital satisfaction is gendered, with males experiencing greater financial concerns. However, Amato and Rogers (1997., p.617) contradict this finding citing gendered reporting differences only.

Subramanian et al. (2005) show that poor health and unhappiness are positively correlated and that causality direction is bidirectional in communities, in that healthier communities are happier and vice versa. This bi-directionality has been found in a number of other studies (Feist, Bodner, Jacobs et al., 1995; Schmidt and Bedeian, 1982).

Extraversion is examined broadly in the gaps section of this chapter and in-depth in the subsequent literature review chapter. Income is examined in the next section.

Age and culture are not included in the above table by Kahneman and Krueger (2006). Shmotkin (1990) and Diener & Suh (1999) show that life satisfaction increases with age and others have shown a ‘U’ shape with happiness lowest at middle age (Frijters and Beatton, 2012). Affect research has had mixed results (Kahneman and Krueger, 2006).

National culture is often looked at in terms of Hofstede's (1984) dimensions of Individualism-Collectivism, Power Distance, Masculinity-Femininity, and Uncertainty Avoidance. Arrindell et al. (1997) found that 'feminine-rich' countries had higher SWB levels. Diener and Diener (1995) found that self-esteem and life satisfaction were distinct constructs, correlated with each other and moderated by societal individualism. Financial satisfaction predicted life satisfaction more strongly in poorer countries.

2.2.5 Adaptation / Set-Point Theory

Set-point theory (Heady and Wearing, 1992) posits that life events do not affect an inherent well-being point, which is set by traits (note, Heady and Wearing, 1989, is referred to in Chapter 3., section 3.4, Personality and Well-Being). However, Lucas et al. (2004), Clark et a., (2001) and Clark and Georgellis (2013) have all found evidence that spells of unemployment is a different class of "life event" in that even short periods (Lucas et al., 2004) of unemployment can change the "point" of well-being in the long term, a form of psychological "scarring" (Clark et a., 2001) - this included both Germany (Clark et a., 2001), and Britain (Clark and Georgellis, 2013), indicating a broad phenomenon rather than a country specific characteristic. Clark et al., (2001) found evidence of a "habituation" effect, in that those who were unemployed previously did not have close to as low a drop in well-being in subsequent spells; and those who had the lowest drop in well-being upon becoming unemployed were less likely to be unemployed for more than a year. (Note, these responses to unemployment which inflicted "scarring" are discussed again in the last section of this thesis, Future Research (Section 8.5), where the question is asked: can "managed" spells of solo self-employment, following unemployment "scarring", produce a "healing" response? i.e. a raising of the long-term set-point?).

2.3 Well-Being and Income

2.3.1 Introduction

There are 2 main foci of research in the well-being and income field that are of relevance to this thesis: Inequality and Relative Income. Each is examined in depth here in relation to the research question. The inequality section (2.3.2) looks broadly at the trends of income at national levels. The relative income (2.3.3) section discusses reference groups individuals have which directly affect how people perceive their income and how this, in turn, affects well-being. Prospect theory is also discussed briefly, for completion, but is not a focus of this thesis.

At the broadest level, rising income results in diminishing returns to life satisfaction and happiness at a country level, a relationship is shown for both developed (Blanchflower and Oswald, 2004) and developing nations (Graham and Pettinato, 2002; Lelkes, 2006) - the effect is stronger for developing and transition countries. During a transition period of 1991 to 2002 East German citizens enjoyed a significant increase in income and, simultaneously, a similarly significant rise in life satisfaction (Clark et al., 2008).

This has been seen as an indicator that economic growth should not dominate economic policy (Oswald, 1997) and that some behavioural scientists have argued for a "revolution" (Layard, 2005) in research, where we are all focused on the determinants of happiness, and that happiness should be the "explicit aim of government intervention." However, in light of the above discussion, it is clearly unwise to focus all resources on hedonistic well-being. Indeed, the literature in the last decade has been clearly tempered by an exploration of eudaimonia, which looks beyond happiness towards purpose in life and includes autonomy (Ryff, 1989), central to entrepreneurship theory (Lumpkin et al., 2009).

2.3.1.1 Economic cycles

There is evidence that happiness has a moving correlation with macroeconomic variables including GDP (Di Tella et al., 2003; Alesina et al., 2004).

2.3.2 Income Inequality

The relationship between income inequality and happiness is relatively unexplored (Oishi et al., 2011). Oishi et al. (2011) found that lower income inequality led to greater average (national) happiness in a US-based study spanning decades. Hagerty (2000) also found a negative relationship between inequality and happiness whereas Berg & Veenhoven (2010) found no relationship. Most research on income inequality and happiness focuses on cross-national, state or city comparisons (Oishi et al., 2011 citing: Berg and Veenhoven, 2010; Diener et al. 1995; Helliwell and Huang, 2008; Alesina et al. 2004; Hagerty, 2000). No studies on the effect of income inequality on the subjective well-being of the solo-self-employed have been found.

The problem of inequality is greater (on average) in the US than in Europe. The main index of income inequality is the Gini coefficient. During the 60's and 70's the US coefficient was similar to most of western Europe (Atkinson, 1996), however, more recently, in 2008, the Gini coefficient was significantly higher in the U.S. (UN, 2009).

Inequality relates to poverty. Ludwig et al. (2012), citing a report on the poverty threshold of 2011 by the US Census Bureau, noted that almost 9 million people in the US lived in extreme poverty neighbourhoods defined as where 40% of residents have incomes below the poverty threshold of about $23,000 per year for a family of four. They note that these neighbourhoods are racially segregated and have higher rates of crime and lower quality public services (p.1). In contrast, the wealthy are consistently happier than poorer people, although these effects are small (Diener et al., 1999). Oishi et al. (2011) found evidence that income inequality and happiness was negatively associated for those with lower-income, however, the finding did not hold for those with higher-income. They suggest that income inequality likely disproportionally affects the happiness of the low income as it feeds into a narrative of the "rich getting richer" (p.1096). In other words, greater income inequality lowers SWB for the poor, which implies that lowering income inequality will raise happiness.

2.3.3 Relative Income

2.3.3.1 Utility

It is useful to explore utility before proceeding further. As mentioned in the introduction to the well-being section, utility was originally meant to be experienced utility (Bentham, 1823). Bentham assumed that this (experienced utility: usefulness, satisfaction, or happiness) was measurable. As the field developed this was eventually abandoned as economists judged 'experienced utility' impossible to quantify, instead economists settled for a compromise – revealed preferences (Samuleson, 1938). In other words, we make retroactive assumptions, i.e. that utility is revealed in past purchase decisions. In economic models, humans are traditionally seen as rational actors seeking to maximise utility. However, while humans do behave rationally, most of the time, enough to satisfy many economic models, humans are not perfectly rationally all the time and do not have access to perfect information - a prerequisite for the expected utility maximisation model. If humans are not rational, then the retroactive assumptions made regarding utility from revealed preferences is called into question - this is where behavioural economics comes in and starts to return to Bentham's 'experienced utility'. Advances such as the proven discriminant validity of self-reported well-being and two theories, in particular, relative income and prospect theory have facilitated this 'return to Bentham'.

2.3.3.2 Relative vs Absolute Income

Relative income effects or interdependent preferences were first looked at by Veblen in 1899. Recent debate has occurred in relation to the correlation between income and subjective well-being at the country level. The earliest, Easterlin (1974), argued that the relationship between income and SWB was relative. In contrast, Veenhoven (1988, 1991) demonstrated an absolute relationship. Easterlin (1974, 1995, 2001) showed that income and SWB are positive within a country – although, in what is commonly referred to as the Easterlin paradox, average happiness does not rise as a country reaches a certain satiation point. He argues that this is due to relativity of income rather than the absolute level of income i.e. impact of income depends on standards (or a reference point) driven by expectations and social comparisons. Caporale et al. (2008) found that within Western European countries that the relationship between income and SWB was negatively affected by reference income whereas the reverse was true for Eastern European countries – they hypothesised that Eastern Europeans saw reference income more optimistically i.e. as a "source of information for forming expectations about their future economic prospects" (p.1). The methodology used to identify reference income proxies drew on McBride (2001), to look at respondents in the same age group, and Ferrer-i-Carbonnell (2005), to look at people in the same age group with similar education levels (in the same country). In contrast, Georgellis et al. (2017) used an "experimental vignette" methodology ("Study 1", p.4.) and directly asked respondents whether and how comparisons were made in determining their pay satisfaction – a negative effect was found which was stronger in higher prestige roles and, relevant to methodology, respondents were more likely to compare themselves others in similar or identical roles.

Van de Stadt et al. (1985) found that income and reference group (similar age and education) income needed to rise for levels of satisfaction to rise. Conversely, Veenhoven (1991) said that as income is responsible for universal basic needs, at least at the lower income level, it is clearly the cause of subjective well-being, which makes the income and SWB relationship absolute, in part. Both Veenhoven (1991) and Diener et al. (1993) show that the relationship between happiness and income is absolute but that it could be partially relative. Diener et al. (1993) could find no evidence for "relative standards on income" (p.1) after exploring dimensions such as ethnicity, education and poor vs rich neighbourhoods. Affluence did correlate with SWB. However, income produced smaller increases in SWB at higher income levels in the US, but not across countries. This distinction between lower and upper-level

incomes is important for the solo-self-employed examined in this thesis. The absolute (or absolute and possibly partially relative) argument is similar to the one by Oishi et al. (2011) discussed in the previous section, i.e. that income inequality at the lower income levels is more significant for SWB for those at higher income levels. There is evidence that the relativity and absolute relationship differ between national and individual level, this appears likely due to the method of averaging populations at the national level. For example, Luttmer (2005) looked at neighbours directly and found in an individual level panel survey that higher earnings of neighbours were linked to lower levels of SWB after controlling for income. However, the study noted that the while there was positive correlation across individuals within a country, as countries became richer average happiness did not rise, i.e. in line with Easterlin (1995).

2.3.3.3 Inverse Income

Easterlin (1995), discussing national-level data, theorises that "the increase in happiness that one might have expected based on the growth in individual incomes is offset by a decrease in happiness due to the rise in the average, yielding, on balance, no net growth in well-being." (p.36) - in this, he is citing Duesenberry (1949) and Pollak (1976) who said that wellbeing is inversely related to others income. In this Eastern suggests that there is no net benefit (or loss) to happiness from income gains (or losses), meaning, happiness levels remain constant.

He explains that the reference income effect is exactly equal to the income effect on SWB. However, causality is difficult to assign. Researchers have tried to use exogenous variations in income to demonstrate causality (Frijters et al., 2004a, 2004b, 2006).

Other studies have shown evidence for causation in the opposite direction, with hedonic well-being shown to be positively assocaited with income (Schyns, 2001; Diener et al., 2002; Graham et al., 2004), and, conversely, unobserved factors negtatively associated with income (Ferrer-i-Carbonell & Frijters, 2004; Luttmer, 2005).

The inverse relationship in these theories of relative income is similar to the Diener and Diener (1995) theory on happiness called "appraisal theory" and refers to adapting to circumstances. The paper presents "Elements of a Theory of Happiness" (p.16) based on "appraisal" which accounts for "adaptation" along with goals and "cultural world-view". Also, the appraisal based view appears to be a precursor to the "aspiration" model. Stutzer (2003) found that higher income aspirations reduce utility, where satisfaction is again used as a proxy for utility.

In all of these relative income variations, the assumption is that the average income of others is what determines the theoretical reference point - how a person 'values', in part, their income. The 'others' is the sticking point, discussed next.

2.3.3.4 Reference Points

Who do people compare themselves to in order to make a relative comparison regarding their income? Clark et al. (2008) noted that very few studies ask respondents directly who they compare themselves to (See Georgellis et al. (2017, referred to above as an example). Therefore, we need to be careful in concluding reference points are a theoretical explanation - this is especially important for the solo-self-employed who work alone.

Van de Stadt, et al., (1985) defined reference groups by education and age (Ferrer-i-Carbonnell (2005) did so also, as referred to above, within the same country) - they show that income level rises in satisfaction are determined by those groups.

These explanations based on reference groups do not explain why people are so affected by their income relative to others. In income inequality theory, Oishi et al. (2011) say that the "negative link between income inequality and the happiness of lower-income respondents was explained not by lower household income, but by perceived unfairness and lack of trust."

To simplify the relative income argument - we get happier as our income rises, but we are, perhaps, jealous or envious of others, so we stay unhappy. The assumption in this argument is that wanting more does not bring greater satisfaction when incomes rise – people who strongly want money and wealth are more unhappy (Kasser & Ryan 1993, 1996). However, returning to the income inequality and the absolute income argument, this relative income finding is not sustained at the lower income levels where universal basic needs are not being met.

Nevertheless, if this conclusion is correct, the implications for the solo-self-employed are striking – i.e. the solo-self-employed are implicitly more alone than the self-employed with employees and the employees. It may be that that the solo-self-employed are not affected by reference group income because they are isolated and do not compare themselves to others.

2.3.4 Prospect Theory

Prospect theory is a decision-making theory which challenges expected utility theory. A rational human should value £10 the same whether it was given or received. In this simple model exchange rates are not being changed, the value of the £10 is £10. However, the theory

proposed by Kahneman and Tversky (1979) demonstrated that people weight losses higher than they weight gains –that humans "systematically violate the axioms of expected utility theory" (p.263). Newell et al. (2015) put it this way: "utilities and probabilities of outcomes both undergo systematic cognitive distortions (non-linear transformations) when they are evaluated" (p.122). In terms of Prospect Theory, this means that people are loss averse (Tversky and Kahneman, 1991), and this is viewed as irrational. Tversky and Kahneman's updated prospect theory using Quiggin's theory (1982) to include loss aversion as a component of "risk attitude" (1991). In Prospect Theory, the marginal utility of money (the subjective value of money) is utilised, and gains and losses are related to a neutral reference point, which explains why wealthier people have the same response to gains as poorer people, who have more to gain. The reference point is malleable (Newell et al., 2015., p.123) which means people can be manipulated at the decision point. There is also an isolation effect (Newell et al., 2015., p.124) which explains why people are concerned with change in wealth rather than the final state of wealth.

2.4 Entrepreneurship & Self-Employment

This section looks at the well-being of the entrepreneur and then income. It is important to specify in this chapter that in discussing entrepreneurship and entrepreneurship theories as they relate to income and well-being, this thesis does not equate entrepreneurship with self-employment. However, due to the crossover and similarities between the two populations, it is useful to discuss both.

The vast majority of those researchers seeking to explain the entrepreneurial phenomenon seek to do so through the lens of economic well-being, i.e., why do entrepreneurs remain (or persist, which is different) entrepreneurs when they earn less? - This is usually explained through “non-pecuniary” benefits, such as job satisfaction and autonomy (see Blanchflower and Oswald, 1992; Hamilton, 2000; Blanchflower, 2004; Shane, 2008), and/or economic models such as rational choice, preferences and decision bias. The prevailing model of economics is that if one does not act towards expected utility maximisation, then one is irrational, but this theory is unidimensional and ignores nonlinear decision making, unlike Prospect Theory. Relevant to this thesis, well-being is a universal drive we all have, which does compel us to act in line with utility maximisation most of the time.

2.4.1 Well Being

A central source of heterogeneity in entrepreneurial well-being is related to entry into entrepreneurship (i.e. necessity or opportunity), yet this separation is rarely delineated in well-being research (Coad and Binder, 2010., p.3). When an unemployed worker becomes self-employed out of necessity, their relationship to the constructs of self-employment which impact well-being may be constructive or destructive. For example, clearly not everyone enjoys taking risks. While entrepreneurship is unique in providing control over "the critical dimensions of job satisfaction" (Carter, 2011., p.11) such as autonomy, availing of this increased utility depends on a self-organizational trait that may not be present in those forced into entrepreneurship.

On the surface, the most frequently examined aspect of entrepreneurial well-being is job satisfaction (for example, Binder and Coad (2013)). Georgellis and Yusuf (2016) found that "job satisfaction follows a rising trajectory immediately upon transition into self-employment and a declining trajectory in subsequent years, as expectations fail to materialize and the novelty of the new venture wanes down" (p.1).

However, autonomy, an aspect of eudaimonia (Ryff, 1989) and psychological well-being (Ryan and Deci 2000) are also examined. Chirkov et al. (2003) provide evidence across varying cultures that autonomy is related to well-being.

2.4.1.1 Eudaimonia and Autonomy

Despite autonomy being prevalent in entrepreneurship research, eudaimonia is rarely examined as a part of entrepreneurial well-being. As discussed in the well-being section (2.2.1), Ryff (1989) distinguished 6 dimensions of eudaimonia: self-acceptance, purpose in life, personal growth, positive relations, environmental mastery, and autonomy. This section is restricted to autonomy and will return to the purpose in life dimension (relevant to this thesis) in section 2.4.1.3, eudaimonia and hedonic well-being.

2.4.1.1.1 Autonomy

The autonomy dimension of eudaimonia is defined by Ryff (1989) as "having the strength to follow personal convictions, even if they go against conventional wisdom". Autonomy means something different in entrepreneurship.

Croson and Minniti (2012., p.7) derive a utility maximisation model using a net present value variation. They distinguish between the psychic benefits of autonomy which include an increase in happiness but argue that such psychic benefits do not compound in the same way as income can - this is a particularly important assumption in their model which is not explored thoroughly, i.e.; they have not justified in their theory or from the literature that happiness does not accrue over time, like experience - this will be explored in the theoretical development section contained in the methodology chapter.

Autonomy does not have a clear definition and this warrants caution. Fischer and Boer (2011) use Hofstede's (1980) Individualism index in a study which examines whether money or autonomy is better for well-being. The implication is that more individualistic societies (such as the UK) are more autonomous than collectivist cultures (such as China). Individualism in the Hofstede model relates to a social framework and how closely family members look after each other and whether self-image is defined as "I" or "we".

In the entrepreneurship domain autonomy is a rather vaunted characteristic which looks beyond families and culture to business outcomes. For example, Lumpkin et al. (2009, p.50) highlight that autonomy can enable "knowledge creation, transfer, and application". The entrepreneurship literature does use autonomy interchangeably with 'independence' and 'freedom' (Croson and Minniti, 2012., p.2) and there is some consensus. For example, Croson and Minniti (2012., p.2) cite van Gelderen and Jansen's (2006) study on autonomy-based motives which posit two categories: 1. "decisional freedom," which allows people to be "in charge and responsible for outcomes" and consider autonomy as "an end in itself" (for nascent entrepreneurs) (p.3) – this is essentially deciding "what" gets done; and 2. goal achievement, for example, avoiding an "unpleasant boss" or acting "in a self-congruent manner consistent with one's beliefs, or to pursue an outside opportunity" (p.3), and is, therefore, more of a "means to an end", or "how" something gets done.

These "what" and "how" dimensions are essentially the same as those mentioned by Lumpkin et al. (2009., p.50) in their examination of the autonomy dimension of 'entrepreneurial orientation' (EO) (Lumpkin and Dess, 1996). They posit that autonomy, in terms of EO, refers to 'strategic autonomy' (Lumpkin et al., 2009., p.50), which relates to how enabled a team or individual is to set goals along with define and solve problems related to those goals – so in this perspective, autonomy could be an end in itself, a "decisional freedom", or, the power to

decide the "what" - this is contrasted in the paper with structural autonomy or 'autonomy of means' where autonomy relates the freedom people have to change the "factors within the work environment", which is more similar to a means to an end, goal "achievement", or, the "how".

Autonomy is cited as a motivation for entry into self-employment in several empirical papers (Blais and Toulouse 1990, Birley and Westhead 1994, Kolvereid 1996, Shane et al. 2001, Carter et al. 2003, Shane et al. 2003). Wanting more autonomy has been shown as an important factor in predicting entry into self-employment (Feldman and Bolino, 2000). Lombard (2001) showed a positive relationship between women's demand for flexibility (a 'how' perspective) and the probability of being self-employed.

Croson and Minniti (2012., p.4) partially characterise the employment relationship in a surprisingly dark manner – i.e. employees must display "obedience" (they cite Simon, 1951; Masten, 1988) in that staff must obey instructions that are "presumably, tailored to the personal preferences of the manager". The self-employed individual need not obey. However, they also highlight the Hundley (2001) study which demonstrated that this distinction is virtually non-existent among managers or professionals who engage in high skill utilisation and autonomy.

Self-determination theory (Ryan and Deci, 1985; 2000) shows that autonomy increases are related to well-being increases and explain the desire for more autonomy as a consequence of the human desire to increase well-being – this would be a tautological argument if their definition of well-being included eudaimonia, i.e. because autonomy is a component of eudaimonia.

Procedural utility looks at self-determination and is dependent on autonomy, competence and relatedness (Ryan and Deci 2000) in order to raise "human well-being", in this definition autonomy is seen as the ability to "self-organize" (Benz and Frey, 2006., p.364).

Ryan and Deci (2000) use self-determination theory to posit that autonomy satisfies a psychological human need (p.1) which leads to "eudaimonia" (p.75 citing Ryan & Frederick, 1997; Waterman, 1993) and state that the outcome is irrelevant to the need - this is central to so-called "intrinsic motivation" (Deci and Ryan, 1985). If this is true and the autonomously self-employed are outcome agnostic - i.e. it is more important to their "eudaimonia" to have autonomy rather than to have a higher income from employment – then, again, this argument by Ryan and Deci (2000) is clearly tautological. Eudaimonia includes autonomy and self-determination. Secondly, as indicated above, strategic autonomy, the "what" or goal setting,

is the determination of the outcome. Theoretically, the goal setting or outcome determination component of eudaimonia's autonomy is distinct from the outcome itself. Theories of hedonic well-being related to aspirations are more clearly linked to the outcome. The statement 'that the outcome itself does not raise eudaimonia' is highly misleading in the context of autonomy as outcomes are not theoretically connected to autonomy, only the setting of outcomes (or goals, the 'what' perspective).

Also, the accomplishment of outcomes is clearly a determinant of the "environmental mastery" component of eudaimonia - this means that while intrinsic motivation from autonomy benefits eudaimonia's autonomy, to not achieve the goal that is determined by the autonomy would lower eudaimonia by lowering environmental mastery. In this sense, there is no such thing as a purely intrinsic motivation of autonomy in the context of self-employed who are strategic autonomy or goal oriented, not autonomy of means oriented.

2.4.1.2 Hedonic well-being

The most examined aspect of hedonic well-being in the entrepreneurship literature is job satisfaction, a type of cognitive well-being. However, job satisfaction does not necessarily lead to life satisfaction, a different type of cognitive well-being.

2.4.1.2.1 Cognitive well-being

Self-employment is positively associated with aspects of hedonic well-being. The main dimensions tested are types of cognitive well-being: life satisfaction, happiness and job satisfaction (Andersson, 2008; Blanchflower and Oswald, 1998; Crum and Chen, 2015). Andersson (2008) observed a positive relationship between self-employment and life satisfaction, as well as job satisfaction. Blanchflower and Oswald (1998) found the self-employed had higher life and job satisfaction than employees. Crum and Chen (2015) found a positive relationship between happiness and life satisfaction in highly developed countries, with the effect stronger for women. In developing nations, self-employed men were found to be happier (but not more satisfied) than employees.

2.4.1.2.2 Job Satisfaction

Schjoedt (2009a, 2009b) found job satisfaction to have four main determinants: autonomy, task identity, task variety and performance feedback. Performance feedback is the most striking determinant in its uniqueness to entrepreneurship. Entrepreneurs have access to "clear and direct performance measures" (Carter, 2011., p.12). "Sales" (Schjoedt, 2009b) in particular,

are a form of feedback that is “amplified, within entrepreneurship” (Carter, 2011., p.12). Other businesses have sales, but the intractable connection between the business and the entrepreneur creates a unique and at times, stinging, rawness, for example, business failure is associated with financial and emotional pain (Shepherd et al., 2009; Ucbasaran et al., 2013). The self-employed also work long hours (Hyytinen and Ruuskanen, 2007) and are subject to increased stress (Blanchflower, 2004). While dissatisfaction can lead to quitting employment (Kawaguchi, 2008) and entry into self-employment (Noorderhaven et al. (2004) even though the grass is not uniformly greener, longer working hours in start-ups has been shown to be positively related to start-up satisfaction (Block and Koellinger, 2009).

2.4.1.3 Eudaimonia and Hedonic well-being

Binder and Coad (2013) point out that “high job satisfaction might be counterbalanced by lower satisfaction in the family domain” (p.4) or other domains, for example, life satisfaction could experience a crowding out effect from job satisfaction (Binder and Coad, 2013). Stiglitz et al. (2009), make a similar point regarding Aristotelian eudaimonia and epicurean hedonic well-being in relation to new parents i.e. that new parents can be overworked (much like entrepreneurs) and exhibit lower levels of life satisfaction (unlike entrepreneurs) a type of hedonic, cognitive well-being, but persevere due to a deep sense of purpose in life, an aspect of eudaimonia. Purpose in life is defined by Ryff (1989) as “having goals and objectives that give life meaning and direction”. However, there may be evidence of a distorted sense of purpose in life for entrepreneurs which could relate to other psychological factors. As Carter (2011, p.8) highlighted, the self-employed likely over "exaggerate" the hours they work to communicate the sense of "importance” in their role (Carter, 2011. p.8), a thesis consistent with entrepreneurial overconfidence (Cooper et al. 1988; Busenitz and Barney, 1997). This perceived importance and overconfidence is clearly related to the purpose in life aspect of eudaimonia - but this may be detrimental to cognitive well-being. A ‘parent’ of a business venture might have a great sense of purpose and high job satisfaction but have low life satisfaction due to long hours worked - and low-income that reduces living standards compared to employees.

2.4.2 Income

The self-employed have been consistently shown to earn less on average than employees (Hamilton, 2000), although some scholars have argued this could be due to measurement issues

(Carter, 2011) including income underreporting (Åstebro and Chen, 2014). This section reviews the challenges related to income measurement for the self-employed, the nature of income and then focuses on the necessity vs opportunity debates and its relationship to lower income.

2.4.2.1 Under Reporting of Income and Overstatement of Hours

Åstebro and Chen (2014) present findings that entrepreneurship income is underreported by 42% based on an analysis of food consumption – with a number of caveats, e.g., even changing one assumption (homogenous tastes) reduces underreporting by 30%. The authors are cautious in their conclusions indicating that the income underreporting explanation does not explain all of the gaps in our knowledge regarding why entrepreneurs persist. One conclusion they offer is that entrepreneurs may think there are high switching costs in returning to employment.

Their study (Åstebro and Chen, 2014), like most in the entrepreneurial income literature, do not look at the solo-self-employed directly. Carter (2011) points out that the self-employed working hours may contain over-statement compared to employees – i.e. researchers should beware that the self-employed may minimise their actual earnings and exaggerate (p.9) their working hours, producing lower than actual earnings estimates.

2.4.2.2 Drawings are minimised in profit estimates.

Net profits are likely minimised by entrepreneurs, due to a desire to reduce taxes. Carter (2011) argues that an "equity adjusted draw" is a more robust measure compared to net profits and drawings as it looks at the increase in equity over time - "but this measure is prone to such vast variations in individual experience as to render it virtually useless as a general indicator in large-scale surveys" (Carter, 2011., p.42). Carter (2011) also points out that smaller or nominal draws on the business may not reflect a higher standard of living – i.e. actual consumption is likely masked by the integration of business and personal assets within a household, although this benefit is clearly accompanied by an inability to diversify (Moskowitz & Vissing Jorgensen, 2002). The Åstebro and Chen (2014) approach of looking at food consumption baskets (discussed above) appear to have been the first attempt at accounting for these differences in a methodologically robust way. However, the authors admit their findings are questionable.

2.4.2.3 Nature of Income

Studies which do not take into account the measurement issues described above (i.e. the majority) show that the self-employed have lower median earnings than employees (Parker, 1997; Hamilton, 2000; Blanchflower, 2004; Åstebro and Chen, 2014.).

Carter (2011) and Åstebro and Chen (2014) both highlight Hamilton (2000) who found that the self-employed had, to begin with, lower earnings and growth - this included self-employed net profit, salaries withdrawn and equity-adjusted draw (EAD). Income was generally flatter than employees in the Hamilton study, similar to Tergiman (2010), and survivability or longer tenure did not have an effect, except "when using the EAD measure and at the top 25th percentile", which as mentioned at the start of section 2.4.2, Carter (2011., p.42) finds to be an unreliable measure.

2.4.2.4 Risk

Entrepreneurship is inherently risky compared to employment if only measured by relative income standard deviations. Income distributions in self-employment have a higher standard deviation, up to 3 to 4 times more than employees (Lazear and Moore, 1984; Evans and Leighton, 1989; Hamilton, 2000; Kawaguchi, 2003; Hartog et al., 2010). Åstebro and Chen (2014) note that the distribution has a positive skew, positively affecting the highest performers spectacularly disproportionally.

2.4.2.5 Necessity and Inequality

There have been disputed findings surrounding positive (Bernhardt, 1994; Groysberg et al., 2009; Hamilton, 2000) and negative selection (Alba-Ramirez, 1994; Evans and Leighton, 1989; Hartog et al., 2010) into entrepreneurship – i.e. entry based on ability (usually measured by education). As a response to this, researchers (Blanchflower, 2000; Andersson and Wadensjö, 2011; Åstebro et al., 2011; Tåg et al., 2013) found bimodal entry patterns leading some to describe the relationship as U-shaped (Poschke, 2008). (*Methodologies regarding selection into entrepreneurship is discussed at the end of this section.) In the emerging entrepreneurship inequality literature, it has been suggested that the two ends of the entry spectrum are distinct based on occupational hierarchy and productivity (Tamvada, 2010), a model which intrinsically excludes certain groups not measurable in productivity terms, e.g. artists - this presents an avenue to connect the 'necessity' and 'opportunity' (Reynolds et al., 2001) literature theoretically to inequality. Åstebro and Chen (2014) refer to necessity and

opportunity entrepreneurs as “stars” and “misfits”, which is an odd classification given that misfits (or nerds, such as Bill Gates) do become stars. They point out that entrepreneurs are overrepresented with “stars” and “misfits”- given the lower average income level, entrepreneurs are dominated by misfits, possibly hoping to become stars. The previously unemployed (i.e. necessity entrepreneurs) are overrepresented among under-performing entrepreneurs (Alba-Ramirez, 1994; Andersson and Wadensjö, 2007; Åstebro et al., 2011; Åstebro and Chen, 2014); however, these assessments may not be accurate. In 2001 GEM, the Global Entrepreneurship Monitor, introduced “necessity entrepreneurship” to its nomenclature through a survey question where respondents were asked if they were involved in entrepreneurial activity because they had “no better choices for work” (Reynolds et al., 2001., p.11). The assumption is that was that this was the “best option available for employment but not necessarily the preferred option” (Reynolds et al., 2001., p.11). However, the language is ambiguous. “No better choices for work” is a relative assessment; someone might have plenty of opportunities in the labour market, but because they prize their independence highly, running their own business is the best choice for them personally. In this sense, “necessity entrepreneurship” is possibly misleading and does not fully capture the motivation for entrepreneurial activity.

If selection does determine differences in earnings in a logical manner (i.e. the lowest able earn the least) and poor performing so-called ‘misfits’ are overrepresented in entrepreneurship, then the inequality literature becomes particularly important in the context of well-being. As mentioned in the previous section, cognitive well-being levels at the bottom end of the inequality and absolute income spectrums respond well to small rises in income.

2.4.3 Well-Being and Income

Despite there being some evidence that self-employment is positively related to some aspects of hedonic well-being (life satisfaction, happiness and job satisfaction (Andersson, 2008; Blanchflower and Oswald, 1998; Crum and Chen, 2015)) Åstebro and Chen (2014) suggest that "It is unclear why so many entrepreneurs persist despite lower earning" (p.92). This section looks at current ‘returns’ theories and literature that attempt to answer this question by examining income inequality, necessity, relative income and (briefly) prospect theory in the entrepreneur. The section also reviews other returns theories in the literature.

2.4.3.1 Income Inequality

Kimhi (2010, p.89) argues that policies targeting entrepreneurs could reduce "inequality if directed at the low-income, low-wealth, and relatively uneducated segments of society" (Kimhi, 2010: 89).

2.4.3.1.1 Necessity

While, as mentioned, necessity entrepreneurs are among the worst performing entrepreneurs (i.e., they have the lowest income). Block and Koellinger (2009) show opportunity entrepreneurs have higher satisfaction with their businesses than necessity entrepreneurs. Binder and Coad (2013) found no change in life satisfaction in the shift from unemployment to self-employment, i.e. more likely to be necessity entrepreneurs – unlike the shift from employment to self-employment where they did find a rise (note, their check for hedonic adaptation is limited to 2 years and this is explored further in the Conclusion in section 8.5, Future Research).

Necessity entrepreneurs have been found to be more likely to return to employment than opportunity entrepreneurs (Kautonen and Palmroos, 2010). Satisfaction with a start-up is a unique cognitive well-being measure that is distinct from life satisfaction or eudemonia. There have been no studies that were found in this review that directly examine a necessity entrepreneur's eudemonia (purpose in life or autonomy) and compared them to opportunity entrepreneurs. Alesina et al. (2004) did find self-employment and happiness were positively correlated for the wealthy, Crum and Chen (2014) suggest this may be because "people enter self-employment out of necessity" and remain unhappy due to the lower income that they likely continue to experience.

The rub for the entrepreneurship domain is that rising income inequality has been shown to be positively associated with entrepreneurial activity, in a 2004-2009 survey of 54 countries by Lecuna (2014A, p.13) using both GEM and World Bank surveys. The model is related to wealth accumulation, a generational effect leading to greater entrepreneurial activity (p.13). As Lecuna puts it "contrary to the mainstream literature that associates entrepreneurial activity to overall well-being, this paper specifically suggests that entrepreneurial activity is associated with greater income inequality." More than this, as this thesis highlights, the overall well-being discussed is almost always hedonic well-being - this also presents an opportunity to

delineate between solo-self-employment and entrepreneurs who hire. Solo-self-employment does not require the wealth for investment implied by the Lecuna model.

2.4.3.2 Returns Theories

2.4.3.2.1 Labour Market Frictions

A reason also cited to explain the prevalence of low-income entrepreneurs, are labour market frictions (Åstebro et al., 2011), i.e. that jobs are not always matched to skills at the tail end of the distribution of the labour market. This theory argues that those who do not know or understand the expected rewards or risks of entrepreneurship enter by taking a chance and if they are successful they remain as entrepreneurs, otherwise, after a short period, they revert to employment - this implies there is no persistence due to higher job satisfaction, and it also assumes that those who remain are all doing so because of economic success rather than a lack of choice in the employment market, e.g. for portions of the disabled worker labour market.

2.4.3.3 Decision Bias

The entrepreneurship literature has shown clear decision biases in entrepreneurs in that they are "unrealistic optimists, overweight small probabilities of success, are skew lovers or hyperbolic discounters, or are overconfident" (Åstebro and Chen, 2014., p.93 citing Arabsheibani et al., 2000; Åstebro et al., 2007; Åstebro et al., 2012b; Koellinger et al., 2007; Landier and Thesmar, 2009; Puri and Robinson, 2007; Tergiman, 2010). Åstebro and Chen (2014) argue that these explanations only partially explain the entry and persistence decision, e.g. why the self-employed engage in longer hours. They argue that these "various decision biases have not yet been integrated into a convincing theory" and that "one possibility to move forward is prospect theory (Kahneman and Tversky, 1979). Optimism, overconfidence, and risk aversion can all be parameterised in prospect theory to explain employment choices" (p.94) - this is an avenue that is explored in this thesis.

Rees and Shah (1986) argued that risk tolerant individuals are more likely to choose self-employment (p.97), they cited (Knight, 1921, 213-214) in relation to the perceived opportunity in relation to the risk. However, if the entrepreneur is consciously more risk tolerant, then this could be partially at odds with the notion that their decisions are biased.

2.5 Solo-Self-Employment + Income + well-being

2.5.1 Introduction

This chapter looks again at well-being, and well-being and income, but this time focusing on the solo-self-employed. (Refer to section 1.3.1 for a full definition of solos.)

2.5.2 Well-Being

In the UK, solo-self-employed well-being has not been studied in isolation. Even most studies by think tanks (e.g. Dellot, 2015) conflate solos to include those with 0 – 9 employees and tend to focus on job satisfaction. As discussed above, the self-employed as an aggregate have higher cognitive well-being than employees (see Blanchflower and Oswald (1998) section 2.4.1.2.1). Clearly, solos, which comprise over 75% of the aggregate category in the US and UK (see section 1.3.1), are likely to have a high average well-being score, higher than employees.

2.5.2.1 Autonomy Driving Well-Being?

The solo-self-employed are intrinsically autonomous, they have no one else but themselves to determine what their goals are or how to accomplish them.

2.5.3 Well-Being and Income

Shane (2008) points out that people who do not like working for others, do not earn as much or grow as quickly (p. 121), this is despite the positive effect of autonomy on job satisfaction. This description seems in line with the low earning, necessity-driven solo-self-employed descriptions articulated above and captures the quintessential non-pecuniary argument of why the self-employed work for themselves. However, while Georgellis and Yusuf (2016) found in their longitudinal analysis of the self-employed that as aspirations "fail to materialize" job satisfaction may drop after an initial entry spike, it is possible that a segment of solos retain their high score – i.e., those solos who have no aspirations of growth and are able to maintain earnings above a minimum or liveable wage may exist in a "sweet spot" (see section 8.5, Future Research, for more on this topic).

2.5.3.1 Traits

Well-being characteristics could be trait like, or could be associated with trait changes, such as deepening eudaimonia could be associated with increased conscientiousness as we age. Affect and cognitive well-being are clearly more dynamic where well-being is affected significantly by how people adapt to major transitions in life such as becoming unemployed (also called the "Hedonic Treadmill", (Deiner et al., 2006). Note, Adaptations and Set-Point Theory was discussed in section 2.2.5).

In trait terms, there are certain personality traits such as extroversion that is associated with increased SWB, entrepreneurship and addictive gambling. Is solo-self-employment as destructive as gambling, i.e., pathological characteristics (Peele & Brodsky, 1975, 1991) such as destructive anti-social behaviour? Or is it possible to consider the solo-self-employed as having a positive relationship to risk which enables them to enjoy the experience of increased uncertainty as a substitute for the increased well-being from income?

2.5.4 Conclusion, Gaps in Knowledge

Generally speaking, the solo-self-employment group are a grossly under-researched group in contrast to the self-employed in general, despite it being the largest sub-group of self-employment - usually they are aggregated into the total self-employed group despite there being clear differences in ambition and ability, income and cognitive well-being responses.

No studies on the effect of income inequality on the subjective well-being of the solo-self-employed were found in conducting the systematic literature review. Relative income theories would not explain fully why solos have high average (and, for some segments [probably those who earn above minimum or liveable wage and have no growth aspirations], long term high) SWB - Veenhoven (1991) said that as income is responsible for universal basic needs, at least at the lower income level, it is clearly the cause of subjective well-being, which makes the income and SWB relationship absolute, in part.

Easterlin conversely suggests that there is no net benefit (or loss), meaning, happiness levels remain constant and his explanation is that the reference income effect is exactly equal to the income effect on SWB (he uses the cognitive and affect well-being interchangeably). As discussed, some of the positive association is likely to be due to causation in the opposite direction, and his conclusions do not take into account eudaimonia.

We do not know much about their (or the entrepreneur's) eudaimonia - their purpose in life, environmental mastery and eudemonia autonomy are strikingly absent in the literature. For example, autonomy is usually identified as a preference for entrepreneurs and is confused theoretically with eudaimonia – i.e. autonomy is not discussed as a fundamental component of the eudaimonia construct.

There is a question as to whether the solo-self-employed are insulated from relative income judgements and whether this only affects the higher income groups (the absolute vs relative income debate). The lower income groups are likely entering from necessity, low ability, low-income, previously unemployed and therefore are affected by the absolute income theory which shares characteristics with the lower end of the inequality spectrum theory – i.e. that SWB levels for the poor are not affected by relative income and do respond well to small rises in income.

It is also unknown how eudaimonia is affected, i.e. purpose in life or autonomy, or how this interacts with personality traits. As mentioned at the beginning of this chapter Clark, Frijters and Shields (2007) warned (p.36) that "there is more to life than happiness". This chapter has also called into question the logic of intrinsic motivation and argued that for the solo-self-employed, despite earning very little, are in fact motivated by external wins and are always motivated by the outcomes of their goals.

2.6 Conclusion

This chapter has reviewed well-being and income broadly before narrowing to the context of the solo self-employed. The broadest examination of well-being revisited Aristotelian definitions and, in line with recent economics of well-being literature, called into question the wisdom of relying heavily on just hedonic well-being - identified as an outcome of eudaimonic well-being. Eudaimonic well-being was explored in detail and in particular the relevance to the entrepreneurship domain was highlighted as dimensions such as autonomy and relationships, are central to both areas (eudaimonia and entrepreneurship). The traditional outcome variables of life satisfaction and happiness, identified as forms of cognitive well-being – a subset of hedonic well-being – were reviewed in the context of income and economic theories such as relative income theory. Easterlin in particular, a proponent of this approach, was examined in detail. The solo self-employed, the largest subset of the self-employed, were explored in order to narrow the context, and this revealed discussions surrounding the non-pecuniary benefits theory i.e., the poor but happy thesis. Solos, who are inherently alone, were identified as having an unusual, and unexplored, relationship with income which relative income theory may explain, in the context of eudaimonia e.g. if solos enjoy greater eudaimonic autonomy and isolation, they may not be as concerned with outside comparisons of income in order to derive their well-being.

The next chapter introduces personality, arguably a sister to eudaimonia. Personality has been argued to have the strongest relationship to hedonic well-being - however, it is likely, that eudaimonia, which shares trait characteristics, has a stronger effect, particularly for solos, whose unique traits are intrinsically less important i.e., as they are not working within an organisation.

Chapter 3. Personality

3.1 Introduction

This chapter looks at personality as it relates to the thesis research question. Personality, as discussed in Chapter 1, in this thesis, refers to the unique traits that can be used to identify the differences between individuals, i.e. a nomothetic trait measurement and theory approach is adopted. The trait approach is dominated by the five-factor model of traits. The chapter begins in section 3.2 by exploring the broader personality literature, relatively briefly, from a historical perspective, before looking closely at the five-factor model of traits in section 3.3. The remainder of the chapter focuses on personality research as it is applied through the five-factor model. Personality and well-being, both hedonic and eudaimonic, are explored in section 3.4. Then, personality and income are examined in section 3.5. Personality, income and well-being, as described above, (i.e. personality and behavioural economics) are rarely examined together, the few relevant papers that do this are reviewed next in section 3.6.

The entrepreneurial personality literature is then examined in section 3.7, with a focus on self-employment and the solo-self-employed. Similarly, the literature on personality, well-being and income are looked at for this group.

Finally, gaps are then identified in relation to the research question. It becomes clear that income, personality and hedonic and eudaimonic well-being are not looked at together in terms of the solo-self-employed, which is, in part, why the research question is important.

The SLR methodology is the same as utilised in the previous chapter – see end of Chapter 2 for full treatment.

3.2 Personality

Winter and Barenbaum (2013) in their analysis of the history of personality research argued that personality research began through an evolution of three intellectual themes which emerged in the 19th century: individualism; irrationality and the conscious; and personality measurement.

A "western philosophical-political climate" (p.2) drove the belief that individuals are "important and unique" (p.2), occurring after the Renaissance. Winter and Barenbaum (2013)

describe the psychology of personality being driven by individuals “bounded by skin” (p.2), and that everything else is viewed as “outside”. However, as Singer (1995), in a study of college students, observed, many “narrative similarities” in their descriptions of their lives (p.452). Winter and Barenbaum (2013) warn of the dangers of ignoring collectivist units, e.g. “groups, social identities and cultural symbols,” (p.2), in favour of an individualistic perspective.

Freud (1923), through research in the late 19th century led a “movement” that promoted “unconscious and irrational emotions” in his seminal publication “The Ego and the Id”, where he wrote that the “division of mental life into what is conscious and what is unconscious is the fundamental premise on which psycho-analysis is based” (1923, p.1). The study of the unconscious mind declined throughout the 20th century.

Winter and Barenbaum (2013) identify two types of study of personality, nomothetic and idiographic and posit that the ideographic view is the least popular, and ignores the question of “basic” traits, whereas the nomothetic technique of factor analysis, is the most popular. Personality research can also involve “a priori theorising” which can involve the development of typologies. Murphy (1932) cast the nomothetic view as a “sum” of individual traits where personality was seen as an “answer to a complicated arithmetical problem” (p.386), a view that resonates with a perceived “practical goal” of personality research: to “predict, modify, and control behaviour, with individual differences conceived as coefficients to be supplied to a linear, additive prediction equation”. This approach appeared political in nature in that the findings could be applied to policies for governing populations. Most "practical social problems" were “framed” by “managers” and the military, with a focus on “controlling an increasingly diverse population” in schools, cities and prisons, “controlling ‘deviant’ behaviour” - this resulted in trait measurements such as “ascendance-submission”. However, Allport and Odbert (1936) argued that “personality evaluated according to prevailing standards of conduct” (p.443) should not be part of the psychological study of personality. Allport and Odbert (1936), led the first major study of which the “Big 5” (also known as the five-factor model (FFM) of 5 orthogonal traits, openness (O), conscientiousness (C), extroversion (E), agreeableness (A) and neuroticism (N) - described in full in the next section), the dominant form of personality research today, was based.

There are other forms of personality research, such as biological, that have been explored. Eysenck (1957, 1967) used "Pavlovian" methods, arousal and limbic systems in the brain, to propose traits structured around biological systems. These have also been linked to the Big 5, with 3 trait factors (extroversion, neuroticism and psychoticism) being linked to the nervous system.

3.3 Factor Analytic Study of Traits

This section looks at the FFM in depth. John and Srivastava (1999) provide an excellent description of traits: "Personality traits are basic tendencies that refer to the abstract underlying potentials of the individual, whereas attitudes, roles, relationships, and goals are characteristic adaptations that reflect the interactions between basic tendencies and environmental demands accumulated over time" (p.42).

Allport and Odbert (1936) began with a study of the dictionary, the so-called "lexical" approach. The research involved extracting all terms that described personality traits. Factor analysis was not practical at that time. Since the end of the last century, the personality psychology domain has reached a consensus (McCrae and John, 1992) that traits could be described by five orthogonally rotated factors, or "clusters of traits", measured in various ways – the Big 5.

3.3.1 Theoretical Perspectives

The FFM has been criticised as being atheoretical (McCrae and John, 1992). However, there are underlying theoretical constructs to the two approaches which led to its formation: the questionnaire tradition, where surveys based on theories are compiled, and the lexical tradition. Allport and Odbert (1936), upon whose work the lexical approach is based, wrote what could only be described as a theoretical proposition: that human personality would be encoded in the language they created, i.e. that all human individual difference is encoded in language. Therefore, the researcher should first decode the language to reveal patterns.

3.3.2 Lexical Approach

Galton (1884) conducted preliminary lexical research prior to Allport and Odbert (1936). Allport has even been described as the "father" of the FFM (Johns and Robins, 1993, p225). Allport and Odbert extracted 17,953 (Gough, 1960) terms that could be used to describe human behaviour from the dictionary. Cattell eventually organised these into synonym clusters in

1945. McCrae and John (1992) summarise the chain of events in this way: "Allport and Odbert (1936) abstracted terms from a dictionary; Cattell (1946) formed them into synonym clusters and then created rating scales contrasting groups of adjectives. Tupes and Christal (1961) obtained observer ratings on these 35 scales, and factor analysed them. Fiske (1949) also used a derivation of Cattell's rating scales which appeared to mirror the five-factors." (p181 – 184). Norman (1963) described an "adequate taxonomy of personality attributes" (title of the article) of five-factors that were derived from Cattell's lexical approach, which included: "I: Extraversion or Surgency; II: Agreeableness; III: Conscientiousness; IV: Emotional Stability; and V: Culture" (McCrae and John, 1992; 177-180) where numbers indicate the frequency of terms in natural language with Extroversion having the most frequent, culture, the least. This five-factor model was a precursor to the five-factor model in use today, in that culture is now openness to experience and emotional stability, in most studies, is reverse coded as neuroticism.

"Allport and Odbert noted some 4,500 trait terms", wrote McCrae and John (1992, p.184). John and Srivastava (1999), however, wrote: "Their complete list amounted to almost 18,000 terms" (p.104). The discrepancy is due to column names, i.e., Allport and Odbert distinguished between trait and personal behaviour. Gough (1960) specified approximately 17,953 adjectives. A word count (using MS Word 2016) revealed over 23,000 words listed in the original manuscript (Allport and Odbert, 1936, (45 – 173), however, it was observed that scanning errors split some words into two and therefore the number 17,953 may be accurate.

Cattell conducted a personality study (1945) using Allport and Odbert's (1936) list of traits, finding an oblique rotation of 12 factors. Eysenck used orthogonal rotations and demonstrated as few as 3 factors of E, N and psychoticism (1985, p.22). Wiggins (1968) had first named neuroticism and extroversion as the "Big Two", this appears to be the derivation of the "Big Five", first named by Goldberg (1981).

While Allport and Odbert (1836) found traits to be the base unit of personality, Cattell (1946) identified motivational or "dynamic traits" based on temperament and ability traits. Each trait was seen to have correlational relationships derived from constituent variables - this meant that dynamic traits "change most in response to change of incentives" where "higher order correlations" were found, whereas temperament was found to "change least" (1946, p.167). Cattell viewed the "most potent method" of understanding traits was to determine "correlation

coefficients" between traits in the individual in order to extract factors (p.272). He went as far as proposing a "specification equation" that could predict behaviour (1957, p.302).

3.3.3 Questionnaire

The questionnaire-based approach describes how researchers compiled factors from analysis of personality questionnaires used by practitioners. Eysenck led the questionnaire based approach by identifying extroversion and neuroticism as common to many psychological tests. McCrae and John (1992) argue that this "second tradition" of deriving "modern FFM comes from the analysis of questionnaires" (p.180). Indeed, most personality research has been based on questionnaires designed to examine theory driven constructs, not lexical studies (McCrae and John, 1992) – however, it is clear that the two traditions strengthened each other. Researchers sought to find commonalities between factors in the various questionnaires, and this led to a mapping of traits (McCrae and John, 1992). The five-factor model emerged through a merging of these lexical and questionnaire traditions (McCrae and John, 1992), i.e. it appears that lexical research clearly informed the questionnaire-based approach. "McCrae and Costa (1985c, 1987) showed convergence for all five-factors across both observers and instruments when they examined adjective scales and questionnaire measures in an adult sample on whom peer ratings on parallel instruments were available." (p.187). These findings were replicated by Goldberg (1989). A widely used FFM survey still used today is the "NEO Personality Inventory" (Costa and McCrae, 1985, 1989; Costa, McCrae, and Dye, 1991) which is designed specifically for measuring the Big 5. While there were "countless" personality scales developed, factor analysis was and remains the most widely used. However, Myers-Briggs (Myers, 1962), is notable for its mainstream popularity.

3.3.4 Nature of Personality Structure

"The five-factors do not exhaust the description of personality, they merely represent the highest hierarchical level of trait description" (McCrae and John, 1992., p.190), in this sense, the FFM is a global personality trait. "A moderate score in Extraversion, for example, might be obtained by an individual who was energetic but aloof, or lethargic but friendly, or average on both energy level and sociability" (McCrae et al., 1986., p.444). Self-report and peer reports have been found to reveal similar factors (McCrae & Costa, 1989b).

McCrae and Costa delineate between "basic tendencies" and "characteristic adaptations." McCrae and Costa argue that traits remain stable across life, although "characteristic" changes

or adaptations can occur. Traits can, therefore, be seen as causally antecedent to behaviour, rather than bidirectional. In this sense, traits are related to "biological structures" and "processes" which is similar to Allport (1937) and Eysenck (1985) who discuss neuropsychic structures and biological structures, respectively.

The five-factors demonstrate convergent and discriminant validity "across instruments and observers, and to endure across decades in adults" (McCrae & Costa, 1990., p.176), indeed, 13 years later, Diener et al. (2003) argued that traits and SWB were evident from childhood with a clear genetic component and remained consistent throughout life (Diener and Lucas, 1999). Following their 1990 study, Costa and McCrae (1992) invented the NEO personality inventory and Goldberg (1992) developed markers for the Big 5 structure, with fifty items. Evidence of discriminant validity for the FFM was then again provided by Costa and McCrae (1995). Perhaps reflecting increasing popularity of the measure in modern research, Gosling et al. (2003) developed and validated a 10-measure scale that could be administered in 1 minute.

Rating scales in German, Japanese and Chinese all reveal similar structures (Borkenau & Ostendorf, 1990; Yang & Bond, 1990) across the five traits. McCrae and John (1992) accepted the five-factor model as correct in terms of its "representation of the structure of traits" (p.176). McCrae and John (1992) also accept there may be "other basic dimensions of personality" (p.177). "Factor titles" which have been in dispute since Tupes and Christal (1961), are still a source of debate. McCrae and John (1992) argue that "factor names reflect historical accidents, conceptual positions" (p.177) deriving from both the "lexical" tradition and the "questionnaire".

There are other criticisms, for example, Block (1995) criticises the lexical approach and factor analysis as well as the questionnaire measures of the Big Five. McAdams (1992) argued that the Big Five can summarize a person's traits but does not provide depth or details in that it leaves out higher order traits. Ashton et al. (2009) argue there were other factors derived from E and O which related to personal growth (important for eudaimonia) and A, C and Emotional Stability, which was related to socialisation. Also, Connelly and Ones (2010) indicated that A, N and O are more difficult to predict from peer reports. Critically, theoretically, Funder et al. (1995) showed different peer reports were in agreement even in changing contexts demonstrating personality consistency, i.e., that we do not fundamentally change our personality dependent on circumstance.

The adoption of the FFM requires that we assume that individuality exists, or as McCrae and John (1992) put it: "The fact that we typically require internal consistency and retest reliability from scales makes sense only because we expect to find consistent and enduring individual differences—the cardinal features of traits." (p.199). The FFM also assumes that "all people must be responsive to danger, loss, and threat; interact with others to some degree; choose between the risks of exploration and the limitations of familiarity; weigh self against social interest; balance work and play" (p.199).

3.3.5 Five-factors

Each of the Big Five-factors is now described in detail.

3.3.5.1 Neuroticism

Neuroticism is the opposite of emotional stability. Below is a summary of descriptions the neuroticism trait drawn from a variety of sources:

- Neurotic individuals are "prone to experiencing negative emotions, such as anxiety, depression, and irritation, rather than being emotionally resilient." (Soto and Jackson, 2013, p.1)
- Neuroticism Can also be prone to "anger" and "guilt" (Widiger, 2009)
- Neuroticism can also be used to recognise psychiatric disorders (Zonderman et al., 1989).
- High neuroticism is associated with "chronic" Negative affect (Watson and Clark, 1984)
- Higher neuroticism is linked with "nervous tension, depression, frustration, guilt, and self-consciousness" along with "irrational thinking, low self-esteem, poor control of impulses and cravings, somatic complaints, and ineffective coping" (McCrae and Costa, 1987)
- Those with lower levels of neuroticism are generally "calm, relaxed, even-tempered, unflappable" but do not necessarily hold high levels of positive mental health (McCrae and Costa, 1987)

3.3.5.2 Extroversion

Extroversion (also spelt 'extraversion') is the opposite of introversion. Below is a summary of traits drawn from a variety of sources:

- Extroverted individuals are “assertive and sociable, rather than quiet and reserved” (Soto and Jackson, 2013, p.1)
- Highly extroverted individuals can also be viewed as “bold” and “talkative”, (Wilt and Revelle, 2009)
- Some researchers have argued that there is less consensus due to extroversion and agreeableness being combined to define an “interpersonal circumplex” (McCrae and John, 1992)
- “cheerful, enthusiastic, optimistic, and energetic”, which does not negate the presence of anxiety or depression, which can be present if accompanied by high levels of N (McCrae and John, 1992)
- Extroverts are described as “cheerful people consistently tend to be dominant, talkative, sociable, and warm” which could relate to “positive emotionality” (Watson and Clark, 1988).
- Extroverts are also ascribed with “venturesome-ness, affiliation, positive affectivity, energy, ascendance, and ambition” (Watson and Clark)
- John (1990a) describes low extroversion (or introverted) as “quiet”, “reserved”, “retiring”, “shy”, “silent”, and “withdrawn” with extreme introverts exhibiting “emotional blandness” and even “over-control of impulses”.
- McCrae and John (1992) argue that ‘social introversion’ is different to ‘thinking introversion’, i.e., that this does not include “introspectiveness” which is more represented in openness and conscientiousness.

3.3.5.3 Agreeableness

Agreeableness is the opposite of disagreeableness. Below is a summary of traits drawn from a variety of sources:

- Agreeable individuals are “cooperative” and “polite”, rather than “antagonistic” and “rude”. (Soto and Jackson, 2013)
- Agreeables are “Likeable,” “pleasant” and “harmonious” when interacting with others (Graziano and Tobin, 2009)
- Agreeableness “seems tepid for a dimension that appears to involve the more humane aspects of humanity—characteristics such as altruism, nurturance, caring, and emotional support at the one end of the dimension, and hostility, indifference to others, self-centeredness, spitefulness, and jealousy at the other" (Digman, 1990, p.422-424)

- Agreeables exhibit "friendly compliance versus hostile noncompliance" (Digman and Takemoto-Chock, 1981)

3.3.5.4 Conscientiousness

Conscientiousness is the opposite of unconscientiousness. Below is a summary of traits drawn from a variety of sources:

- "Conscientious individuals are task-focused and orderly, rather than distractible and disorganised" (Soto and Jackson, 2013, p.1)
- Conscientious individuals control their impulses and delay gratification in order to achieve goals and plans through following rules and social norms (Roberts et al., 2009)
- Conscientiousness individuals are described as thorough, neat, well-organized, diligent, achievement oriented (McCrae and Costa, 1987, p.85)
- Tellegen (1982) viewed "constraint" as an aspect of conscientiosness and could be viewed as inhibitive (McCrae and John, 1992), part of the reason conscientiousness is seen as controlling impulses.

3.3.5.5 Openness

Open to Experience is the opposite of closed. Below is a summary of traits drawn from a variety of sources:

- "Highly open individuals have a broad rather than narrow range of interests, are sensitive rather than indifferent to art and beauty, and prefer novelty to routine" (Soto and Jackson, 2013)
- Open individuals are "imaginative, sensitive to art and beauty, flexible, intellectually curious…liberal" (McCrae and Sutin, 2009., p.258)
- Lexical studies show open individuals to be "intelligent, imaginative, and perceptive" (McCrae and John, 1992) and this has been classified as "intellect" by Fiske (1949), Hogan (1986), Digman (1990).
- McCrae and John, 1992 argue that openness is not represented in trait adjectives in English and cite an example that there is no word in English that means "sensitive to art and beauty" (McCrae, 1990) – note, this is not actually true, as this is the definition of the word "aesthete".
- McCrae and John (1992) argue that "fantasies, feelings, sensations, and values are also experiences to which individuals can be more or less open."

3.3.6 Findings

There are thousands of papers that provide findings related to the Big 5. Briefly, the following are some examples that provide some context to the theoretical model and discussion chapters (Chapters 4 and 7). Roberts et al. (2006) found that A, C increase with age. However, aspects of E change over age, assertiveness increases, but sociability and gregariousness decrease. O decreases in late adulthood. Srivastava et al. (2003) found that A, Emotional Stability and C increased between early adulthood and middle age. Jackson et al. (2012a) in a compelling study found older adults increased in openness when trained in reasoning skills and given crossword puzzles. Jost et al. (2003), found higher levels of O with lower levels of conservativism. Anderson et al. (2001) found that extroversion positively related to higher status in men. Traits have also been found to be correlated with self-esteem (Robins et al., 2001).

The remaining sections on personality focus on the FFM in relation to behavioural economics, income, well-being and self-employment.

3.4 Personality & Well-Being

Some researchers have argued that personality is the strongest and most robust predictor of cross sectional hedonic well-being (Boyce et al., 2012; Diener and Lucas, 1999), even stronger than income. This section will review studies that have examined the relationship between traits and hedonic well-being.

Soto (2015) looked at traits in relation to satisfaction and affect using latent growth and autoregressive models and found higher SWB associated with higher E, A, C and lower N. The latent growth model looked at the SWB relationship in the reverse direction also, showing higher levels of SWB led to more A, C, Introversion and Emotional Stability. The findings show that some traits and SWB "reciprocally influence each other over time" (Soto, 2015., p.1). Friedman and Kern (2014) argue that the direction of causality regarding SWB and health is unclear, i.e., working towards goals can have health benefits, rather than stress causing health deterioration - this is an important perspective in relation to this thesis as it re-emphasises the significance of the nature of SWB. The causes of SWB can be different; hedonic pleasure can come from positive or negative sources. The paper goes on to argue that conscientiousness has a significant impact on health throughout life.

Mathieu (2013) separated narcissism from the FFM and showed narcissism positively associated with E and O, and negatively with A. However, narcissism can be seen as a derived trait. The paper shows a strong relationship between narcissism and job satisfaction – although, as narcissism is a tendency towards hedonic pleasure, and job satisfaction is a form of hedonic cognitive well-being, it raises the question as to why this is relevant when other measures of well-being exist which encapsulate this measure. Steel et al. (2008) suggest caution in measuring the personality SWB relationship, indicating that different scales can differ by as much as 22% in showing the effect. Diener et al. (2003) argue that culture can moderate the relationship between personality and SWB. Hayes and Joseph (2003) show that traits E, N, C have differing responses to different SWB measures.

Schumtte and Ryff (1997) make connections between PWB inventory, a measure of the six dimensions of eudaimonia, and the NEO FFM measure. They found:

- Self-acceptance, environmental mastery, purpose in life were connected to N, E and C
- Personal growth was connected with O and E
- Positive relations were connected with A and E
- Autonomy was linked with N.

Headey and Wearing (1989) look at life events, traits and SWB and found that stability in N, E and O was linked to both "moderately stable levels" of favourable and adverse life events, and SWB. Their findings contradict Costa and McCrae (1984) to find that life events are more important than traits to personality. They propose a strikingly provocative "dynamic equilibrium model" using SWB, age and personality. "Only when events deviate from their equilibrium levels does SWB change" (Headey and Wearing, 1989., p.1.) They argue that extroverts are more likely to get married or have high-status jobs and that these positive events will enhance well-being.

However, the question can also be asked, can certain traits or trait combinations lead to a greater resilience in the face or difficult circumstances? Does a rise in income qualify as a major life event, and can this rise in income insulate the individual from other events?

3.4.1 Construct Overlap (Affect)

There is some question as to whether construct overlap exists between personality and well-being, and affect in particular. McCrae and Costa (1991) argue that traits and emotions are

hard to distinguish from each other, in that mood, measured on an affect scale (called PANAS, the positive (PA) and negative affect (NA) schedule (Watson et al., 1998)) and traits have identical measurement items. They find that factors cannot be separated for affect or traits, specifically, negative affect loads on neuroticism and positive affect loads on extroversion. They conclude that well-being and traits may not be distinct, despite evidence of convergent-discriminant validity (Campbell & Fiske, 1959) and internal reliability (Cronbach, 1951).

Affect has been shown to be related to traits (Eysenck & Eysenck, 1964, 1975). However, John (1990) argued that states are "temporary" and "externally caused" (p.5), compared to traits which were described as "stable, long-lasting and internally caused" (p.5). Schmutte and Ryff (1997) argue that a "central premise" of trait and well-being literature is that happiness can be caused by dispositions and events. Schmutte and Ryff (1997) asked whether the "strong association of N with NA (or E with PA) is evidence that personality is a determinant of mood, or, alternatively, that it is a methodological artefact arising from similar item content". Schmutte and Ryff (1997, p.555) note that a factor analysis containing personality and affect reveals negative affect to load heavily on neuroticism and positive affect on extroversion - there is no clear distinction, similar to McCrae and Costa (1991).

Costa and McCrae's (1980) personality and well-being study focused on E and N and found that E was related to PA but not NA and N were related to NA only, not PA - this led to conclusions about the direction of causality, i.e. that traits caused happiness. O has shown to be positively associated with PA and NA with no net difference in happiness (Costa and McCrae, 1984; McCrae and Costa, 1991). Although Watson and Clark (1992) found a negative link between O and NA, A and C have been shown to have positive links to PA and negative to NA (McCrae and Costa, 1991; Watson and Clark, 1992).

Schmutte and Ryff (1997) argued that due to the "convergence of findings" over several studies that this implies that the FFM and well-being are "meaningfully related" (p.550). Schmutte and Ryff (1997) argue that there has been a "failure to differentiate clearly among the constructs" (p.550), including a "failure to examine noise variance" (p.550), i.e., how much relates to measurement idiosyncrasy. Most critically, to this thesis, Schmutte and Ryff (1997) argue that the "operationalization of well-being" has "ignored relevant theory" (p.550) relating to "the nature of positive functioning" (p.550).

3.5 Personality & Income

This section performs a high-level review of the literature on personality and income before focusing on solos.

Viinikainen et al. (2010) use longitudinal data to show that extroversion is positively linked to income. Soto and Luhmann (2013) show that all 5 factors moderate effects of income on satisfaction. The neuroticism moderation held for both between and within-person income effects on life satisfaction. Income was found to be more important for satisfaction in neurotic individuals.

There are questions surrounding the moderation model and causality assumptions. Moderation assumes that the predictor and moderator both occur, at the same time, before the outcome. The assumption, therefore, is that personality does not cause income, or vice versa – which may not be the case. It could be that the relationship is reciprocal, leading to a bi-directional relationship, i.e., SEM or mediation models that are non-recursive may be more appropriate rather than moderation.

de Vries et al. (2011) found a negative relationship between inequality at the state level in the USA, and agreeableness. This relationship is explained theoretically by a proposition that as inequality is linked to less friendly, more self-focused behaviour (increased competitiveness and lower altruism), that these characteristics are in line with disagreeability traits - this requires an assumption that personality is contextual and subject to change.

Barrick and Mount (1991) found C as being most important for job performance. Mount et al. (1998) showed that A, C and Emotional Stability were important for job performance with roles that required interaction and relationships. Extroverts are argued, theoretically, to be more reactive to positive emotions than introverts and neurotics are more reactive to negative emotions.

3.6 Personality, Well-Being & Income

There were no papers that looked at all 3 variables (4, if well-being is separated into hedonic and eudaimonia) simultaneously, i.e. the focus of this thesis, personality, well-being and income. In terms of the direct paths, these are examined in detail in the next Chapter, Theoretical Model, and are presented as support for hypotheses. Please see Chapter 4 and Figure 4.5 for an explanation of the path logic –, i.e. the following list should not be read or

considered in isolation. A selection of papers that support the paths and their mediation relationships (income to well-being, income to eudaimonia, etc., note that most hedonic well-being papers related to cognitive well-being only) included:

- Income is positively related to Hedonic Well-Being (Clark and Oswald, 1996; Easterlin, 2001; Diener and Oishi, 2000)
- Income is positively related to eudaimonia (Tiliouine, 2012; Ward and King, 2016 – both of these papers related to "purpose")
- Income is positively related to personality (Proto and Rustichini, 2012; Soto and Luhman, 2013; Boyce and Wood, 2011)
- Personality is positively related to hedonic well-being (Mack, 2012; Costa and McCrae, 1980; Pavot et al., 1990, Diener and Lucas, 1999; Ferrer-i-Carbonell and Frijters, 2004)
- Personality is positively related to eudaimonia (Simmering et al., 2003; Barrick and Mount, 1993)
- Eudaimonia is positively related to hedonic well-being (Kashdan and Biswas-Diener, 2008; Starkey, 2006; Kauppinen, 2013; Epstein, 2003; King et al., 2006; McGregor and Little, 1998)
- Personality mediates the relationship between income and hedonic well-being (Boyce and Wood, 2011; Soto and Luhmann, 2013; Proto and Rustichini, 2012)
- Personality mediates the relationship between income and eudaimonia - None found.
- Eudaimonia mediates the relationship between personality and hedonic well-being - paper by Lange (2012) almost covers these 3 variables (personality, autonomy and job satisfaction) for the self-employed but does not posit mediation. No other papers found in the SLR were deemed relevant
- Eudaimonia mediates the relationship between income and hedonic well-being - The Ward and King (2016) paper mentioned above posits income and meaning (purpose) is moderated by positive affect. No other papers found in the SLR were deemed relevant.

3.7 Personality & Entrepreneurship or Self-Employment

In the entrepreneurship domain, personality research has been somewhat controversial as epitomised by Gartner (1989) who said: "a focus on the traits and personality characteristics of entrepreneurs will never lead us to a definition of the entrepreneur nor help us to understand the phenomenon of entrepreneurship" (p.48). It appears that Gartner's perspective was linked to the assumption that entrepreneurs form organizations ("entrepreneurship is a role that individuals under-take (sic) to create organizations" p.64)), which is simply not the case for solos. Beyond solos, Rauch and Frese (2007) rebutted this directly (the following quote is from a book chapter which begins with the above quote from Gartner (1989) highlighted), saying "all those who have called for the end of doing research on personality traits for lack of important relationships with entrepreneurship, are clearly wrong" (p.20).

The trait approach has been criticized by several other researchers also (Aldrich and Widenmayer, 1993; Brockhaus and Horwitz, 1985; Low and MacMillan, 1988; Chell et al., 1991; Cooper and Gimeno-Gascon, 1992; Brockhaus and Horwitz, 1985; Davis-Blake and Pfeffer, 1989) leading to a relatively brief (10 year) cessation of entrepreneurial personality research (Rauch and Frese, 2007). The original reason for this criticism appears to be a misunderstanding of the distinction between broad and specific traits and their purpose. Rauch and Frese (2007) argued that the methodological "quality in entrepreneurship research was (and still is) (sic) weak" (p.8) echoing criticisms by Low and MacMillan (1988) and Smith, Gannon and Spineza (1989). They argued that because of this trait effects may have been "underestimated" leading to "beta error" or false hypothesis rejection. Another problem with early entrepreneurial personality research was that it was atheoretical in nature, and descriptive, with no causal explanations for business formation or performance, for example (Low and MacMillan, 1988). The reality is that "as broad dispositions, traits cannot be expected to be very good predictors of individual acts" (Epstein & O'Brien, 1985, p. 532). As Rauch and Frese wrote, "It is a common misunderstanding to assume that all behaviour is determined by a trait – this is definitely not the case: A personality trait is a disposition, not a determination" (2007., p.6).

Most early personality studies of the entrepreneur were based on "criterion validated" constructs of personality, instead of the Big 5 (Rauch and Frese, 2007). Rauch and Frese (2007)

found that business creation and success had stronger relationships to specific traits than global traits. The traits they focused on included: "need for achievement, risk-taking, innovativeness, autonomy, locus of control, and self-efficacy" (p.13). However, it is questionable whether many of these are traits. Are Schumpeter's (1935) innovativeness, achievement orientation and dominance, traits or behaviours? Similarly, is "achievement motivation" (McClelland, 1961), popular in the eighties (Rauch and Frese, 2007), a trait? Also, it is questionable whether "goal orientation" or "self-efficacy" (Baum and Locke, 2004) are traits, they may be learned or situational behaviours. Rauch and Frese (2007) argue that sales growth is too specific to be predicted by the Big Five (p.12), and then make the broad claim that "the predictive validity of Big Five traits should be lower in entrepreneurship research than in research on employees" (p.12). That well-being is clearly predicted by income (a small but robust finding (Clark and Oswald, 1996; Easterlin, 2001; Diener and Oishi, 2000) and (most strongly (Diener and Lucas 1999; Ferrer-i-Carbonell and Frijters 2004)) by personality, indicates that this claim may not be true for the individual, and this, therefore, indicates FFM trait's relevance as a predictor for the solo-self-employed. The FFM are effective at predicting "aggregated classes of performance" (Rauch and Frese, 2007., p.22) such as "supervisor ratings" (Barrick and Mount, 1991) in employees.

Regardless of this apparent lack of usefulness in the Big 5 for entrepreneurial personality research, the FFM has actually gained popularity in recent years. The relevant studies to this thesis are reviewed now in chronological order.

Brandsatter (1997) showed that founders were more emotionally stable than other types of business owners (e.g. those who inherited the business from their parents). Emotionally stable owners were shown to be more satisfied with the role and success and "preferred internal attributions of the business outcome" (p.1) and were more likely to expand. Littunen (2000) uses personality research to examine the personality effect on an entrepreneur's relationships. The paper argues that becoming and acting as an entrepreneur form part of a learning process which "has an effect on the personality characteristics" (p.1) of the entrepreneur, the underlying assumption being that personality can change. Singh and DeNoble (2003) found that views about the self-employed were related to traits. O related to perceived ability, N was negatively related to intent and ability. Baron and Markman (2005) found extroversion to be related to early stages of business creation, and conscientiousness was important to survival in the long term. Schmitt and Rodermund (2004) took the highly unusual step of defining the

entrepreneurial personality in FFM model terms as *low A and N, high E, O and A.* This combined with authoritative parenting led to entrepreneurial competence in adolescents.

Rauch and Frese (2007) in a meta-analysis, use theories to match traits to tasks of entrepreneurs. Traits identified included the need for achievement, self-efficacy, innovativeness, stress tolerance, need for autonomy and proactiveness. Heterogeneity in the findings led to the conclusion that moderator variables should be examined in the future.

Nga and Shamuganathan (2010) argued that traits are tacit, partly developed by "nurturing, socialization and education" (p.259) and impact values and beliefs which can direct choices related to social entrepreneurship. The paper theorises that management education can "facilitate the development of these critical personality traits", finding that agreeableness has a positive relationship with all aspects of social entrepreneurship, and openness can positively impact "social vision, innovation and financial returns". The paper argues that "character development needs to be integrated within the business education curriculum" to impact social entrepreneurship. This approach assumes that personality can change and that personality and "character" are the same construct. Zhang et al. (2009) using a large study of twins found that E and N mediate genetic influences on women's intention to become entrepreneurs and that extroversion mediated "shared environmental influences" on male intention.

Zhao et al. (2010) conducted a meta-analysis to examine personality, entrepreneurial intentions and performance. They appear to use the "questionnaire method" and took a "broad range" of trait scales and categorised them into constructs using the five-factor model. They found that all five-factors were associated with both intention and performance except for agreeableness. They found moderate effect sizes (including R = .36 and .31 for intention and performance respectively). Stepping outside of the Big 5, they also measured "risk propensity" and found that it was positively associated with intention but not performance. They conclude that "personality plays a role in the emergence and success of entrepreneurs".

Brandstätter (2011) found O+, C+, A, E+, N (where + relates to greater effect in entrepreneurs than managers) difference in entrepreneurs compared to managers including O+, C+, E+, N for entrepreneurial performance. Risk propensity has been shown to support business foundation but not success. The paper looks at how risk propensity and autonomy manifests itself in the Big 5. Fairlie and Holleran (2012) found that the risk tolerant benefit from entrepreneurship training. Lange (2012) takes a well-known finding, that self-employment and job satisfaction

was mediated by greater autonomy, and reinforce it using the European Social Survey (2006), controlling for values and traits. Obschonka et al. (2013) found that an "entrepreneurship prone personality profile" (p.3) was "regionally clustered" (p.3). Caliendo et al. (2014) found that O, E and to a lesser extent A and N helped to explain "entrepreneurial development", comparable to education.

Most recently, (2015), in an editorial discussion piece on the "Downside" to the entrepreneurial personality in ETP, Miller (2015) argued that while some "traits" are valuable to entrepreneurs, there is a dark side to those traits. However, the piece is short and does not refer to the Big 5 at all and is ethical in nature. Miller contrasts energy, self-confidence, need for achievement and autonomy with characteristics that can be "devolved" into such as "aggressiveness, narcissism, ruthlessness and irresponsibility". The author has, with the support of specific examples of wrongdoing and "unsavoury practices", provided a narrative call to action for entrepreneurial research into what seems to be ethically questionable entrepreneurial behaviour, rather than research on entrepreneurial dispositions. Miller has listed characteristics that are not broad traits and some, if not all, that are questionable as specific traits. In fact, many of these such as self-confidence, autonomy and especially "energy", are better classified as signs of positive psychological functioning, i.e. eudaimonia. Indeed, even "need for achievement", a classic specific entrepreneurial trait, seems better classified as a eudaimonic dimension, rather than a distal or even proximate personality disposition - the relationship and distinction between eudaimonic dimensions and personality traits are discussed at length in the next chapter on the Theoretical Model. Briefly, it may be possible to view eudaimonic dimensions as traits, in that they are enduring and broad, more useful for predicting larger phenomenon, such as elements of positive functioning rather than specific behaviour, however, as will be argued, a person's "daemon" (a classic conceptualisation of eudaimonia), is not the same as their personality.

Klotz and Neubaum (2015) respond to Miller's article using organisational behaviour literature and offer guidance for an entrepreneurial personality research agenda. Specifically, they "urge researchers to examine interactions among different personality traits, and between traits and contextual and *affective variables* (emphasis added) which play a critical role in personality–outcome relationships" and "to consider the personality of new venture team members, and how some traits may serve important resource-conservation roles." They, unlike Miller, do highlight the Big 5. Referring to Zhao et al. (2010): "The five personality dimensions are

O.C.E.A.N (abbreviation added), although Zhao et al. added a potential fifth (sic) dimension—risk propensity." Numerical typo aside in the ETP editorial (should be sixth, not fifth), similarly to Miller, the authors do not embark on a distinction between the behaviour and trait, i.e. is "risk propensity" a trait or a behaviour? Note, Zhao et al (2010) did use a sixth dimension in their hypothesizing, however they credit Jackson and Paunonen with the addition of the dimension: "Others argue that risk propensity forms a separate sixth dimension of personality not captured by the Big Five (Jackson, 1994; Paunonen & Jackson, 1996)" (p.383).

While interactions are clearly important, Rauch and Frese (2007) argue that "mediators explain the effect of personality traits on entrepreneurship" (p.26). Their methodological concerns surround "the match between independent and dependent variable, the level of analysis problems, mediator and contingency approaches, and quality issues" (p.22). While they found a "weak albeit significant relationship" (p.22) with traits and "entrepreneurial success" (2007, p.22) (Rauch & Frese, 2005). Raunch and Frese also cite agreement amongst researchers: "most researchers of the personality approach agree that distal personality traits are not directly related to success, but their effects are mediated by more specific, proximal processes" (p.25).

Also, Baum and Locke (2004) cite "motivation" as a mediator in small enterprises. Baum (1995) and Rauch et al. (2000) showed business strategy as a mediator.

Mediation is a central part of the theoretical model for this thesis and is explored at length in Chapter 4, Theoretical Model.

3.8 Conclusion

There were no papers found in the systematic literature review that focused precisely on the topic of this thesis. None that focused on both hedonic well-being and eudaimonia, income and personality together on the total population, and none for the self-employed or solos. There certainly are clues in relation to some of the dimensions, such as personality to hedonic or personality to eudaimonia in general - but these are almost non-existent in the domain of entrepreneurship. Discussions or investigations into the relationships between these variables, dimensions and traits are missing. This thesis adds to the literature by providing a starting point for this discussion for the solo self-employed, the largest and most vulnerable group.

This literature review chapter established the nomothetic approach to personality taken in this thesis and began by providing a historical perspective of the five-factor model of traits before

describing the traits themselves in detail. The strong links between personality and well-being were explored (with personality having been known to be the strongest determinant of hedonic well-being) with trait overlap issues identified, in particular the qualitative closeness to eudaimonia was discussed. When looking at income as it relates to personality, it was highlighted that few papers have explored this relationship, and directionality issues were raised – i.e., can personality change, and if so, what can cause this change and, given that it has been theorized to be "set like plaster", over what time period? The entrepreneurial personality was discussed, in particular traits related to negotiating and selling (disagreeability) and those related to self-organizing (conscientiousness) and the related eudaimonic dimension (environmental mastery) were explored.

It became clear that the four dimensions of income, traits, hedonic and eudaimonic well-being have not been examined in terms of the solo self-employed. Indeed, with close to 1 billion solos, less then 20 academics were found to have researched the topic of solos in either literature review chapter, and none have focused on their well-being.

The next chapter draws together these concepts into a theoretical model with hypotheses.

Chapter 4. Theoretical Model

The income and well-being chapter highlighted some central theories and distinctions. Well-being was separated into both hedonic and eudaimonic components. Hedonic into cognitive and affect. This called into question the wisdom of utilizing only the effect of income on hedonic well-being as a measure of societal progress. The income to hedonic well-being relationship, famously exposed by Easterlin (1974), is fundamentally a derivation of the law of diminishing returns (Smith, 1776), where diminishment in national hedonic well-being is explained by relative income theory or inverse income (Veblen, 1899; Duesenberry, 1949; Pollak, 1976; Easterlin, 1974, 1995, 2001; Veenhoven, 1988, 1991; Van de Stadt et al., 1985; Diener et al., 1993; Luttmer, 2005; Caporale et al., 2008; Clark et al., 2008; Oishi et al., 2011; Georgellis et al., 2017) which can colloquially be described as "keeping up with the Joneses", or more plainly, envy. As national income rises, hedonic well-being, such as happiness or satisfaction (but also affect), rises but only to a point due to rises in reference income i.e. diminishing returns of hedonic well-being from income is explained by envy as it inhibits hedonism. As we increase our levels of hedonic well-being, we do this by comparing how we are doing to others. For solos, their income remains comparatively low and they are intrinsically and objectively alone, compared to others. In fact, it is likely that the solo self-employed will have the lowest income of all groups (United Nations, 2017; International Labor Organization, 2017) – this is the first hypothesis:

- H1: Solos have the lowest income compared the self-employed and employed

Solos are also likely to have the highest hedonic well-being, merely as a statistical consequence of being the largest part of the known happiest group i.e., the usual measure of self-employed conflates solos with hiring entrepreneurs and this group is known to be the happiest and most satisfied (Andersson, 2008; Blanchflower and Oswald, 1998; Crum and Chen, 2015). This is the second hypothesis:

- H2: Solos have the highest hedonic well-being compared to the self-employed and employed.

With fewer peers to compare themselves (there is no team, there is no organization, there is no "water cooler" for office gossip) they are likely to derive more hedonic well-being from income than all other groups i.e. their returns of hedonic well-being from income are less diminished as their hedonism is less inhibited by envy.

This leads to the first general hypothesis to be included in the theoretical model. (Note, as mentioned in Chapter 1., HG refers to Hypothesis General):

- HG: Income is positively related to hedonic well-being for solos

Note that following general hypotheses will be numbered below in the context of the final model. HG refers to the hypotheses being general in the sense that there are multiple traits and types of hedonic well-being (i.e. affect and cognitive well-being). All other general hypotheses should be assumed to refer to solos.

Personality has been found to be the strongest most robust predictor of hedonic well-being (Boyce et al., 2012; Diener and Lucas, 1999), even stronger than income, but eudaimonia, which has been argued to have construct overlap with traits, has not been tested in this regard. This leads to the next general hypothesis:

- HG: Traits are associated with a change in hedonic well-being.

This thesis will relax the contemporary assumption that personality and income are the most important determinants of hedonic well-being and return to the original Aristotelian assumption that eudaimonia is the most important direct determinant of hedonic well-being and is a distinct construct - testing this with modern data and methodologies. Eudaimonia has trait qualities, but the components (including sense of purpose, relationships, autonomy and environmental mastery) are the functional aspects of hedonic well-being. Eudaimonia is likely to more directly raise hedonic-well-being compared to personality (agreeableness, neuroticism etc.) characteristics which inform all behaviour.

This leads to the following proposition:

- P1: Eudaimonia is the strongest direct determinant of well-being, even stronger than personality or income.

This proposition will be examined in the context of the hypotheses formalized in the theoretical model in the Chapter 7, Discussion, in section 7.2, Theoretical Contributions.

Before exploring these eudaimonic connections and formalizing hypotheses, consider personality in relation to income and hedonic well-being and two contributions in particular: the first related to moderation, the second related to personality change. Firstly, Soto and Luhman (2013) explicitly identified traits as a moderator of income to hedonic well-being using a standard moderation methodology of a trait interaction with income. Also, Boyce and Wood (2011) do not include the terms moderator or mediator in their paper but their methodology also explicitly interacts personality with income, and therefore their findings imply a moderation relationship with hedonic well-being. And, Proto and Rustichini (2012) use the term mediator and "modulator" (their term appears fabricated i.e. it is not an established statistical term) interchangeably, but regardless, also explicitly interact trait with income, implying a moderation relationship with hedonic well-being. Secondly, there is an emerging literature that personality can change, or that it is "set like plaster" (Costa and McCrae 1980, 1988). Boyce et al (2012), demonstrated that personality changes "as much" as some economic factors. Boyce et al (2015) also demonstrated personality changes following unemployment. It is not possible for the trait moderation and trait change hypotheses to both be true, there is a clear logical fallacy i.e. if economic factors (such as income) cause a change in personality, then that means income comes before personality, it does not occur simultaneously as is implied by a moderation relationship. The only solution which takes into account both personality change and economic factors in relation to hedonic well-being is a mediation model. To grasp this fully it is critical to understand the fundamentals of causality in regards to mediation and moderation and how they are different. Baron and Kenny (1986) demonstrate this clearly in their paper on distinguishing between mediation and moderation methods. The simplest and most clear point is that in mediation models the predictor is causally antecedent to the mediator. (A more full description is provided in a section on mediation in the Methodology chapter that follows). The predictor comes *before* the mediator. In moderation the predictor is not causally antecedent to the moderator – i.e. they occur at the same time.

Hence in all of the above moderation examples, income and personality are assumed to 'pre-exist' together prior to hedonic well-being. If (1.) income changes (2.) personality *and* (2.) personality changes (3.) well-being then that implies a sequence of events i.e. (1.) then (2.) then (3.). The only way for both the personality change and well-being hypotheses to be both true in the same model is in a mediation relationship, where (1.) income comes before both (2.) personality and (3.) well-being, and (2.) personality comes before (3.) well-being. Baron and Kenny (1986) are at pains to warn of the dangers of using the concepts interchangeably, their 1986 paper (cited over 77,000 times) is literally called "The moderator-mediator variable distinction". Therefore, this thesis makes a small contribution to the literature by just applying Baron and Kenny (1986) i.e. this thesis considers traits as a mediator in the causal model in that: the direct effect of income on hedonic well-being is mediated by traits, explicitly assuming that income causes traits and traits cause hedonic well-being; and that the product of the two coefficients of those latter paths is the indirect effect or the mediation effect. (Note, that a moderated-mediation model could be feasible, but is likely to not expose new effects, this is explored in the Discussion section.)

Therefore, the following two general hypotheses are added:

- HG: Income is associated with a change in traits.
- HG: Traits mediate the relationship between income and hedonic well-being.

The research question is interested in well-being, not just hedonic well-being. Therefore, eudaimonic well-being must be included in the theoretical model development of this chapter. However, in the case of the solo-self-employed, we are not interested in all 6 dimensions of eudaimonia described in Chapter 2. In self-determination theory (Ryan and Deci 2000), which is a derivative of the eudaimonia model developed by Ryff and Singer (1998), the constructs of autonomy, relatedness and competence are included, where relatedness is equivalent to Ryff and Singer's 'relationships', and competence is to 'environmental mastery'. For solos these dimensions are relevant. Autonomy is clearly important to solos and entrepreneurs (Shane, 2008) alike, and environmental mastery is important to being able to self-organize –, i.e., this goes hand in hand with autonomy in that in terms of being a solo, or entrepreneurial, there is no point in having autonomy if you are unable to self-organize. Relationships may be less important to solos because they work alone compared to the self-employed and therefore

including this should provide useful insight. Ryff and Singer's (1998) dimensions of self-acceptance, personal growth and purpose are not included in self-determination theory (Ryan and Deci 2000). It seems useful to include purpose as the solo-self-employed, as well as all entrepreneurs, (as discussed in Chapter 2) might "exaggerate" the hours they work to convey the perceived "importance of their role" (Carter, 2011. p.8) inline with the entrepreneurial overconfidence (Cooper et al. 1988; Busenitz and Barney, 1997) thesis, i.e. this may be captured in their sense of purpose.

Eudaimonia, therefore, can be conceived of as a latent variable, much as personality is considered a latent variable, but containing the four variables of autonomy (auto), environmental mastery (env), relationships (rel) and purpose (pur).

Eudaimonia is known to be positively related to hedonic well-being (Schmutte and Ryff, 1997), and as income is known to be positively related to hedonic well-being, it is likely that income is also positively related to eudaimonia, i.e. that eudaimonia mediates the relationship between income and hedonic well-being. Therefore, the following three general hypotheses are added.

- HG: Income is positively related to eudaimonia
- HG: Eudaimonia is positively related to hedonic well-being
- HG: Eudaimonia mediates the relationship between income and hedonic well-being

There is also evidence that personality predicts or is positively associated with eudaimonic well-being (Schmutte and Ryff, 1997), which, given that personality is positively associated with hedonic well-being and eudaimonic well-being is positively associated with hedonic well-being, it is likely that eudaimonic well-being mediates the relationship between personality and hedonic well-being (see Proto and Rustichini, 2012; Soto and Luhman, 2013; Boyce and Wood, 2011).

- HG: Traits are positively associated with eudaimonia
- HG: Eudaimonia mediates traits and hedonic

Logically, if income is positively related with eudaimonia and traits, and traits are positively associated with eudaimonia, it follows that traits should also mediate the relationship between income and eudaimonia – while there were no papers found on this topic, this is the final general hypothesis:

- HG: Traits mediate income and eudaimonia.

This allows the hypotheses above and mediation models to be combined into a single theoretical model. A structural equation model (SEM) approach is used in constructing a theoretical model to answer the thesis main question. SEM methodology utilized is described in detail in the Methodology chapter. For the purposes of this chapter, the model below is presented in a 'quasi SEM' format i.e., ovals represent latent variables, and the box represents observed. The model needs to answer both direct and total effect questions., where direct effects are linear relationships and total effects take into consideration mediation relationships. Therefore 6 direct paths were established first, that were then connected by a single SEM with the mediation relationships described above.

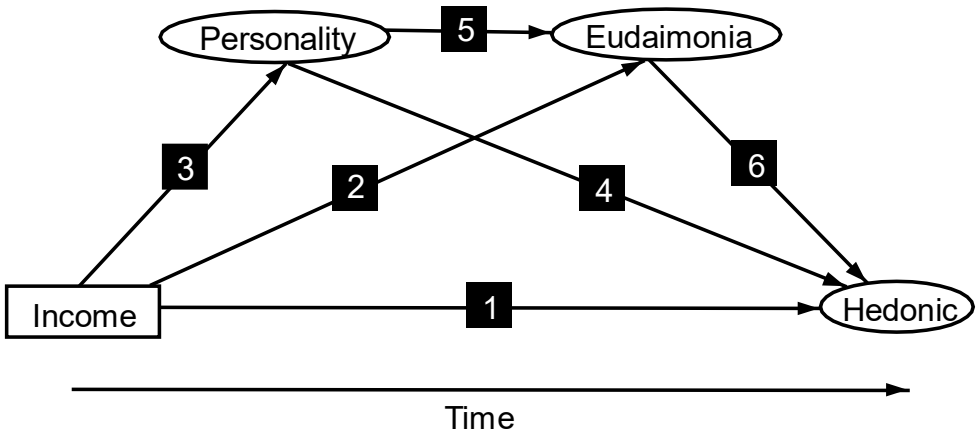


Figure 4.1 Main Theoretical Model

In the diagram above a line hypothetical "Time" line (which is not meant to be at a constant rate or representative) has been added to illustrate causality and mediation more clearly. Adding the time line requires that personality and eudaimonia are closer to each other than income and hedonic (i.e. mediation diagrams are always triangles with the base running from predictor to outcome and the apex being the mediator; this SEM model fits that criteria). (Note for the purposes of the results section only, where SEM out diagrams are presented, the

eudaimonia to hedonic path is presented as the same distance as the income to hedonic path, resulting in a square diagram. Also, the "Time" line will be omitted). While personality is represented by a latent variable symbol, an oval, in this model, this is not to imply that personality is a latent variable, personality cannot be a latent variable due to the orthogonality of the composite Big 5 traits (although each trait is latent as described in the methodology section). This model represents the final theoretical model at the heart of this thesis and contains six direct effect relationships (and, not numbered, 4 mediation hypotheses) which are listed below and numbered according to the diagram (note that this includes all previously listed hypotheses except the hypothesis that income is the lowest for solos). Hedonic well-being is abbreviated to hedonic and eudaimonic well-being to eudaimonia.

The following are the general hypotheses numbered according to the above diagram with relevant citations listed below.

HG 1. Income is positively related to hedonic.

- (Clark and Oswald, 1996; Easterlin, 2001; Diener and Oishi, 2000)

HG 2. Income is positively related to eudaimonia.

- (Tiliouine, 2012; Ward and King, 2016 – both related to purpose)

HG 3. Income is positively related to personality.

- (Proto and Rustichini, 2012; Soto and Luhman, 2013; Boyce and Wood, 2011)

HG 4. Personality is positively related to hedonic.

- (Mack, 2012; Costa and McCrae, 1980; Pavot et al., 1990, Diener and Lucas 1999; Ferrer-i-Carbonell and Frijters 2004)

HG 5. Personality is positively related to eudaimonia.

- (Simmering et al., 2003; Barrick and Mount, 1993)

HG 6. Eudaimonia is positively related to hedonic.

- (Kashdan and Biswas-Diener, 2008; Starkey, 2006; Kauppinen, 2013; Epstein, 2003; Krull et al., 2006; McGregor and Little, 1998)

HG 7. Personality mediates the relationship between Income and hedonic.

- (Boyce and Wood, 2011; Soto and Luhmann, 2013; Proto and Rustichini, 2012)

HG 8. Personality mediates the relationship between Income and eudaimonia.

- None found.

HG 9. Eudaimonia mediates the relationship between Income and hedonic.

- The Ward and King (2016) paper mentioned above posits Incomeome and meaning (purpose) is moderated by positive affect.

HG 10. Eudaimonia mediates the relationship between personality and hedonic.

- A paper by Lange (2012) almost covers these 3 variables (personality, autonomy and job satisfaction) for the self-employed but does not posit mediation.

Findings will be presented in terms of the solos in Chapter 6., Results, alongside findings for the self-employed, and employed.

In most cases, it is expected that the solo self-employed will:

1. Have similar findings to the general population (such as the relationship between income and hedonic well-being)
2. Be in the middle between self-employed and employed
3. Or/ Be similar to self-employed
4. Be distinct from the employed.

As mentioned at the beginning of this chapter, it is expected that the relationship between eudaimonia and hedonic well-being will be the strongest for the solo self-employed due to their likely having the lowest overall income – this should hold across all models, although neuroticism might suppress this finding due to the mixed findings of the trait as discussed in Chapter 4.

In terms of traits, solos should have no substantial connections to extroversion due to their relative isolation. Emotional stability will be strongly related to hedonic well-being and eudaimonic well-being for solos. Openness to new ideas should have strong relationships to income for the solo self-employed due to an implicit requirement for increased level of individual resourcefulness.

Chapter 5. Methodology

5.1 Introduction

This thesis examines the hypotheses articulated in Chapter 4 using a positivist methodology, specifically, for the primary hypotheses, structural equation modelling (SEM) on a large, publicly available dataset, the British Household Panel Survey (BHPS). SEM allows for the testing of theoretical constructs using survey-based datasets. The BHPS dataset is chosen as it contains a large representative survey of the UK population containing all the variables concerned, including income, eudaimonia dimensions, Big 5 personality traits and hedonic well-being variables including both cognitive well-being and affect. The BHPS dataset is also longitudinal which increases the sample size, reduces the complexity of the modelling fit analyses and also reduces endogeneity issues. The dataset also allows for the segmentation of solo self-employed, the self-employed and employed. The waves of data are analysed using a weighted, multilevel structural equation model using Stata 12. After cleaning the data and removing missing cases there were 35,647 observations, including 2859 solo self-employed, 1,058 self-employed and 31,550 employed.

The chapter is separated into 5 sections, Mediation, Causality and Inferences, Sample Definition, Tests Run, Construction Operationalisations and Models.

The Mediation, Causality and Inferences section provides a clear delineation between mediation and moderation along with a critical discussion of causality and inferences in terms of confounding variables in particular.

The Sample Definition section describes the BHPS, which waves (or years) were selected for inclusion, weights chosen and UK regions included.

The “Tests Run” section is the most technically complex section and is largely descriptive. There are two main tests run, means tests and SEM. Information is provided about SVY commands which are used in Stata 12 to analyse panel data. Next, the processes of means testing for the first hypotheses related to income and well-being are described. Then, the SEM section describes, firstly, the basic concepts of SEM, path diagrams and terminology along with discussions about model adequacy and parameter estimations used to test hypotheses.

The model specification sub-section in SEM describes how the hypotheses are operationalised in the SEM. A technical description of the measurement components of the model is also provided, i.e. the factors and loading specifications, scaling techniques used etc.

Next, model identification in SEM is described, i.e. ensuring that the number of parameters to be estimated is less than the number of "data-points" in the model - this will include a description of how to calculate the number of data-points. Information will also be provided about how the factors have been identified. It should be pointed out that in the construct operationalisations section a separate factor analysis was conducted on the Big 5 factor observed variables prior to their inclusion in the model as separate traits. The factors are also analysed directly in the SEM itself where the factor loadings (described below) are similar to those found in the separate analysis.

A discussion on required sample size in SEM is provided along with a discussion on how missing data has been handled using a simple listwise deletion technique. Finally, some discussion of multivariate normality is provided.

The model estimation technique sub-section in SEM describes how model estimation works, i.e. by attempting to minimise the difference between the unstructured matrix of the observed data and the structured matrix of the model (a simplified representation of reality) we are estimating.

A short discussion on model modification in SEM is provided - it is short as there are no modification indices (described below) possible in SVY, also, as will be discussed in the Results Chapter, 6, these were not required for good fitting (described below) of the model.

Finally, in the SEM section, in the Reliability and Validity section, goodness of fit methods are described. Only SRMR and CD (described below) measures of fit are possible with SVY. However, a discussion of Chi-Square and other common methods are described for completeness. Discussions of construct, content and discriminant validities and reliability are had to conclude the section.

The Construct Operationalisations section describes which variables are chosen for inclusion in the model and how they are built. Each construct (hedonic well-being, personality and eudaimonia) is a latent factor, as described in the previous section, and these are operationalised through the careful selection of variables, or questions, that met theoretical and methodological

criterion for inclusion. In addition, the income variable, which is the primary predictor variable, must also meet theoretical criteria that make its inclusion appropriate – this is done equally carefully as there are many income variables within the BHPS. This selection process is described in detail. Transformations on each of the variables, such as normalisation, are discussed in terms of the "Tests Run" section, along with, the creation of various dummy variables, or variables constructed from existing variables for inclusion in the dataset, e.g. the variable which segments the dataset into solo self-employed, self-employed and employed.

Finally, in this Chapter, the Models section provides formal SEM diagrams for each hypothesis group, this includes the model statistical specification for each group. Also, the model is then provided in Stata 12 code.

5.2 Mediation, Causality and Inferences

5.2.1 Mediation

Moderation and mediation are two separate and (still) often confused statistical techniques for considering the effect of a third variable over a direct effect. In moderation the independent variable is in effect "partitioned" (Baron and Kenny, 1986) into subgroups in order to examine how a dependent variable is effected. In mediation, the third variable is a "generative mechanism" (Baron and Kenny, 1986), that the independent variable can operate through in order to effect a dependent variable. Probably the clearest way to conceive of the difference between moderation and mediation, is that in mediation the independent predictor variable is "causally antecedent" to the mediator and the mediator is also causally antecedent to the dependent variable. In the mediation system a mediator is an effect of the independent variable and a "co-cause", with the independent variable, of the dependent variable. If i = independent, d = dependent and med = mediator, then i comes before both med and d, and med comes before d. In a moderation system, the moderator and the independent variable occur simultaneously, in this sense moderators are always independent variables, they are always causes, and never effects.

Moderation exists when the path of the independent variable and the moderator interacted is significant. Often researchers will classify this as mediation when it is not (Baron and Kenny, 1986).

Mediation is more difficult to calculate. The path from independent to dependent variable is called the direct effect. The product of the paths from independent to mediator and mediator to dependent variables is called the indirect effect. The total effect is the direct effect plus the indirect effect. The amount of mediation provided is usually calculated as a percentage of the indirect effect of the total effect. If the indirect effect percentage is 100% then there is complete mediation. An alternative way to calculate this "complete mediation" is if the direct effect is no longer significant when controlling for the two paths that comprise the indirect effect. In other cases, mediation can exist but is said to be "partial mediation".

5.2.2 Causality and Inferences

Central to this thesis is a structural equation model, comprising mediation components, which make assumptions regarding causality, especially regarding the effect of income e.g. income rises can cause changes in personality, or income rises can cause changes in well-being, or personality can cause changes in well-being; and eudaimonia can cause changes in hedonic well-being.

Assumptions regarding causal inferences drawn from "observational data" in this thesis are based on "domain knowledge" and is not a "mechanistic procedure" (Rohrer, 2018, p. 1). Discussing causal issues are essential to most "substantive questions" (Rohrer, 2018, p. 2), most humans make causal statements daily e.g. the use of the common word "because" is an effort to assign a reason, which is often the "cause" of an outcome. In reality, causality is difficult to assign or even impossible, especially without "background knowledge" (Robins & Wasserman, 1999). Often times researchers who use large datasets like the one used in this thesis, evade the assignment of causality by "cautiously avoiding causal language: They refer to "associations," "relationships," or tentative "links" between variables instead of clear cause-effect relationships" (Roher, 2018, p2). However cautious the language, humans are still likely to make conclusions regarding causality, yet clearly this does not mean academics should not be cautious in their language.

Correlations are different to regressions, but both require domain knowledge to make assumptions about causality. Correlations allow researchers to see how similar two variables are to one another, or how much one variable changes when another one does. This makes no comment regarding causality by itself, but researchers can assign causality based on domain knowledge. Regressions (the basis of the SEM) allow a best line of fit between variables and

allows predictions based on this line to occur i.e. if the coefficient of x changes, then y will change. While there is, strictly speaking, a mathematical causality (i.e., in a formula where y = mx + c, when the coefficient m changes, this will mathematically cause a change in y) this cannot be used to assume that the change will occur in real life, as there may be other factors which are not accounted for in the equation, often referred to as confounding or collider variables. Researchers can use control variables to try to account for such changes, or SEM researchers try to make the model as complete as possible. A full description of the SEM identification process is provided below.

In the literature review of this thesis, Clark et al (2008) were cited regarding problems with establishing causality in terms of "exogenous variation in income", meaning high SWB could cause income growth, whereas Dolan et al (2008), argued that panel data made it possible infer causality with greater confidence. There were several examples of bidirectionality given also where non-recursive models may be possible.

Thus, in this thesis care has been taken in the Results, Discussion and Conclusion sections that follow to not assign causality, but rather use of the phrases "is positively associated with", or "may" cause a rise etc. This allows for useful discussions of causality to occur, whilst highlighting the necessary caution required to interpret the results.

5.3 Sample Definition

The BHPS is an ongoing longitudinal panel study conducted by the ESRC in conjunction with the University of Essex aimed at understanding "social and economic change at the individual and household level in Britain" (Taylor, 2010, p.23). Using the BHPS, it is possible to model changes to populations and their causes in relation to socioeconomic variables, making it ideal for this thesis. The original study began in 1989 and was an annual panel of 5,000 households with approximately 10,000 individuals, aged 16 or older in most "waves" or year of data. If an individual left a household, they would be re-interviewed with all adult members of the new household. Core repeating topics include labour market, income, health (including subjective well-being) and socioeconomic values. The panel data allows individual and household analysis of change in socioeconomic environment and behaviour in a dynamic manner over time.

The survey is stratified and clustered with 1,255 variables. Stratified means that the populations are surveyed by groups or strata, in this case, by geographic region (Scotland,

Northern Ireland, England and Wales) along with neighbourhood. These stratifications are taken into account by probability weightings which must be used in order to provide a representative sample of the national population. Clustering is also an approach to surveying or sampling where the surveys are conducted in groups, in this case, the BHPS, in households. In the case of this thesis the household clustering is not used, all data is analysed at the individual level, and an individual level variable (called PID) is used to cluster data at the individual level across multiple waves (or years) of data. While the panel nature of the study allows for analysis at the household level and interactions of constituent individuals and this thesis only focuses on individual level responses, it may be possible that some solo, self-employed or employed individuals are from the same household.

The initial sample consisted of 8167 addresses gathered from a postcode address file where all relevant (or private) households were approached. Throughout the duration of the study, the sample was "boosted" with new regions so that by 2009 the survey included England, Wales, Scotland and Northern Ireland. The survey is therefore nationally representative of Britain as it changes over time.

The original participants were interviewed (mostly) annually even if they moved households or entered institutions (except prisons or if they were too mentally impaired or frail) or moved to Northern Scotland (North of the Caledonian Canal). Each wave, therefore, contains all original participants and their children along with adult members of their household, except in the case of "booster" samples. All household members, over 16 years of age, were questioned. Note, this thesis only examines participants over 18 and under 65.

5.3.1 Weights & Regions

On page 197, A5-14, Volume A of the British Household Panel Survey User Manual is a Table 25, a useful "Guide to the selection of BHPS weights for analysis". The sample selection mechanism follows an equal probability selection process or "epsem design" (Kish, 1965), which means, as this suggests, that each individual has the same probability of being selected. 2000/2001 (noted as year 1 in this thesis), Scotland and Wales "booster" samples were included, which meant that there were some methodological differences between England and Wales, however, these are accounted for by using the longitudinal weight variable called QLRWTSW1 (note that the BHPS instructs that Northern Ireland be excluded using this sample). This combination presented the largest possible sample size. Tests included in this

thesis include weighted regressions using SVY for years 1 – 9 which included the Scotland and Wales boosters and excluded Northern Ireland. The BHPS has designed the weight variable so that only the weight included in the last wave of the panel analysis should be used (Taylor, 2010) (page 189, A5 -6), and therefore the weight variable from wave 9, or Q, was used, hence the first letter of the weight variable starts with Q.

5.4 Tests Run

There are 2 main tests run in this thesis, means testing to determine differences in levels of income, well-being and traits in the populations; and, structural equation modelling. This section describes these 2 tests in detail. Prior to this, a description of the SVY command in Stata is performed, as this is an intrinsic component of working with the BHPS, i.e. panel data.

5.4.1 Stata 12 and Waves

The analysis is conducted in STATA 12, a statistical analysis software package. The last 10 years of the BHPS are used, waves I – r, named year 1 – 10 for simplicity, however, the last year ends 2008/2009. Files from "indresp" datasets, which capture individual cases, were merged using standard methods (BHPS – Guidebook A). Each of the 10 data files is opened, and the variables required for analysis are saved to a new file including the ID variable PID. Wave 10 is excluded as this wave included the start of the recession in 2008/2009 and this presented significantly different responses to income and hedonic well-being during this time.

5.4.1.1 SVY

SVY is a command in Stata that can be used to declare a dataset to be panel data. In doing this it is possible to specify a weight variable, along with the wave and individual identification variable (Stata, 2014). Using SVY in this way allows for the use of observations of the same individual to be gathered from the same question but taken at multiple times. Therefore, compared to a cross-sectional analysis of a single wave, a longitudinal analysis will increase the number of observations, but, does not increase the number of individuals – unless a new individual joined the survey during a new year, in which case there would be no observations from previous waves etc.

Because of the nature of SVY, there are certain statistical techniques which are not possible such as t-tests (or, more specifically, the "ttest" function in Stata) and some post-estimation analyses. For example, in running SVY on SEM, it is only possible to report SRMR and CD

values; chi-square and CFI values and other commonly used fit indices are unable to be calculated.

5.4.2 Means Testing

It is not possible to use the "ttest" command using SVY, i.e. it is necessary to conduct a means test in order to check the hypothesis that the solo-self-employed have the lowest income of all groups etc. However, it is possible to run a mean function called SVY: mean, and then run a post-estimation command called "lincom" which calculates the difference between the means, standard error of the difference, as well as the t-value and the p-value.

T-tests are a method of determining if there is a statistical difference between two means in a population or a population mean and a hypothesized value. In this thesis, we are looking at two population means in all cases. T is the difference measured in units of standard error where standard error is the standard deviation divided by the square root of sample size. The closer T is to 0 the more likely there is a no significant difference. P values are related directly to T values; they are the area under a T-curve (which is often bell-shaped). The closer the area under the t curve is to 0 the more likely there is a statistical difference, i.e. smaller P values are better in confirming a difference.

5.4.3 Structural Equation Modelling

Structural Equation Modelling (SEM) allows for the combination of regression and factor models in the same analysis (Acock, 2013) - this allows simultaneous estimation of observed and unobserved variables and the relationships between these variables. Both continuous and categorical variables can be included in the analysis. It allows invisible (or latent) constructs to be examined in a way that is inherently useful to social science research. Ullman (2006., P4) puts it this way, "When the phenomena of interest are complex and multidimensional, SEM is the only analysis that allows complete and simultaneous tests of all the relations".

SEM is conducted using graphical interfaces (Ullman, 2006) and this thesis uses Stata 12. In the factor analysis component of the model, latent variables can be derived from measured variables. In this case, personality, eudaimonia, and hedonic well-being are all latent variables derived from factor analysis.

There are two types of factor analysis, exploratory (EFA) and confirmatory (CFA). Note that PCA (Principal Component Analysis), which is used to reduce the number of correlated

observed variables, is different to factor analysis, which concerns reducing observed variables to a latent factor - PCA is not used in this thesis. In EFA there are a large number of variables and the objective is to determine if there is an underlying structure, without a clear understanding of the structure. CFA, the type used in this thesis, is based on an understanding of the number of factors and relationships "between the factors and measured variables" (Ullman, 2006, p3). The goal of CFA is to test the hypothesised structure. It is important to note that rotation is not part of CFA.

CFA works by using covariances of the sample rather than correlations, which are used in EFA. A covariance is an unstandardized correlation, i.e. dividing a covariance by the product of standard deviations of each variable gives a correlation. Where correlations "indicate degree of linear relationships in scale-free units" (Ullman, 2006., p.37).

CFA "offers a statistical test of the comparison between the estimated ***unstructured*** population covariance matrix (upcm) and the estimated ***structured*** population covariance matrix (spcm)" (p.37, with emphasis and abbreviations added). The sample covariance matrix is used to estimate the upcm whereas the parameter estimates in the model are used to estimate the spcm. This is crucial as the way the CFA has hypothesized sets up the spcm. The primary question asked in SEM is whether the spcm is consistent upcm, i.e. this is the SEM's central concept of "fit". These are usually estimated via various fit indices along with the famous chi-square test statistic, to be discussed below. If the model is "good" the model will fit.

SEM allows us to ask if the parameters of the model estimate a spcm (structured population covariance matrix) are consistent with the sample upcm? If the model is properly fit the two matrices will be statistically similar or close. This is the fundamental purpose of SEM, to find a model that fits the population in reality. This is also central to the philosophical approach to this thesis which views social reality as positivist, fundamentally measurable, external and verifiable.

SEM also allows us to ask what relationships are significant in the model? In the direct relationships between an IV and DV, this is the same as in regression analysis (Acock, 2013; Ullman, 2006). P values can be used to determine significance of the relationship and beta or coefficient values to evaluate the strength of the path.

Reliability is calculated "explicitly within" SEM by "estimating and removing the measurement error", leaving only common variance in the factor analysis. This presents a tremendous advantage to SEM.

In SEM, the factor component just described, the latent variable, is called the measurement component whereas the relationship among latent and observed variables is the structural model. If the structural model does not contain a measurement component, i.e., it is just a relationship between observed variables, then it is simply a path analysis or a set of multiple simultaneous regressions. Independent variables are called exogenous and dependent are endogenous and can be either observed or latent variables (Acock, 2013; Ullman, 2006).

The main steps in SEM are model specification, estimation, modification along with checks for reliability and validity. Each step is examined. Prior to this, a description of the common terminology of SEM is provided.

5.4.3.1.1 Note on Traditional Factor Analysis

Factor analysis is a sophisticated mathematical process takes a set of variables that are usually hypothesised to be related to each other in some way. The process attempts to identify a smaller number of underlying latent variables, the factors. There are a range of constraints in place to ensure uniqueness of the reduced number of variables, a reduction the number of variables that are correlated with each other is the primary outcome. Stata allows for a simple process whereby the function "Factor" is run on a set of variables to be reduced; specification is permitted for the maximum number of factors.

Mathematically, factor analysis linearly connects original variables to common factors (StataCorp., 2013 – see Factor Analysis, p.5).

$$y_{ij} = z_{i1}b_{1j} + z_{i2}b_{2j} + \cdots + z_{iq}b_{qj} + e_{ij}$$

Equation 5.1 Factor Analysis

yij (the only element not estimated) is the value of the ith observation on the ith variable. "Factor loadings" are the set of coefficients bkj. (eij is the jth variables "unique factor"). "zik is the ith observation" on the "kth common factor" (StataCorp., 2013 – see Factor Analysis, p.5). The analysis process is based on a prediction of the correlation matrix (which is different to principle component analysis). The estimated "factor loadings" are then grouped "labelled"

by the researcher. At this point, rotations are taken to simplify the matrix before values are predicted in a post-estimation process.

The two most common are varimax which specifies an orthogonal rotation (meaning factors are uncorrelated), and the more recent Promax rotation which produces an oblique rotation (meaning the factors can be correlated).

Following this, a post-estimation procedure can be run to predict the factors that can then be used in the analysis. This results in a continuous variable, from the original categorical variable. Traditional factor analysis was used in this thesis on the Big 5 variables, prior to an adoption of a SEM methodology - these findings are not presented.

5.4.3.2 Terminology

Diagrams are central to SEM, and the equations in a model correspond to the relationships hypothesised in the diagrams provided in Chapter 4., Theoretical Model. Measured or observed variables, also called latent variables, are represented by rectangles, constructs, also called unobserved variables, are represented by ovals (Acock, 2013; Ullman, 2006). There are lines with arrows that represent either a direct relationship, covariance or error term. Covariances, logically, have two arrows. If an arrow is pointing to a variable, that variable is a dependent variable, except if it is an error term, then it could be any type, i.e. DV, IV or observed variable used to calculate a factor. Latent variables have arrows pointing away from them to factor variables which indicates that the unobserved latent variable causes the effect in the observed variables that comprise the latent variable or factor. Error terms, also known as residuals, are represented in this thesis by circles. Residuals are the variance not predicted by the independent variables, there is always residual, error, variance etc., as no model can predict reality perfectly.

5.4.3.3 Model Specification/Hypotheses

In SEM, the first stage is to articulate the hypothesis as both an equation and diagram and to "identify" the model statistically, revealing all assumptions (Acock, 2013). The previous Chapter 4., Theoretical Model, has actually provided a theoretical identification of the model, the SEM process formalises this further by detailing all observed variables and construct operationalisations to be documented by using software, which is the final stage before results are gathered.

5.4.3.3.1 Model hypotheses and diagrams

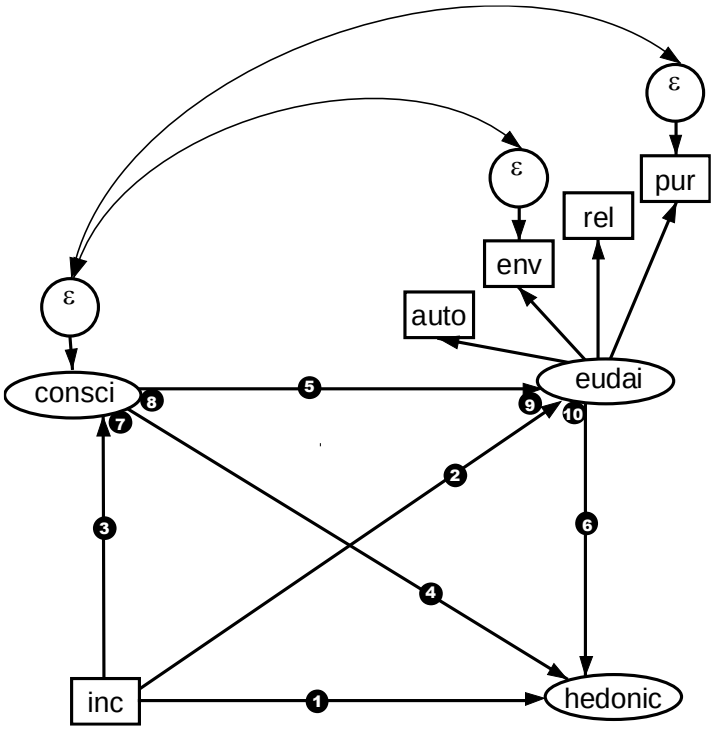


Figure 5.1 SEM Model

In the model above all lines with arrows represent parameters to be estimated. (Note, please refer to Table 6.2 in Chapter 6, Variable Abbreviations for explanations of terms e.g., consci = conscientiousness, inc = log of income.) The covariances and variances of variables are either estimated or fixed.

5.4.3.3.2 Model statistical specification

The Bentler-Weeks method (Bentler and Weeks, 1980) of specification treats all variables in the model as either an IV or DV (including residuals) with regression coefficients, variances and covariances estimated. The Bentler-Weeks model uses regression model structure in its algebra: $\eta = \beta\eta + \gamma\xi$. Where q and r are the number of DV's and IV's respectively and the η is a vector (qx1) of DV's. β is a matrix (q x q) of regression coefficients between DV's. γ is a matrix (q x r) of regression coefficients between DV's and IV's and ξ is a vector (r x 1) of IV's. In Bentler-Weeks only IV's have variances and covariances. All of this can be translated into code for Stata 12 which is automatically generated by the SEM program in Stata 12.

5.4.3.3.3 Model identification

If a model is not properly "identified" it cannot be estimated in SEM. If a model is identified all of the parameters can be estimated. A model is identified if the number of data points in the model is greater than the number of parameters to be estimated. The number of data points is calculated by taking (o(o+1)/2) where o is the number of observed or measured variables. The number of parameters to be estimated is just the number of coefficients, variances and coefficients in the model.

5.4.3.3.4 Identifying Factors

Factors also have an identification process (Ullman, 2006; Acock, 2013). As factors are hypothetical, they have no intrinsic scale or unit of measurement. To artificially account for this lack of scale it is necessary to either set the variance of the factor to 1 or to set the regression coefficient of one of the observed variables of the factor to 1. If the factor is a DV the regression coefficient option is the only alternative. If a model has 2 or more factors and each factor has 3 or more observed variables, and their errors are not correlated, then that component of the model, the measurement component, can be identified.

5.4.3.3.5 Sample size and Power

Parameter estimates and fit tests are highly sensitive to sample size, the larger, the better. Kline (2011) suggests that the ratio of observations to parameter is the most common way to determine minimum sample size, where Bentler and Chou (1987) suggest at least 5 – 10 observations per parameter, whereas, Jackson (2003) suggests 20.

5.4.3.3.6 Missing Data

Listwise deletion process was used which simply removes those individuals from a sample where responses were not gathered for a question in the model.

5.4.3.3.7 Normality

Normality is usually measured by skewness and kurtosis. If skewness is greater than 2 and kurtosis, 7, then there is nonnormality (Fabrigar et al., 1999). However, Kline (2011, p.63) suggests skewness greater than 3 is extremely skewed, and kurtosis greater than 10 are undesirable but greater than 20 is the cut-off. Normality transformations are dependent on the type of skewness; Kline suggests that moderately positive skews should have a square root

transformation, whereas more than moderately positive skews should undergo a logarithmic transformation.

The annual income variable (described in construct operationalisations) was transformed by logarithmic transformation following observation of highly positive skewed distributions (Hair et al. 1998; Kline, 2011). All other variables met the skewness and kurtosis tests of greater than 2 and 7 as indicated above. These findings are presented in Chapter 6., Results.

5.4.3.4 Model Estimation Techniques and Test Statistics

As implied above, the purpose of SEM is to produce a model or structured population covariance matrix that is close to the observed or unstructured population matrix. In formal notation, to minimise the function F, below.

$$F = (\mathbf{s} - \boldsymbol{\sigma}(\boldsymbol{\Theta}))\mathbf{W}(\mathbf{s} - \boldsymbol{\sigma}(\boldsymbol{\Theta})),$$

Equation 5.2 SEM Model Estimation

In this equation s is a vector of observed unstructured data, $\boldsymbol{\sigma}$ is the vector of the structured population covariance matrix where the($\boldsymbol{\Theta}$) indicates that $\boldsymbol{\sigma}$ calculated from the parameters of the model (Ullman, 2006). W is a matrix that weights the squared differences between the unstructured sample and estimated population covariance matrix. F time (N – 1) is the chi-square test statistic, to be discussed below.

5.4.3.4.2 Recommendations for selecting estimation method

This thesis uses the maximum likelihood (ML) estimation method, which is the default in Stata 12 - this provides the smallest variance estimates when the data is normally distributed.

5.4.3.5 Model Modification

After the SEM is estimated it is possible to run post-estimation commands which can yield suggestions as to how to improve the model fit. However, this approach is controversial (Bagozzi and Yi, 1988; Field, 2000; Hair et al., 2010; Schermelleh-Engel et al. 2003). Model modification should only be undertaken if there are strong theoretical reasons for doing so rather than reasons of methodological expediency (Field, 2000; Hair et al., 2010; Bagozzi and Yi, 1988).

In this thesis model modification post-estimation techniques such as the Stata 12 command “mindices” were not possible due to the use of the SVY command.

5.4.3.6 Reliability and Validity of Measurement Models

5.4.3.6.1 Factors and Composite Reliability

Of fundamental concern are factor loadings, where higher factor loadings indicate that the observed variables are strongly related to the factor (Hair et al., 2011). In this thesis, the standardised coefficients or betas are presented which range from 0 to 1. Scores above 0.4 are acceptable values. The beta of the first factor, as indicated above, is fixed at 1. In SEM researchers can also utilise "composite reliability" for larger models, where individual betas can be smaller (Bagozzi and Yi, 2012). Composite reliability is sometimes referred to as "construct reliability" (Hair et al., 2010)." Composite reliability and average variance extracted (AVE) of latent variables are often used together (Fornell and Larcker, 1981; Bagozzi and Yi, 1988; Hair et al., 2011). Both can be calculated automatically in Stata 12 using the CR and AVE functions. AVE is the average amount of variance in "observed variables that a latent construct is able to explain" (Farrell, 2010, p325)." Latent factors should have an AVE of at least 0.5 (Fornell and Larcker, 1981) which demonstrates that on average less than 50% variance of observed variables is explained by the factor, i.e. more than 50% error remains. The logic is that if there is less than 0.5 AVE, then more error remains in the observed variances than the factor variance explains (Hair et al., 2010).

Note that in SEM Cronbach's alpha, which is used for factor analysis in separate analyses outside of SEM, is "neither accurate nor a useful decision aid in the structural equation context" (Bacon et al., 1995, p403) and should not be used in SEM (Bagozzi and Yi, 2012).

5.4.3.6.2 Goodness of Fit of the Model

The two most frequently used indices to measure goodness of fit are $\chi 2$ (or Chi-Square) and Root-Mean-Square Error of Approximation (RMSEA) (Jackson et al., 2009). If $\chi 2$ is small relative to degrees of freedom then the model has a better fit and $\chi 2$ should be insignificant. However, Hu and Bentler (1998) raised concerns that the model is not universally useful because often times models are significant (Iacobucci, 2010).

Another popular method (Bagozzi and Yi, 2012) is the Standardized Root Mean Square Residual (SRMR) (Hu and Bentler, 1998, 1999) which is an index derived from covariance residuals which explains the difference between observed data and the model (Weston and Gore, 2006) and it handles nonnormality more robustly than most other methods (Iacobucci, 2010). In SRMR scores are shown to be a good fit if they are less than 0.07 (Bagozzi and Yi,

2012), 0.08 (Hu and Bentler, 1999), 0.09 (Hair et al., 2010 – if CFI is greater than 0.92) or as low as 0.05 (Schermelleh-Engel et al., 2003).

In this thesis, the SRMR is used as this along with CD, coefficient of determination, as they are the only post estimations available to SEM which uses SVY. All models are required to have a fit of less than 0.09 SRMR for inclusion in this thesis.

5.4.3.6.3 For Robustness of Goodness of Fit

It is generally considered best practice to include two measures of fit. The limitation put on the analysis by the SVY function described in the previous point (i.e. that only SRMR can be utilised) has been combatted in two ways.

1. An analysis of each year was run separately. The limitations to this are that the sample size is smaller and that the number of replications is increased by the number of waves. When these tests were run the strength and signs of the paths were the same, however, for one path (the trait to hedonic paths), the p values were almost all greater than 0.05; this is due to the smaller sample size.
    a. Also, sample weights are not possible in order to get fit statistics.
    b. All SRMR and RMSEA, CFI IFI measures were within acceptable norms.
2. The entire analysis was done with no SVY but all years all at once. The limitation to this is that the analysis does not take into account the underlying structure of the survey, but this does allow for the full goodness of fit statistics to be reported. The usefulness of this is limited, but nonetheless, the findings were all identical in terms of p values and direction of coefficient. All SRMR and RMSEA, CFI IFI measures were within acceptable norms.

Due to the voluminous nature of point 1., these outputs have been omitted from the main thesis. Only comments have been made when caution is required as raised by a discrepancy between these points and SVY with SRMR.

5.4.3.6.4 Reliability and Validity Analysis

The methods chosen are well-documented using Stata 12 programming and included in full as a "Do" File in the appendix. The reported growth figures in the ONS are largely similar to those reported in the weighted BHPS, figures.

Propositions, a theoretical model and hypotheses have been deduced based on a comprehensive review of the literature in terms of theory, empirical findings and methodology. The only dataset used is a large publicly available secondary data-source, the British Household Panel Survey. All methods chosen are within the usual practice for a study related to the dimensions examined and are methodologically practical and robust in terms of the statistical requirements of the model.

5.4.3.6.5 Validity

Face validity is a subjective measure in which the researcher considers whether other scientists in the field ordinarily agree with the definitions - this is done through a comprehensive literature review based on empirical and theoretical foundations ensuring that terminology is as expected and measures are already widely used. For this thesis, the dataset is the BHPS, a widely respected and utilised dataset in the social sciences.

The Big 5 Factors are widely recognised trait measures. Measured based on hedonic well-being and affect used are also widely recognised measures. Eudaimonia measures required more subjectivity than others, but these questions were deemed to be appropriate given the context of the literature.

Income is an annual income figure after tax and requires no further validation.

5.4.3.6.6 Content Validity

For content validity to be present, the empirical data must reflect the domain (Venkatraman & Grant 1986). To ensure this a literature review was conducted to understand the constructs thoroughly.

5.4.3.6.7 Discriminant Validity

Discriminant validity refers to how unique factors are (Hair et al., 2010). In SEM, discriminant validity can be shown if the AVE (described above) of each factor is higher than the squared correlation between the other factors and the factor loadings are higher than its "cross-loadings", i.e. how the variables load on other factors (Fornell and Larcker, 1981; Hair et al., 2011).

5.5 Construct Operationalisations

5.5.1 Solo Self-Employed

As discussed in detail in the Introduction Chapter, 1, the solo self-employed in this thesis are classed as those self-employed who have no employees. To construct a variable to segment the solo self-employed, self-employed and employed from the general population there are 2 variables of interest, the "wjbsemp" variable (which identifies whether a worker is an employee or self-employed in their current job), and the "wssize" variable (which identifies the number of employees a self-employed worker has) both present in all 10 waves examined. The w prefix has been added to denote a variable present during multiple waves.

A new variable was created with 3 categories, 1 for solo self-employed, who is a self-employed worker with no employees, 2 for self-employed with 1 or more employees, and 3 for employed. This variable is used in all SEM equations and to conduct means testing.

5.5.2 Hedonic Well-Being

Hedonic well-being is a latent construct / factor / variable comprising cognitive well-being and affect. Satisfaction and happiness are similar but distinct variables which are both forms of cognitive well-being. In the model, all constructs have hedonic well-being as an outcome; no other construct has this quality in the model.

Creating a latent variable, hedonic well-being, is possible with SEM. This method is chosen as there is no single measure of hedonic well-being and it is theorised that hedonic well-being, comprised of affect and cognitive well-being, should exist and should be related to the causal variables of eudaimonia. This assumes that as hedonic well-being rises so too does affect and cognitive well-being.

In constructing the variable, the decision is made to include both happiness and satisfaction as observed variables of the hedonic well-being variable rather than creating another latent variable, cognitive well-being, comprised of happiness and satisfaction, and having this be an observed variable of the hedonic well-being factor.

5.5.2.1 Cognitive Well-Being

Cognitive well-being, as described in Chapter 2., relates to happiness and satisfaction, the 3 variables chosen for form the latent variable are described below. There were other happiness

variables and cognitive well-being variables. However, these 3 had the most similar wording and the strongest loadings onto the factor.

5.5.2.1.1 Satisfaction

The satisfaction variable is called "satisfaction with: life overall". It is based on a 7-point scale ranging from "not satisfied at all", at 1, and "completely satisfied", at 7. This question is one of a range of self-reported satisfaction variables which relate to the respondent's life and household. The measure is available in all waves except wave or year 3. The question is "how dissatisfied or satisfied are you with your life overall?".

5.5.2.1.2 Happiness

The first happiness variable chosen is included from the GHQ (General Health Questionaire) question on general happiness based on 4 categories:

1. More so than usual
2. Same as usual
3. Less so than usual
4. Much less than usual

The happiness variable was reverse scored so that "more so than usual" was ranked 4, or highest. The GHQ questions are generally accepted measures psychological illness but are also used as measures of subjective well-being (Taylor, 2010). There are 12 questions including "ability to concentrate" and "belief in self-worth" along with the global question related to general happiness. This variable was included in all waves. The question is phrased "Have you been feeling reasonably happy, all things considered?"

5.5.2.1.3 Happy Month

The second happiness and third cognitive well-being question was listed in just two waves, 1 and 7. The question is phrased "How much time during the past month have you been a happy person?". The question has a 6 point, no middle score, scale ranging from all the time to none of the time.

5.5.2.2 Affect

Affect has been measured by the PANAS scale developed by Watson et al. (1988) where both positive affect and negative affect are measured separately. The BHPS has a set of questions related to recent emotions or moods which are used to measure positive and negative affect. These questions are nearly identical to those specified by the ONS for inclusion. 3 variables

were chosen which loaded the most strongly on the latent variable and had the most relevant wording of questions. This variable is also listed in just two waves, 1 and 7 and all questions are worded "How much time during the past month have you been…?". The questions all also have a 6 point, no middle score, scale ranging from all the time to none of the time. These are listed below:

Positive affect:

- Past month: Felt full of life
- Past month: Felt calm and cheerful
- Past month: Had lots of energy

Negative affect:

- Past month: Been very nervy
- Past month: Felt down in the dumps
- Past month: Felt downhearted and low

For completeness, the 6 item no middle point scale in full is:

1. all of the time
2. most of the time
3. a good bit of the time
4. some of the time
5. a little of the time
6. none of the time

To ensure the variables moved in the same direction, all the positive affect variables scores were reversed, e.g. 1. "all of the time" was rescored to 6.

5.5.2.3 4 tests for Hedonic Well-Being

Negative affect is a different theoretical construct to positive affect. It can actually be included in the same factor, as in, the all observed variables load on an affect latent variable and score above 0.4 and theoretically it could be viewed as the same phenomenon. However, it is useful to separate negative affect from positive affect, particularly in terms of its relationship to personality. Therefore, negative affect and positive affect latent variables are tested separately, as is cognitive well-being, and a fourth test is included which includes all hedonic well-being variables.

Rather than present separate sets of hypotheses, the findings are discussed in terms of the existing hypotheses in Chapter 7., Discussion. It is likely that the relationship between personality and hedonic well-being is affected differently by positive affect, negative affect and cognitive well-being.

5.5.3 Income

Income is the simplest to operationalize. For the solo self-employed annual income is the most relevant value. It can be used in conjunction with income last month in order to remove those cases with high seasonality, i.e. those solo self-employed who have high or low extreme income in the month due to the seasonality of income prior to the survey may have hedonic responses which are not consistent.

There are multiple income measures in the BHPS. However, the primary variables were annual reported income and income last month. These are calculated based on tax receipts submitted.

The annual income variable is a before-tax figure. Those with no income in the month prior were removed, this amounted to 77 individuals. All values less than 0 were removed (199 observations) and £10 is added to the value of each case. After the log transformation, extreme cases were removed by removing all cases less than 5 (613 observations). Detailed discussion on missing cases and normality, kurtosis and skewness, is provided in the SEM section.

5.5.4 Personality

During the wave starting 2005, personality data was also included in a shortened version of the Big 5 personality traits. It is the only wave where this data was collected. The Big 5 traits are measured in the BHPS via a short item measure of 15 questions. For use within the SEM, the 3 questions are included. In each model, the trait has three questions these are labelled a, b and c, prefixed with the first letter of the trait, for example, for agreeable the first question is labelled aa, as below:

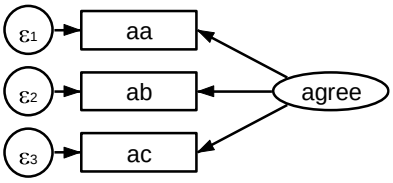


Figure 5.2 Agree Latent Component

Below are the Big 5 questions listed in the BHPS organised via trait:

- Openness
    - resp. is original, come up with ideas
    - resp. values artistic, aesthetic experience
    - resp. has an active imagination
- Conscientiousness
    - resp. does a thorough job
    - resp. tends to be lazy
    - resp. does things efficiently
- Extraversion
    - resp. is talkative
    - resp. is outgoing, sociable
    - resp. is reserved
- Agreeableness
    - resp. is sometimes rude to others
    - resp. has a forgiving nature
    - resp. considerate & kind
- Neuroticism
    - resp. worries a lot
    - resp. gets nervous easily
    - resp. is relaxed, handles stress well

The questions are worded "I see myself as someone who…?". The questions are on a scale of 1 – 7, where 1 is "does not apply" and 7 is "applies perfectly".

5.5.5 Personality 1 Wave

Personality is measured in only 1 wave, 2005 (or wave o). Personality was held constant across years, in line with the theory that traits are "set like plaster" (Costa, 1994) (this does

not preclude that income causes traits to change, as described below). This was required to boost the sample size. Income was used to predict personality however, income had a low standard deviation (< 0.9) with mean of log income ranging from 9.3 – 9.6 over 9 waves. The tests were run on years *prior* to 2005, i.e. the wave personality was recorded, ensuring that no subsequent years of income were used as predictors.

With traits being held constant across waves and prior years of income being used as predictors, this can only be used to make inferences about how traits can change over years, rather over a single year. The trait values held constant from wave 2005 indicates that the predictors of income in the years prior for traits may not be representative; but as average income does not change much during previous years (i.e. it ranges from 9.3 to 9.6) it is highly likely that those trait values are representative.

That being said, as income rarely changes, it might be equally possible for traits to change faster with larger changes in income in line with theories regarding trait change following unemployment (Boyce et al, 2015).

To be certain, for robustness, a test was also run for only 1 year, 2005, i.e., with traits not being held constant over multiple years, the findings were, as expected, similar, due to the relative invariability of income - with the exception of the agreeability to negative affect finding for solos was insignificant, at $p < .2$, due to small sample size.

It would be clearly better if personality was measured in every wave, and this should be a consideration for future research projects.

5.5.6 Eudaimonia

There were 4 eudaimonia dimensions selected for inclusion in the model. These included purpose, autonomy, relationships and environmental mastery. The QLF or quality of life variables within the BHPS included 4 questions which were well aligned with these. Below are the 4 dimensions as labelled in Chapter 4., Theoretical Model, followed by an equals sign and the wording of the question in the BHPS:

- Purpose = Life has meaning
- Relationships = Enjoys being in the company of others
- Environmental Mastery = Has control of life
- Autonomy = Has autonomy

These variables were only gathered in two waves (K and P), however, as discussed in the previous chapter, eudaimonic dimensions share characteristics with personality traits, in that they do not change significantly over time. The questions are worded as "I feel that…?" for example, "I feel that my life has meaning" for the purpose question. The questions were scaled from 1 – 4 where 1 is often and 4 is never. These were all reverse coded.

In order to correctly specify the models to be examined in relation to traits it is necessary to include findings from Schmutte and Ryff (1997) who found that personality traits and some dimensions of eudaimonia covary. In particular these authors found the following relationships:

- Openness covaries with Growth
- Conscientiousness covaries with Self-Acceptance, Environmental Mastery and Purpose
- Extroversion covaries with Self-Acceptance, Environ Mastery, Purpose, Growth and Relationships
- Agreeableness covaries with Relationships
- Neuroticism covaries with Self-Acceptance, Environ Mastery, Purpose and Autonomy

However, there are theoretical arguments that can be made for other relationships. These are:

- Agreeableness likely covaries with Autonomy (i.e. those who are autonomous are likely to be more disagreeable)
- Neuroticism likely covaries with Growth (i.e. personal growth should be associated with emotional stability and mental health)
- Extroversion likely covaries with Relationships (i.e. being more extroverted puts individuals in a position to build more relationships).

As growth and self-acceptance are not included in the eudaimonia model chosen above, the following relationships are selected:

- Agreeability covaries with Autonomy and Relationships.
- Conscientiousness covaries with Environmental Mastery and Purpose
- Extroversion covaries with Environmental Mastery, Purpose and Relationships
- Neuroticism covaries with Environmental Mastery, Purpose and Autonomy
- Openness covaries with none.

5.6 Model

5.6.1 General Model

All models presented are properly identified, in fact, they have more than twice as many data-points as parameters. All factors are DV's in the models presented and the top, vertically, listed observed variable of each factor has had its regression coefficient set to 1 to fit the model. In fact, in Stata's SEM graphical user interface, this is done automatically.

In the presentations of the models below, a model for each trait will be presented, focusing cognitive well-being only, rather than with 4 replications, i.e. substituting positive affect, negative affect and hedonic for cognitive well-being in the additional iterations. However, all 4 replications will be presented in the results chapter. Each of the 4 iterations is presented first, for discussions purposes, with a general personality latent variable shown.

5.6.1.1 Positive Affect

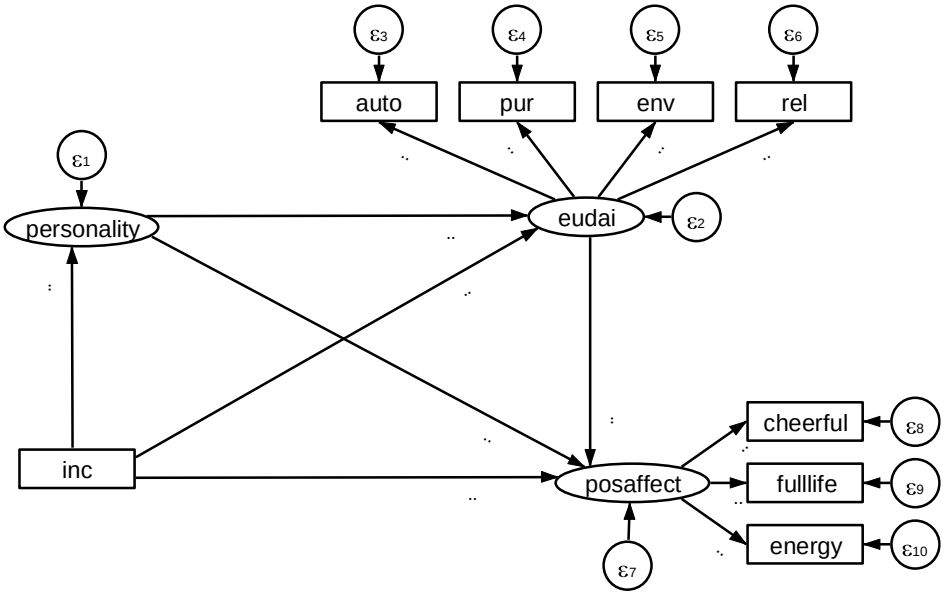


Figure 5.3 Positive Affect SEM

Abbreviations are:

- Past month: Felt full of life = fulllife
- Past month: Felt calm and cheerful = cheerful
- Past month: Had lots of energy = energy

5.6.1.2 Negative Affect

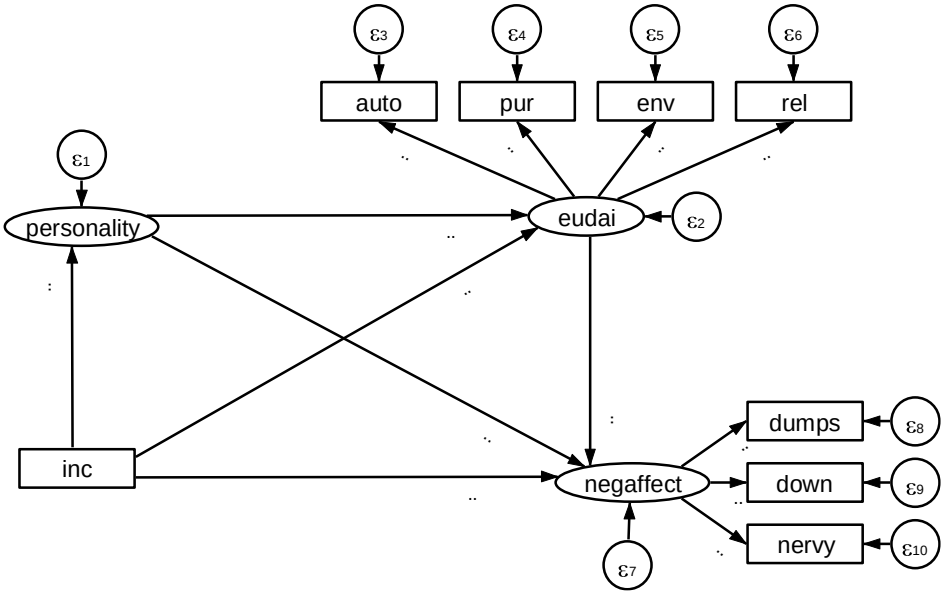


Figure 5.4 Negative Affect SEM

Abbreviations are:

- Past month: Been very nervy = nervy
- Past month: Felt down in the dumps = dumps
- Past month: Felt downhearted and low = down

5.6.1.3 Cognitive Well-Being

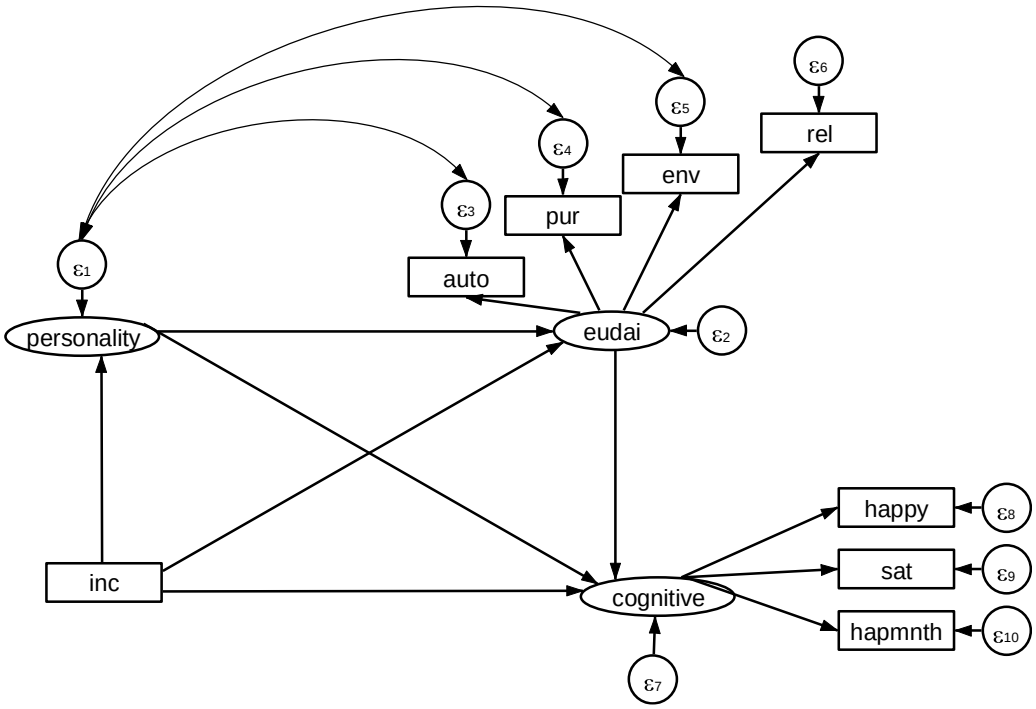


Figure 5.5 Cognitive Well-Being SEM

Abbreviations are:

- Happiness = happy
- Satisfaction = sat
- Past month: Been a happy person = hapmnth

5.6.1.4 Hedonic Well-Being

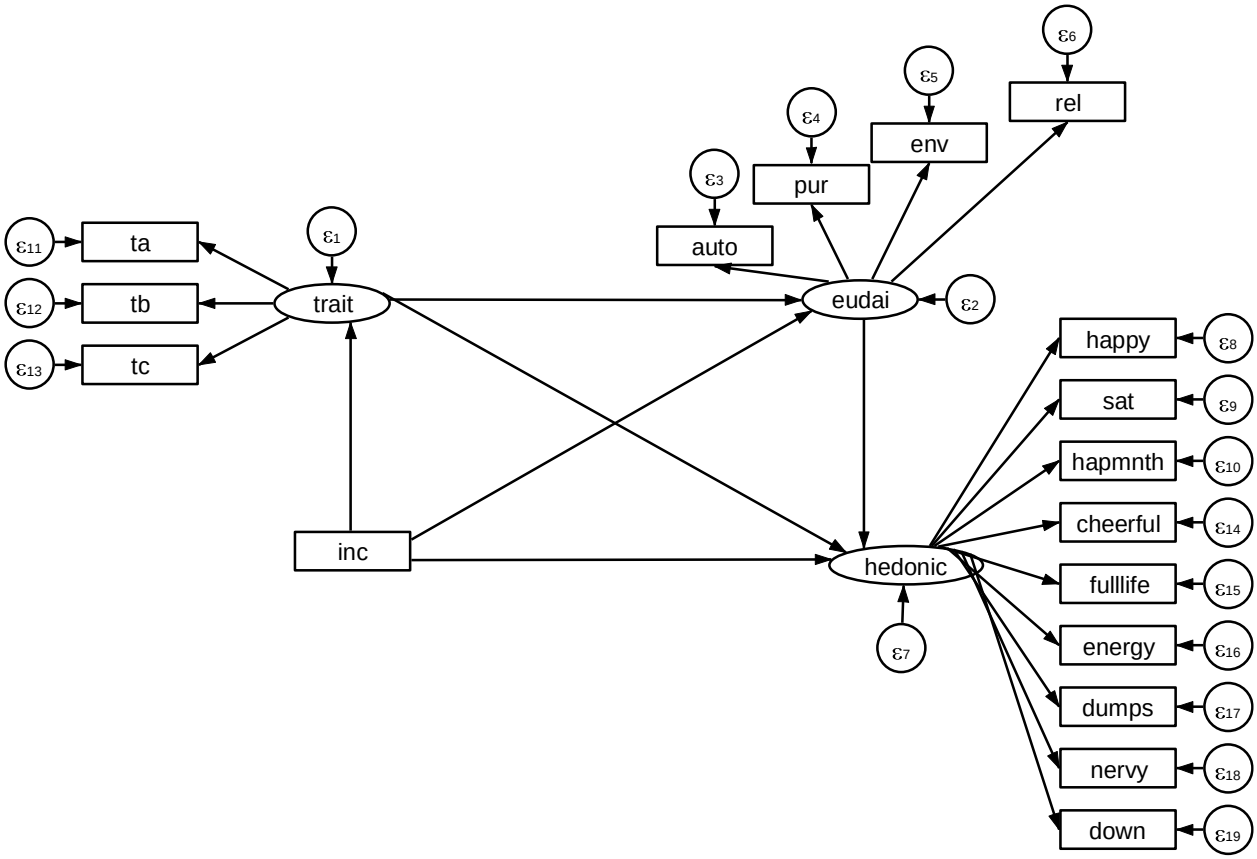


Figure 5.6 Hedonic Well-Being SEM

This model contains all affect and cognitive well-being variables.

Now each model for each trait will be presented with the cognitive well-being latent variable in the model. Each model is presented with relevant correlations with eudaimonic dimensions as defined in Chapter 4., including openness, listed first, which had no theoretical correlations with eudaimonic dimensions.

5.6.2 Openness

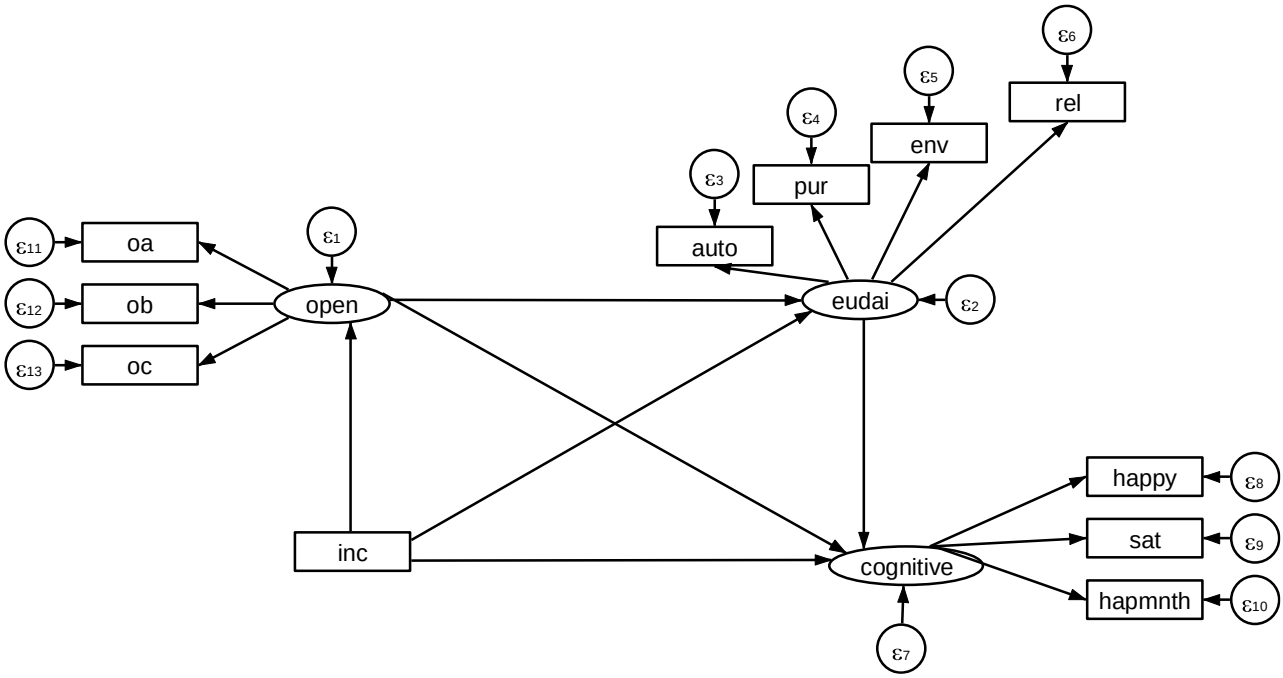


Figure 5.7 Openness SEM

5.6.3 Conscientiousness

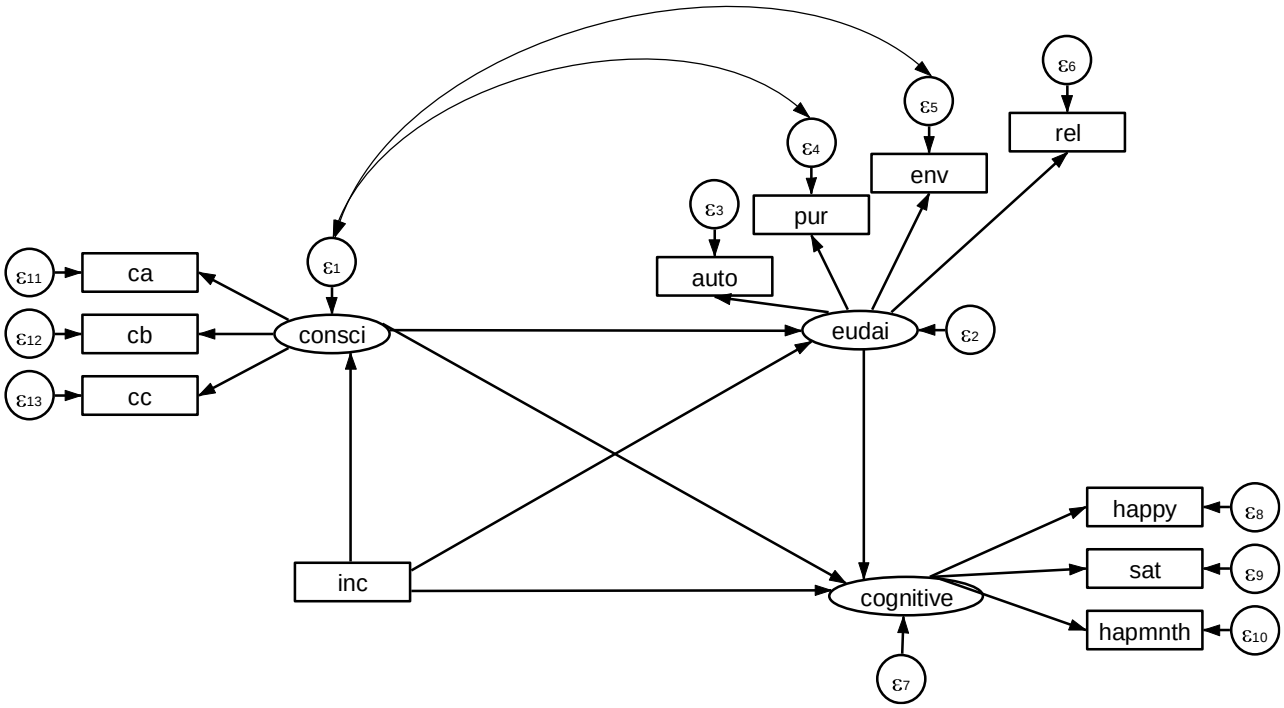


Figure 5.8 Consci SEM

5.6.4 Extroversion

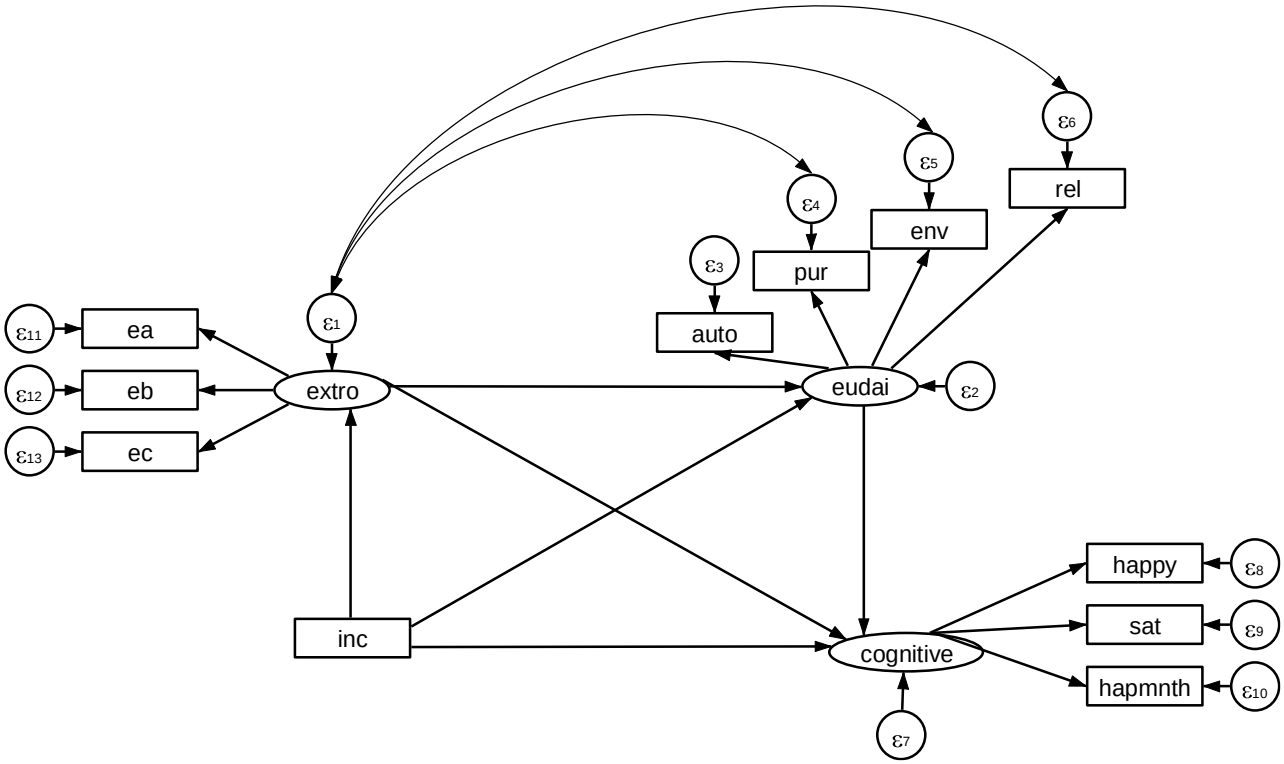


Figure 5.9 Extro SEM

5.6.5 Agreeability

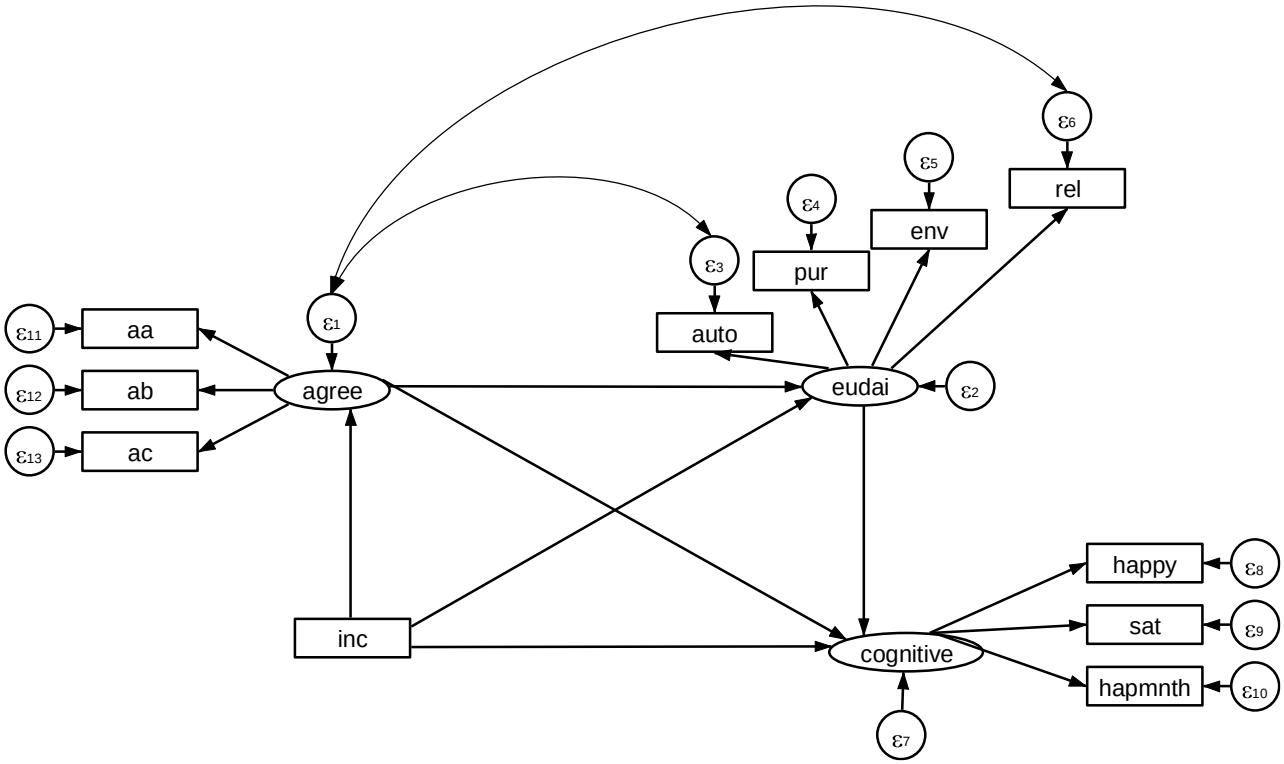


Figure 5.10 Agree SEM

5.6.6 Neuroticism

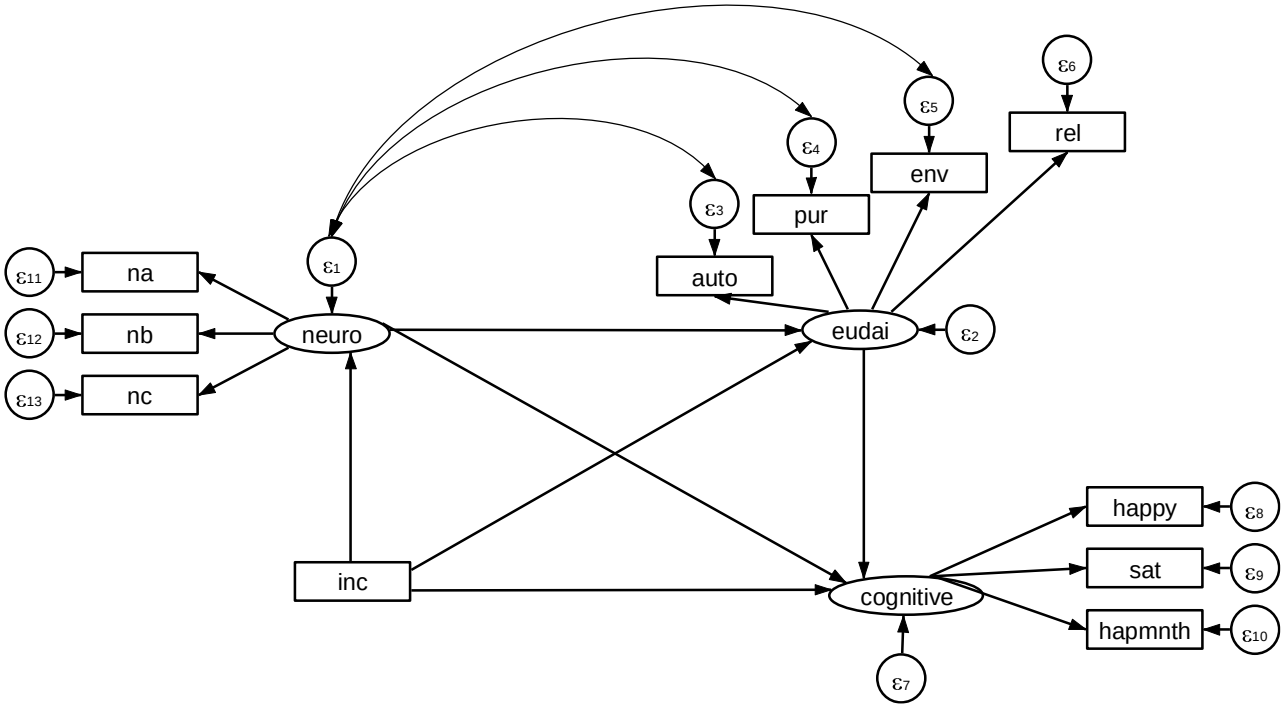


Figure 5.11 Neuro SEM

5.7 Conclusion

The chapter has discussed Mediation, Causality and Inferences, Sample Definition, Tests Run, Construction Operationalisations and Models. Critical discussions of mediation and causality, along with descriptives of fundamental concepts such as SEM and the structure of the tests run have been provided. This section has also described STATA which implies the learning of a programming language in order to run the tests, clearly describing the syntax and coding methods would not be practical to include, however a "DO" file of the code constructed is provided in the Appendix. The model specification and construct operationalizations of the theoretical model components provided the most technically detailed section and includes important information on the limitations of the thesis including the capturing of only 1 wave of personality data and how this was dealt with. Finally, reliability and validity methodologies were described. The next section presents the results based on these methodologies.

Chapter 6. Results

6.1 Introduction

This section presents the findings of the analysis. It makes no comment regarding the research and practical implications, which are reviewed in the next chapter. Descriptive statistics are presented first, and then the findings in relation to the main general hypotheses in terms of direct and total effects.

6.2 Descriptive Statistics

6.2.1 Variables

After removing missing variables there were 40,179 observations across 8 waves, with wave 3 removed as this did not have data on the cognitive well-being variable satisfaction.

The following table gives frequency of observations per year/wave.

year	Freq.	%	Cum.
1	4,826	12.01	12.01
2	4,975	12.38	24.39
4	5,097	12.69	37.08
5	5,070	12.62	49.7
6	5,117	12.74	62.43
7	5,196	12.93	75.37
8	5,017	12.49	87.85
9	4,881	12.15	100
Total	40,179	100	

Table 6.1

Frequency of Observations

The frequency ranges from 5,196 in year 7 to 4,826 in year 1.

The following is a list of all variables used organised by type and including their description and the variable name that is used in Stata12 and in all SEM diagrams and tables.

Type	**Description**	**Variable**
Organising Variables	Cross Wave Individual Identifier	Pid
	Wave	Year
	Region	Region
	Weight	qlrwtsw1
Demographics	Age	Age
	Gender	Sex
	Education	Edu
	Type of Employment	Solo
Income		
	Log of Income	Inc
Cognitive Well-Being		
	Satisfaction	Sat
	Happiness	Happy
	Happiness	Hapmnth
Positive Affect		
	Cheerful	Cheerful
	Full of Life	Fulllife
	Energy	Energy
Negative Affect	Felt Nervy	Nervy
	Felt Down in Dumps	Dumps
	Felt Downhearted	Down
Eudaimonia	Purpose	Pur
	Autonomy	Auto
	Environmental Mastery	Env
	Relationships	Rel
Personality Big 5	Agreeable	aa
	Agreeable	Ab
	Agreeable	Ac
	Conscientious	Ca
	Conscientious	Cb
	Conscientious	Cc
	Extroversion	Ea
	Extroversion	Eb
	Extroversion	Ec
	Neurotic	Na
	Neurotic	Nb
Table 6.2	Neurotic	Nc
	Openness	Oa
	Openness	Ob
	Openness	Oc

Variable Abbreviations

6.2.2 SVY Set

The following command is used to declare the dataset to be panel data:

- svyset pid [pweight=qlrwtsw1], strata(year) vce(linearized) singleunit(missing)

This uses the weighting variable described in Chapter 5., Methodology.

6.2.3 Demographics

6.2.3.1 Employment Type

Status	Freq.	%
Solo	3,214	8
Self	1,201	2.99
employ	35,764	89.01
Total	40,179	100

Table 6.3 Employment Type Frequencies

Table 6.3 shows that the sample is comprised of 3,214 observations of solo self-employed, 1,201 self-employed and 35,764 employed. Note, broken down by wave, self ranged from 143 - 160 observations per wave and solos ranged from 359 – 446.

6.2.3.2 Gender

	Solo	Self	Employed
Male	68%	72%	48%
Female	32%	28%	52%

Table 6.4 Gender Distribution

Table 6.4 shows that males comprised 68% of the solo self-employed, and 72% of the self-employed, compared to just 48% of the employed.

6.2.3.3 Age

Age	Freq.	%	Cum.
18 - 24	3,553	8.84	8.84
25 - 34	8,936	22.24	31.08
35 - 44	11,664	29.03	60.11
45 - 54	9,750	24.27	84.38
55 - 65	6,276	15.62	100
Total	40,179	100	

Table 6.5 Age Range Frequencies

Table 6.5 shows the age ranges of those sampled. Only those over the age of 18 and under 65 are included in tests run.

6.2.3.4 Education

Highest Education	Freq.	%	Cum.
None	6,120	15.23	15.23
cse + o level	13,737	34.19	49.42
a level	9,176	22.84	72.26
hnd, hnc, teaching	3,366	8.38	80.64
1st degree	6,251	15.56	96.19
higher degree	1,529	3.81	100
Total	40,179	100	

Education Level Frequencies

Table 6.6 shows the distribution of education level for the sample.

Table 6.6

6.2.4 Normalisation

6.2.4.1 Skewness, Kurtosis of all Observed Variables 2, 7.

Statistics for normalisation are provided in the following section, this includes all variables included in the sample along with demographic variables just shown. All variables conform to the minimum requirement of less than 2 skewness and less than 7 kurtosis as specified by Fabrigar et al (1999), as described in Chapter 5., Methodology, except for two negative affect variables: “past month, felt down down in the dumps” (dumps) and “past month, felt nervy” (nervy). However, both these variables conform to Kline’s (2011, p.63) minimums of 3 and 10 for skewness and kurtosis respectively.

Skewness and Kurtosis along with mean, median, minimum and maximum values, standard deviations, standard error means, are included in this section. The following Stata 12 “tabstat” command is used to generate the statistics:

- tabstat age sex edu solo, stats(mean p50 max min sd var semean skewness kurtosis) column(variable)

6.2.4.2 Demographics

stats	age	sex	edu
Mean	3.155803	0.496155	2
p50	3	0	2
Max	5	1	5
Min	1	0	0
Sd	1.191365	0.499991	1
variance	1.419351	0.249991	2
se(mean)	0.005944	0.002494	0
skewness	-0.06195	0.015382	1
kurtosis	2.103359	1.000237	2.318483

Demographics Descriptive Statistics

Table 6.7 shows descriptive statistics and normal distribution tests for the age, gender and education variables. Note, p50 refers to the 50th percentile or median.

[Table 6.7]

6.2.4.3 Income

stats	Inc
mean	9.471164
p50	9.610526
max	13.98973
min	5.014196
Sd	0.892142
variance	0.795917
se(mean)	0.004451
skewness	-1.03113
kurtosis	5.253171

Income Descriptive Statistics

Table 6.8

Table 6.8 shows the descriptive statistics for the income variable which is the natural log of annual income as described in Chapter 5., Methodology.

6.2.4.4 Cognitive Well-Being

stats	happy	sat	hapmnth
mean	3.010204	5.233878	2.374026
p50	3	5	2
Max	4	7	6
Min	1	1	1
Sd	0.564427	1.095441	0.988398
variance	0.318578	1.199991	0.976931
se(mean)	0.002816	0.005465	0.004931
skewness	-0.46922	-0.80132	1.175988
kurtosis	4.843584	3.911835	4.260585

Table 6.9

Cognitive Well-Being Descriptive Statistics

Table 6.9 shows descriptive statistics and normal distribution tests for the cognitive well-being variables happiness, satisfaction and feeling of happiness over the past month, as described in Chapter 5., Methodology.

6.2.4.5 Affect

Stats	cheerful	fulllife	Energy	nervy	dumps	down
mean	4	4.174519	4.047911	5.471639	5.50397	5.241445
p50	5	5	4	6	6	5
max	6	6	6	6	6	6
min	1	1	1	1	1	1
sd	1	1.156936	1.19905	0.887135	0.887411	0.952983
variance	1	1.3385	1.437721	0.787009	0.787499	0.908177
se(mean)	0	0.005772	0.005982	0.004426	0.004427	0.004754
skewness	-1	-0.72526	-0.68961	-1.96824	-2.09488	-1.44552
kurtosis	4	2.876682	2.751902	7.082969	7.581664	5.276695

Affect Descriptive Statistics

Table 6.10

Table 6.10 shows descriptive statistics and normal distribution tests for the affect variables as listed in Chapter 5., Methodology. As can be see, both "nervy" and "dumps" are just over 7 points in kurtosis, and "dumps" is just over 2 points in skewness. These are considered within the criteria for inclusion by Kline and the variables are used untransformed for normality.

6.2.4.6 Eudaimonia

Stats	Auto	Pur	Rel	env
Mean	3	3.49043	3.684686	3.370094
p50	3	4	4	3
Max	4	4	4	4
Min	1	1	1	1
Sd	1	0.650648	0.508289	0.708649
Variance	1	0.423343	0.258358	0.502183
se(mean)	0	0.003246	0.002536	0.003535
skewness	-1	-1.15786	-1.34195	-0.98101
Kurtosis	3	4.22851	4.222447	3.752931

Eudaimonia Descriptive Statistics

Table 6.11

Table 6.11 shows descriptive statistics and normal distribution tests for the eudaimonia variables as listed in Chapter 5., Methodology.

6.2.4.7 Personality Big 5

6.2.4.7.1 Open

Stats	oa	ob	oc
Mean	4.389009	4.402076	5
p50	4	4	5
Max	7	7	7
Min	1	1	1
Sd	1.342321	1.546446	1
Variance	1.801827	2.391495	1.77456
se(mean)	0.006697	0.007715	0.006646
Skewness	-0.19216	-0.24384	-0.45719
Kurtosis	2.766055	2.487976	2.913066

Open Descriptive Statistics

Table 6.12 shows descriptive statistics and normal distribution tests for the openness personality trait variables as listed in Chapter 5., Methodology.

Table 6.12

6.2.4.7.2 Consci

Stats	ca	cb	cc
Mean	5.572961	5.241071	5
p50	6	6	6
Max	7	7	7
Min	1	1	1
Sd	1.356735	1.564714	1.102213
Variance	1.84073	2.44833	1.214873
se(mean)	0.006769	0.007806	0.005499
Skewness	-1.45906	-0.67978	-0.87069

Table 6.13

Consci Descriptive Statitsics

Table 6.13 shows descriptive statistics and normal distribution tests for the conscientiousness personality trait variables as listed in Chapter 5., Methodology.

6.2.4.7.3 Extro

Stats	ea	eb	Ec
Mean	4.636775	4.853779	4
p50	5	5	4
Max	7	7	7
Min	1	1	1
Sd	1.536529	1.447317	1
Variance	2.360921	2.094727	2.237741
se(mean)	0.007666	0.00722	0.007463
Skewness	-0.22626	-0.40801	0.034464
Kurtosis	2.375203	2.554865	2.348386

Extro Descriptive Statitsics

Table 7.16 shows descriptive statistics and normal distribution tests for the extroversion personality trait variables as listed in Chapter 5., Methodology.

6.2.4.7.4 Agree

Table 6.14

Stats	aa	ab	Ac
Mean	5.786232	5.033849	5
p50	6	5	6
Max	7	7	7
Min	1	1	1
Sd	1.335883	1.38073	1.15353
Variance	1.784582	1.906416	1.330631
se(mean)	0.006665	0.006888	0.005755
Skewness	-1.31638	-0.66753	-0.90651
Kurtosis	4.406218	2.972095	4

Agree Descriptive Statitsics

Table 6.15

Table 6.15 shows descriptive statistics and normal distribution tests for the agreeableness trait variables as listed in Chapter 5., Methodology.

6.2.4.7.5 Neuro

Stats	na	nb	Nc
Mean	3.77879	3.428906	4
p50	4	3	3
Max	7	7	7
Min	1	1	1
Sd	1.649391	1.600653	1
Variance	2.720491	2.56209	2.006556
se(mean)	0.008229	0.007985	0.007067
Skewness	0.15944	0.291831	0.281009
Kurtosis	2.17179	2.259637	2.500075

Table 6.16

Neuro Descriptive Statitsics

Table 6.16 shows descriptive statistics and normal distribution tests for the neuroticism trait variables as listed in Chapter 5., Methodology.

6.2.5 Means Tests

As described in Chapter 5., Methodology, all means tests, run by the command “svy: mean” are provided in this section. This provided 8 strata of data and 40179 observations. The command run in Stata 12 is:

- svy: mean varlist, over(solo)

Where varlist is the variables listed in the table displayed in each subsection and solo refers to the employment type variable.

6.2.5.1 Income

	Variable	Mean	Std. Err.	95% C.I.	
Inc					
	Solo	9.183583	0.023205	9.1381	9.229066
	Self	9.683483	0.041993	9.601176	9.76579
	Employ	9.484356	0.006221	9.472164	9.496549

Income Means Tests

Table 6.17

Table 6.17 shows that the mean log income for the solo self-employed is 9.18 compared to 9.48 for the employed and 9.68 for the self-employed. All 3 groups confidence intervals show the 3 mean values are statistically unique, in that the confidence intervals do not overlap. This provides strong evidence to support the first hypothesis, H1, that the solo self-employed earn the least compared to the self-employed and employed.

Below is a box and whisker plot to further explore the "disconnect" in income described at the bottom of Section 1.3.2. As discussed in Chapter 1., Introduction, there appears to be a disconnect between the high level of earnings of the solo segment, which excluded "freelancers" i.e. average earnings of above £45,000 based on total solo earnings (including freelancers) of £237 billion in 2015; and the U.N. and International Labor Organization definition of own account workers as those who are "vulnerable" with "inadequate" earnings.

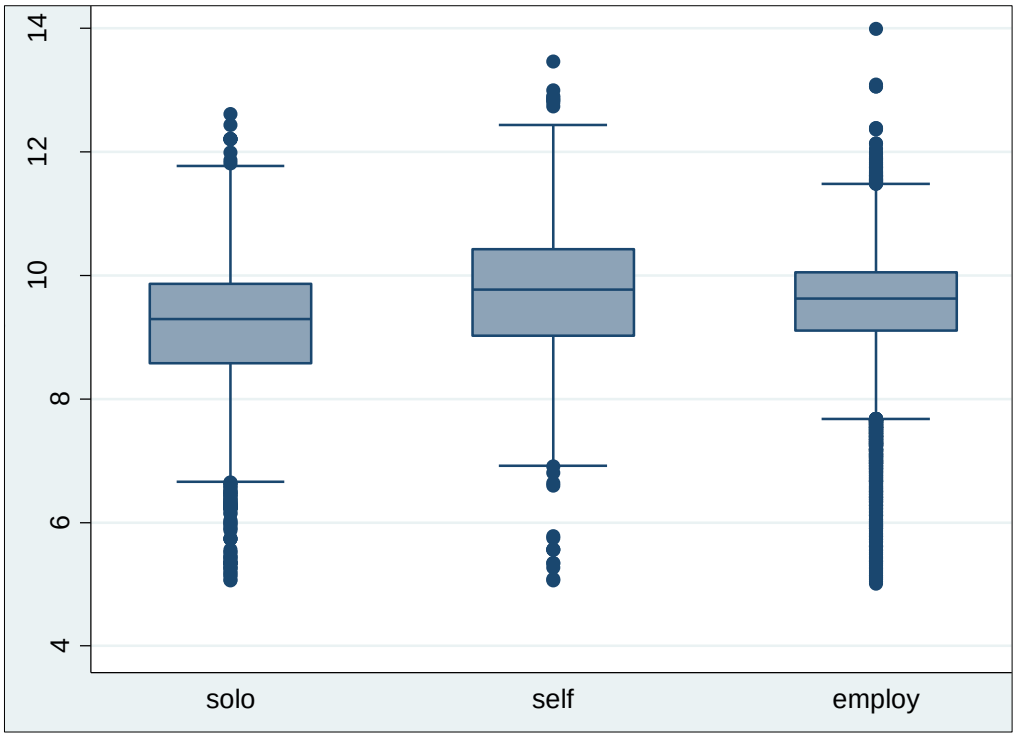


Figure 6.1 Box and Whisker Plot of Income (Natural Log)

Figure 6.1 emphasises that there are a number of high earning solos which may contain so called "freelancers". The mean income for solos was £15,370, the 25th percentile £5304, 75th percentile £19,150, the highest observed annual income was £300,000. There were 157 solos who earned over £45,000 in the sample i.e., 5% of the sample, 16% who earned over £25,000.

In section 1.3.2 in Chapter 1, freelancers were estimated to earn on average £69,000 per year in 2015. £49,000 x 1.037 (10) would lead to approximately £69,000 i.e., assuming 10 years of income growth at 3.7% per annum –in 2005 there were only 14 solos who earned over £49,000. The point here is that this is clearly not close to the 46% of estimated freelancers in the population (who should be earning 150% above average earnings of an employed person).

6.2.5.1.2 (SIC) Standard Industrial Classification Codes 1992

To further understand the sample an analysis of the industrial codes was undertaken. The below graph shows the frequencies and mean income of categories for solos.

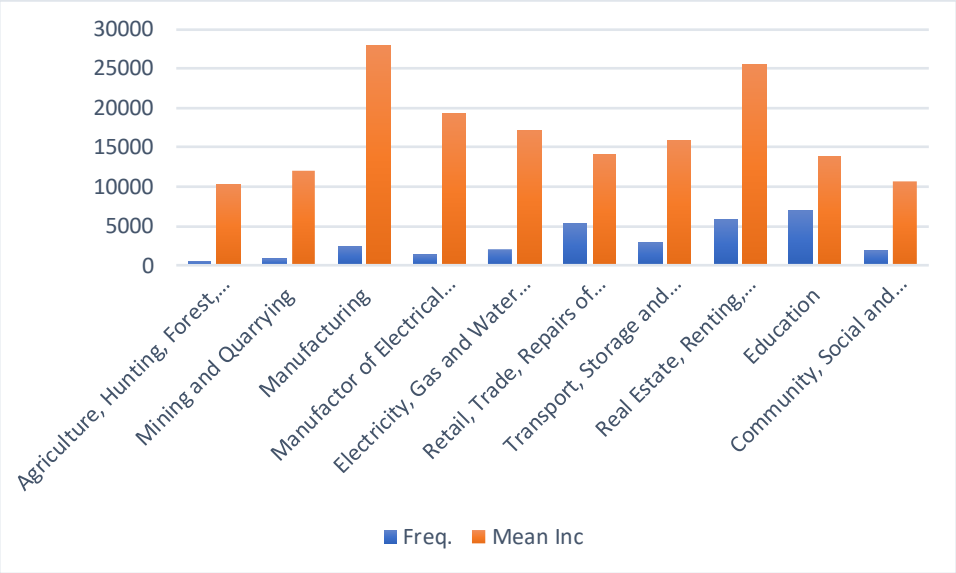


Figure 6.2 SIC 1992 Categories for Solos

The most profitable sector was manufacturing with average earnings for solos of £27,828. The most populous individual category was taxis with average earnings of £15,943.26.

The below pie chart looks at the top 50% i.e., the most populous categories.

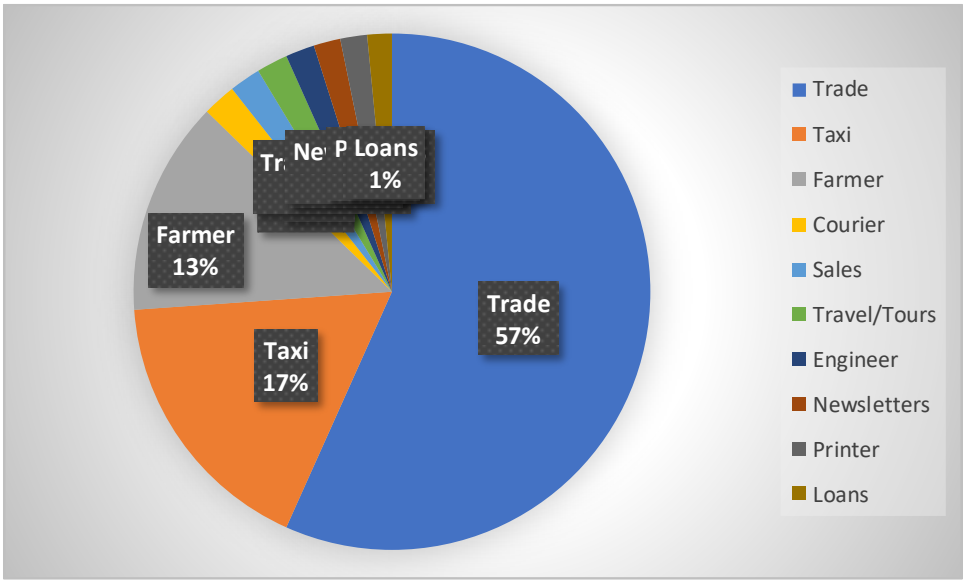


Figure 6.3 Distribution of the Top 50%

Trade is an aggregate category, which is why it is larger than taxis. It comprises builders, construction workers, plumbers, electricians, joiners and mechanics.

6.2.5.2 Cognitive Well-Being

Variable	Mean	Std. Err.	95% CI	
Happy				
Solo	3.035654	0.012239	3.011665	3.059644
Self	3.022325	0.021817	2.979563	3.065086
Employ	3.006918	0.004094	2.998893	3.014942
Sat				
Solo	5.296744	0.025516	5.246732	5.346756
Self	5.372266	0.035165	5.303342	5.441191
Employ	5.19645	0.007463	5.181822	5.211078
hapmnth				
Solo	2.210075	0.01938	2.172089	2.248061
Self	2.308077	0.03537	2.238751	2.377403
Employ	2.403785	0.006739	2.390577	2.416994

Cogntive Well-Being Means Tests

Table 6.18

Table 6.18 shows the means of the cognitive well-being variables. The solo self-employed are shown to be the happiest group overall, however the figure is misleading as the confidence intervals overlap. The solo self-employed can be said to be statistically more satisfied than the employed, but not more satisfied than the self-employed. The final figure, "past month, felt happy", the solo-self employed were statistically less happy than the employed but not the self-employed. This provides partial support to H2, that solos have the highest hedonic well-being.

6.2.5.3 Affect

Variable	Mean	Std. Err.	95% CI	
cheerful				
solo	4.562809	0.022555	4.518601	4.607018
self	4.52985	0.034103	4.463008	4.596693
employ	4.437286	0.007115	4.423341	4.451232
fulllife				
solo	4.345503	0.0249	4.296698	4.394308
self	4.228983	0.04104	4.148543	4.309424
employ	4.159975	0.007827	4.144635	4.175315
energy				
solo	4.173896	0.025811	4.123306	4.224486
self	4.08249	0.041466	4.001216	4.163765
employ	4.030876	0.008082	4.015036	4.046717
nervy				
solo	5.52161	0.019412	5.483562	5.559657
self	5.435239	0.035776	5.365118	5.50536
employ	5.444979	0.006284	5.432662	5.457296
dumps				
solo	5.627354	0.015872	5.596245	5.658462
self	5.641672	0.025398	5.591892	5.691452
employ	5.473244	0.0063	5.460897	5.485592
down				
solo	5.304265	0.020997	5.263111	5.345419
self	5.262979	0.036018	5.192383	5.333576
employ	5.210657	0.006653	5.197617	5.223698

Tableau 29

Affect Means Tests

The solo-self-employed are more cheerful than the employed, more-full of life and more energetic than the employed, but not the self-employed, who are within the same statistical range for all variables. For the negative affect variables, solos are less-nervy, down in the dumps and down hearted than the employed and the self-employed, except for down in the dumps, where self are less.

This also provides partial support to H2, that solos have the highest hedonic well-being.

6.2.5.4 Eudaimonia

	Variable	Mean	Std. Err.	95% C.I.	
Auto					
	Solo	3.067129	0.018954	3.029979	3.104279
	Self	3.104836	0.026963	3.051988	3.157683
	Employ	3.063106	0.005483	3.052359	3.073853
Rel					
	Solo	3.673955	0.010861	3.652667	3.695243
	Self	3.670265	0.018029	3.634927	3.705603
	Employ	3.693252	0.003453	3.686485	3.700019
Env					
	Solo	3.321427	0.017675	3.286785	3.35607
	Self	3.408067	0.024647	3.359759	3.456375
	Employ	3.372848	0.004872	3.363299	3.382398
Pur					
	Solo	3.546149	0.014966	3.516815	3.575483
	Self	3.568158	0.022129	3.524785	3.611531
	Employ	3.46794	0.00447	3.45918	3.4767

Eudaimonia Means Tests

Table 6.20

(Note, please refer to table 6.2, Variable Abbreviations, above for explanation of terms e.g., Pur = purpose).

There are no statistical differences in the sense of autonomy in any of the groups, or the positive relationship and environmental mastery eudaimonia variables. However, the sense of purpose or life has meaning variable clearly shows the employed as having statistically less sense of purpose than the solos and self-employed.

6.2.5.5 Personality Big 5

(Note, please refer to table 6.2, Variable abbreviations for explanation of terms e.g., oa = the first openness question).

6.2.5.6 Open

	Variable	Mean	Std. Err.	95% C.I.	
oa					
	Solo	4.729005	0.029964	4.670275	4.787736
	Self	4.64817	0.048829	4.552465	4.743875
	Employ	4.378863	0.009249	4.360734	4.396992
ob					
	Solo	4.735289	0.037699	4.661397	4.80918
	Self	4.641422	0.053163	4.537221	4.745623
	Employ	4.435397	0.010445	4.414925	4.455869
oc					
	Solo	5.203935	0.030239	5.144667	5.263203
	Self	4.957227	0.050705	4.857844	5.056611
	Employ	4.92633	0.009101	4.908491	4.944169

Open Means Tests

Table 6.21

In all three questions, solos report more openness to new ideas than the employed, and in only two out of three questions do the self-employed report higher openness.

6.2.5.7 Consci

	Variable	Mean	Std. Err.	95% C.I.	
ca					
	Solo	5.614942	0.032462	5.551316	5.678569
	Self	5.64188	0.047523	5.548733	5.735027
	Employ	5.576	0.008998	5.558364	5.593636
cb					
	Solo	5.285958	0.037087	5.213267	5.358649
	Self	5.343911	0.0573	5.231602	5.45622
	Employ	5.165357	0.010881	5.144029	5.186684
cc					
	Solo	5.449407	0.025045	5.400319	5.498496
	Self	5.446797	0.038071	5.372176	5.521417
	Employ	5.381669	0.007381	5.367202	5.396136

Consci Means Tests

Table 6.22

In all 3 questions, the solos report higher levels of conscientiousness than the employed, in only 1 out of 3 do the self-employed report higher levels of conscientiousness, question CB.

6.2.5.8 Extro

	Variable	Mean	Std. Err.	95% C.I.	
ea					
	Solo	4.66618	0.035565	4.596472	4.735888
	Self	4.562148	0.051644	4.460925	4.66337
	Employ	4.682455	0.010401	4.66207	4.702841
eb					
	Solo	4.900626	0.031984	4.837936	4.963316
	Self	4.812438	0.048983	4.716429	4.908446
	Employ	4.882584	0.009729	4.863515	4.901653
ec					
	Solo	4.159217	0.035034	4.09055	4.227883
	Self	4.254642	0.057417	4.142104	4.36718
	Employ	4.118279	0.010091	4.0985	4.138058

Extro Means Tests

There are no statistical differences in extroversion questions between the 3 employment types.
Table 6.23

6.2.5.9 Agree

	Variable	Mean	Std. Err.	95% C.I.	
aa					
	Solo	5.667312	0.034631	5.599435	5.735189
	Self	5.600578	0.055064	5.492653	5.708504
	Employ	5.720256	0.009585	5.701471	5.739042
ab					
	Solo	4.971724	0.031567	4.909851	5.033597
	Self	4.931808	0.048992	4.835783	5.027832
	Employ	5.03507	0.009244	5.016952	5.053188
ac					
	Solo	5.433015	0.025856	5.382337	5.483692
	Self	5.187003	0.042716	5.10328	5.270727
	Employ	5.430356	0.007639	5.415384	5.445328

Table 6.24 Agree Means Tests

In only one agreeability question, AC, are the groups different. AC shows that the self-employed report lower levels of agreeability than the solos and employed.

6.2.5.10 Neuro

	Over	Mean	Std. Err.	95% C.I.	
na					
	Solo	3.526249	0.037044	3.453641	3.598856
	Self	3.587085	0.057294	3.474788	3.699382
	Employ	3.822548	0.011217	3.800563	3.844533
nb					
	Solo	3.211396	0.0357	3.141424	3.281368
	Self	3.174435	0.053857	3.068875	3.279995
	Employ	3.494086	0.010925	3.472672	3.515499
nc					
	Solo	3.421044	0.031563	3.359179	3.482909
	Self	3.425304	0.0515	3.324363	3.526245
	Employ	3.608534	0.009808	3.589311	3.627757

Table 6.25 Neuro Means Tests

In the neuroticism variable, in all 3 questions the employed report the highest scores, solos and self-employed are statistically no different.

6.3 Direct Effects

The remainder of this chapter refers to Table 1 in Chapter 9, Appendix, section 9.1. Table 1 is a condensed summary of all six direct paths, by three employment types, with variations based on the five traits by each of the four types of hedonic well-being – this leads to a table that contains 342 path betas, below each of these betas are p values to two decimal places. (Note that there was no convergence on the openness hedonic model, and therefore that column is left blank).

HG1 (Income to Hedonic) was supported for solos (average $\beta = 0.0466$, $p < 0.01$). Models containing affect were substantially stronger in effect than cognitive well-being for all employment types.

For solos, income to negative affect was the strongest relationship, with solos also exhibiting the strongest average effect ($\beta = 0.09$, $p < 0.01$) compared to self and the employed. Positive affect was also strong, with again, solos having the strongest average effect across employment types. In models containing traits, there was little variation (average β's ranged from 0.03 for neuro, to 0.06 with $p < 0.01$ for both open and consci) for solos. Surprisingly, models containing neuroticism led to a negative ($\beta = -0.02$, $p < 0.01$) relationship between income and cognitive well-being for both solos and the employed. In models containing consci, there was no observed relationship for income to cognitive for all groups. Only solos showed a relationship for income to cognitive in the openness model.

HG2 (Income to Eudaimonia) was supported for solos, except in models containing openness. Solos had the strongest average relationship between income and eudaimonia ($\beta = 0.0222$, $p < 0.01$). For solos, models containing agreeability were the strongest ($\beta = 0.03$, $p < 0.01$ for all hedonic models). For solos and the employed, models containing openness were all insignificant ($p > 0.1$). Models containing consci was weakest, (ranging from $\beta = 0.01 – 0.02$, $p < 0.01$). For models containing neuroticism, income was negatively related to eudai ($\beta = -0.02$, $p < 0.1$) for self.

HG3 (Income to Traits) was supported as income was shown to be related to all traits for all employment types. Solos had the strongest overall relationship between income and personality. Income was most strongly related to emotional stability for all groups with the effect strongest for solos (average $\beta = 0.22$, $p < 0.01$). Income was negatively related to

extroversion and agreeableness, or positively related to introversion and disagreeableness for all groups. Income had the smallest effect on conscientiousness for all groups.

HG4 (Traits to Hedonic) was partially supported for solos. For all groups, emotional stability had the strongest effect on hedonic well-being, especially on reducing negative affect (for solos $\beta = 0.26$, $p < 0.01$). For solos, disagreeability was strongly related to negative affect (b-0.16, $p < 0.01$). For solos, negative affect was reduced by closed to ideas (b-0.11, $p < 0.00$), and cog was increased (b-0.03, $p < 0.01$).

HG5 (Traits to Eudaimonia) was partially supported for solos. Solos had the strongest relationship between personality and eudaimonia compared to the other employment types, but, consci, extro and neuro are excluded from the average, because they were all insignificant ($P > 0.1$). For solos, agreeable to eudai was the strongest, overall ($\beta = 0.25 – 0.26$, $p < 0.01$) for solos, while openness was also strong ($\beta = 0.13$, $p < 0.01$). Both self and the employed had strong responses across more trait to eudai paths, with only consci for self's models being insignificant.

HG6 (Eudaimonia to Hedonic) is supported for solos who had the weakest average betas compared to other employment types, however, these values were still high, compared to other hypothesis sets - especially in the eudai to positive affect in the openness model ($\beta = 0.45$, $p < 0.01$).

Models containing openness led to the highest relationship between eudaimonia and hedonic for all employment types. Eudai to negative affect was the strongest on average across all traits, for self. For solos, eudai to positive affect was strongest.

6.4 Total Effects

There are 4 potential mediations:

- HG7: For HG1, income to hedonic, this path can be mediated by traits.
- HG8: For HG1, income to hedonic an also be mediated by eudaimonia.
- HG9: For HG2, Income to eudaimonia, this path can be mediated by traits.
- HG10: For HG4, Traits to hedonic, this path can be mediated by eudaimonia.

Note, while it is tempting to consider other mediation paths, the arrows (or direction of path) are structured in such a way that other mediation paths are not feasible. For example, income

to eudaimonia cannot be mediated by negative affect as this would require the mediator negative affect to predict eudaimonia, however in this model and, in the theoretical model justification, this is not possible i.e. negative affect, a form of hedonic well-being, is an outcome of the functional eudaimonic well-being. Negative affect is assumed to be caused by eudaimonia (hence the direction of the arrow points from eudaimonia to negative affect) theoretically, not the other way around as eudaimonia contain practical components (such as environmental mastery) which can be directly changed by the actions of the individual and hedonic well-being is assumed to be the outcome.

HG7: For HG1, income to hedonic, mediated by traits: For HG1 there are two potential mediators, trait and eudaimonia. For trait, mediation (as described in Mediation section above) is calculated by taking the % of the indirect effect of the total effect. The direct effect is income to hedonic, or HG1 just explored. The indirect effect is HG3 (the income to trait path) multiplied by HG4 (the trait to hedonic path).

In terms of mediation for income to positive and negative affect, neuroticism mediated the relationship by 72% and 54% respectively. In other words, the total effect of $\beta = 0.06$ ($p < 0.01$) from income to positive affect was almost completely explained by neuroticism. The Income to Neuroticism path had a $\beta = -0.22$ ($p < 0.01$) in the positive affect model, while, in HG4, the Neuroticism to Positive Affect path, had a $\beta = -0.21$ ($p < 0.01$). Note, that the negative beta indicates that income is related to emotional stability, and emotional stability is related to positive affect. Therefore, 72% of the total effect of income on positive affect is explained by the mediating effect of emotional stability. Similar conclusions can be drawn for negative affect and emotional stability.

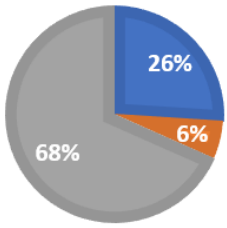
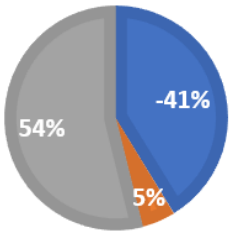
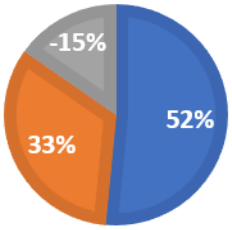
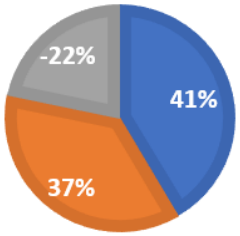
For income to cognitive well-being, openness, extroversion and agreeability all had negative indirect effects, these amounted to -104%, -42% and -110% respectively. (Negative values and values greater than 100% indicate inconsistent mediation i.e., where mediation is present, but the indirect effect is a different sign to the direct effect.) This indicates that these traits are suppressing the direct effect of income to cognitive well-being as it contributes to the total effect. The negative indirect effects are caused by negative coefficients in either HG3 or HG4. In the openness trait, income to openness is positive, and openness to cognitive is negative i.e., while income leads to more openness, this openness leads to a lowering of cognitive well-being.

For the neuroticism model of income to cognitive well-being, the indirect effect was positive and 426% of the total effect. This helps explain the unusual finding (described above) of why the model containing neuroticism had a negative beta on the income to cognitive path ($\beta = -0.02$, $p < 0.01$). Income to neuroticism was negative and neuroticism to cognitive is also negative. This means that as income is positively related to emotional stability and emotional stability is positively related to cognitive well-being, the total effect of income to cognitive well-being, is strongly inflated by the indirect mediation of emotional stability. The remaining relationships had mediations of less than plus or minus 20% of the total effect and will not be commented on, except the negative affect model mediated by agreeability, as this was unusual.

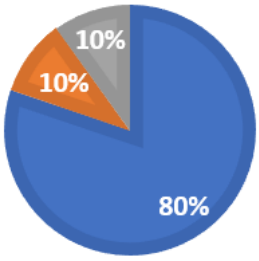
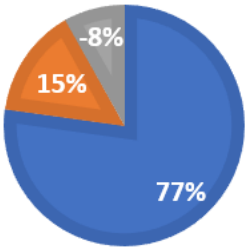
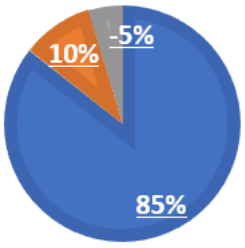
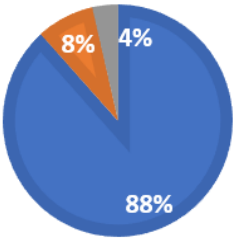
In the income to negative affect mediated by agreeability model, the indirect effect was positive due to both HG3 and HG4 paths being negative i.e. income to agreeability ($\beta = -0.07$, $p < 0.01$), and agreeability to negative affect ($\beta = -0.16$, $p < 0.01$). This indicates that income is positively related to disagreeability, and unusually, disagreeability is positively related to a lowering of negative affect (i.e., if the negative affect figure increases, this means that negative affect is better, or reduced). The total effect was $\beta = 0.1033$ ($p < 0.01$), the second highest total effect. However, the indirect effect was only 11%, so disagreeability mediation explained a small, but unusual, part of the total effect of income's positive relationship with negative affect.

HG8: For HG1, income to hedonic, mediated by eudaimonia: The eudaimonia mediation effect is much simpler to estimate. Eudaimonia mediated the total effect of the relationship between income and cognitive well-being, positive affect, negative affect and hedonic total by 44%, 12%, 7% and 12% respectively. Apart from the neuroticism model, which was not included in the average, no inconsistent mediation was observed.

For HG1, combining HG1 mediators (traits and eudaimonia): HG1 had two mediators, eudaimonia and traits. Looking at this path and these mediators provides the most complete analysis of the model of all as it looks at the most direct and indirect paths (i.e. only HG1 had two possible mediators, HG2 and HG4 had only one each). In SEM it is possible to combine the indirect effects to produce a meaningful total effect for both mediators of the same path. In this case, combining mediations gives the most comprehensive picture for determining the overall theoretical, empirical, practical and policy implications of the findings. There were eight combined charts (below) possible (insignificant paths are not included) for the mediators, traits and eudaimonia, of the income to hedonic path.

Inc to +ve affect mediated by Neuro and Eudai	Inc to Cog mediated by Neuro & Eudai	Inc to Cog mediated by Extro & Eudai	Inc to Cog mediated by Agree & Eudai
			

% Direct % Eudai % Trait

Inc to -ve affect mediated by Disagree and Eudai	Inc to Hed mediated by Agree and Eudai	Inc to Hed mediated by Extro and Eudai	Inc to Hed mediated by Consci and Eudai
			

% Direct % Eudai % Trait

Table 6.26

Total Effects

For half of these, the direct effect was over 75% of the total effect. Extroversion, conscientiousness and agreeable had little mediating effect on hedonic total. For those traits, income was far important in raising hedonic total well-being. For Income to negative affect, the mediators both played indirect mediations of 10% each overall, while this is a small effect it is unusual, as mentioned.

This means that actually, income is more important for well-being for more personality types, than their individual traits and eudaimonia. However, this was not the case for neuro.

In the income to cognitive mediated by extroversion/agree and eudaimonia models, traits were both negative, meaning that the paths to the mediator were of opposite signs. In both cases, income to trait was negative, meaning, income is associated with rises in introversion and disagreeableness, but rises in extroversion and agreeableness are associated with rises in eudaimonia. These indirect trait effects are weaker than the indirect eudaimonia effects (a

reminder that the indirect effect of eudaimonia is the product of income to eudaimonia and eudaimonia to cognitive for both models). The direct effect is important for both models.

Inc to +ve affect & cog med by Neuro and eudai: Results Description: For income to cognitive and positive affect, neuroticism had 54% and 68% indirect effects respectively, while the direct effect was -41% and 26%, while the eudaimonia effect was under 6% for both. For the cognitive model, an unusual negative direct relationship was observed indicating in this chart also, that emotional stability strongly inflated the total effect. For income to positive affect, emotional stability strongly inflated the total effect also. Note that the indirect effect of neuro being positive is determined by the product of the two negative paths of income to neuro and neuro to negative affect/cognitive (the product of these is positive).

HG9: For HG2, income to eudaimonia, mediated by traits: For HG2, only agreeableness was found to mediate income to eudaimonia for solos. The indirect effect across the different hedonic models was negative due to the income to agreeability path being negative i.e. that income is associated with a rise in disagreeability. The net effect is that income rises associated with disagreeability are creating a negative indirect effect on the positive association of income to eudaimonia – even though agreeability is related to a rise in eudaimonia.

The spectre of income on the relationship is distorting the otherwise positive effect of eudaimonia on negative affect.

HG10: For HG4, traits to hedonic, mediated by eudaimonia: There were only findings for openness and agreeability. For Openness, while the direct effect of openness to cognitive was negative, this was offset by an indirect effect of eudaimonia. The reverse was true for negative affect. For agreeability, both the direct and indirect affects contributed to an improved cognitive position, with a total effect of $\beta = 0.13$, compared to a direct effect of $\beta = .07$, eudaimonia clearly boosted the relationship for agreeable solos.

For negative affect, agreeability was negatively related at $\beta = -0.16$, the total affect was negative also, at $\beta = -0.08026$, indicating that the indirect effect of eudaimonia reduced this effect. As negative affect could be improved by disagreeability, this also indicates that agreeability can improve eudaimonia, which can also improve negative affect at $\beta = 0.33$. So, while the impact of agreeability on negative affect remains, overall (or in total), negative, this is greatly reduced by improved eudaimonia.

6.5 Conclusion

This Results chapter has firstly presented descriptive statistics of the sample population, including demographics, skewness tests and means testing of all constructs utilized. The chapter then presented the findings in terms of the Direct effects of the first six hypotheses. All hypotheses were at least partially supported with most fully supported. The total effects in terms of mediation and total SEM outcomes were then presented, with 8 unique cases that presented the most complete utilization of the theoretical model. The next section discusses the implications for research and practice.

Chapter 7. Discussion

7.1 Introduction

When looking at the theoretical, empirical and practical implications of all models, it is important to distinguish between the types of findings. Initially, it makes sense to examine each direct path, as many papers and practitioners are interested in single dimensions. So, for example, income to hedonic well-being, is a single path, single hypothesis. The primary conclusions for the income to hedonic-well-being path were that affect was stronger than cognitive well-being, solos having a strong (the strongest) income to negative affect relationship and there were some unusual findings, for example, in models with neuroticism, income to cognitive well-being was shown to be negatively related. This leads to the implication that theorists need to be aware of not just cognitive well-being in looking at income's impact on hedonic well-being.

The central model of this thesis connects the income to hedonic path and hypothesis through SEM, and therefore there are simple mediations and combined model total effects that should be examined. For example, traits and eudaimonia were shown to mediate the income to hedonic path in many cases. These mediators were shown to both inflate the total effect of income to hedonic and these combined to a grand total effect which belies the impact of just income or just eudaimonia or just personality on an individual solos hedonic well-being.

This has important implications for theory, empirics and practice, such as, how relative income judgements of solos may be lessened by increased eudemonic autonomy; how traits and eudemonia are measured (i.e., in distinguishing between negotiating behaviour for disagreeability and healthy relationships in the overall self-judgement of a solo's personality and eudemonic person).

As such, in this Discussion, first, direct paths are discussed in terms of the findings contribution and impact on theory, empirical research and policy/practice; then simple mediations; and then combined total mediation effects for the model.

7.2 Theoretical Contribution

The direct effects will be discussed first.

For HG1, the income to hedonic path, the income to cognitive well-being path is a well-researched topic (Clark and Oswald, 1996; Easterlin, 1974; 2001; Diener and Oishi, 2000), one contribution this thesis makes is not only confirming this relationship exists but exposing that the relationship is particularly strong for solos. The direct path held little variation across most traits for cognitive well-being, except, notably, for neuroticism, which implies that the income to cognitive well-being relationship is important for all types of personalities and is more dependent on employment type. For solos, however, there was no observed income to cognitive relationship when conscientiousness was included, indicating that those who are conscientious are likely to continue being conscientious, regardless of the gains to cognitive well-being i.e., solos just get on with it. Solos were the only group who had a relationship between income and cognitive in the openness model, indicating that those who are open to new ideas who are solos are particularly responsive in terms of cognitive well-being to small rises in income. Models containing neuroticism distorted the income to cognitive relationship. The neuroticism finding emphasizes that improvements in mental health can help those high in neuroticism produce gains in cognitive well-being, but only by enhancing their emotional stability may enable them to derive cognitive well-being from income.

While income can be seen as less effective for traditional measures of subjective well-being (e.g., Layard et al., 2013), looking at affect, can have an important change for solos. This thesis adds to the literature by going further than cognitive well-being in distinguishing the different types of hedonic well-being and showed that for all employment types both positive and negative affect had a much stronger relationship association with income than cognitive well-being and, for solos, negative affect was the strongest. The income to negative affect relationship was strongest overall, and especially for solos, where this relationship was the strongest overall including compared to all other employment types.

This thesis adds to the literature by highlighting the income to negative affect as particularly important for solos. Recall that negative affect is based on not feeling "in the dumps", nervy or feeling "down", these important feelings are particularly acute in solos, and this demonstrates that small rises in income can greatly improve this aspect of their well-being.

The strong relationship between income and cognitive well-being and affect models for solos can be explained by inverse income, reference income or relative income theories (Veblen, 1899; Duesenberry, 1949; Pollak, 1976; Easterlin, 1974, 1995, 2001; Veenhoven, 1988, 1991;

Van de Stadt et al., 1985; Diener et al., 1993; Luttmer, 2005; Caporale et al., 2008; Clark et al., 2008; Oishi et al., 2011; Georgellis et al., 2017). Solos may well be less affected by reference income due to the nature of their intrinsic isolation i.e. this is exacerbated by the lack of an organization of peers.

For HG2 the income to eudaimonia path, in almost all examples of well-being research the relationship between income and well-being relates to hedonic well-being. However, this thesis demonstrates a clear relationship between income and eudemonic well-being. This has important implications for the economics of well-being literature, particularly for solos, who derive the most eudaimonia from income, and also, in relation to the previous finding, on income to hedonic well-being - as will be demonstrated in the mediation section, these two findings are connected i.e. in that solos derive more hedonic well-being from income, because they derive more well-being from eudaimonia. Existing research papers have demonstrated income is positively associated with purpose, moderated by positive affect (Ward and King, 2016), and this thesis refines that finding by more accurately identifying the income to positive affect as the direct affect, and purpose (as a component of eudaimonia), as a mediator (this is fundamentally based on Aristotle, whose works state that eudaimonia causes hedonic well-being). Therefore, one contribution of this thesis to the field is to clarify the distinction between moderators and mediators in these examples i.e. to clearly place income prior to eudemonia in the mediation section.

For HG3 the income to traits path, there is a growing body of research which argues that traits change as much as income and this may be caused by economic factors (Costa and McCrae, 1980, 1988; Boyce et al, 2012; Boyce et al, 2015). This thesis adds to this research by demonstrating that changes in income is associated with changes in traits. There was strong support for this hypothesis across all traits and employment types with solos having the strongest average support. The strong support solos have for this relationship is likely due in part to lower income and possibly is a reason why they are unsuited to employment i.e., their personality 'responses' to income changes precludes them from involvement in organizations (this is difficult to establish without further research, but it opens an avenue for discussion). Income was positively related to emotional stability, introversion and disagreeableness for all groups; while income had the smallest effect on conscientiousness for all groups. The implication here is that as individuals become richer they have improved mental health, become more insular and become ruder and less forgiving, while, regardless of changes in income,

individuals level of conscientiousness does not change. The main difference between the groups is that solos have the strongest response. This has implications for trait economics and the self-employment literature.

For HG4 the traits to hedonic path, this thesis confirms an existing strong relationship (Mack, 2012; Costa and McCrae, 1980; Pavot et al., 1990, Diener and Lucas 1999; Ferrer-i-Carbonell and Frijters 2004) for most employment types, but for solos, the relationship was only partially confirmed, with unusual findings related to disagreeability. Emotional stability reduced negative affect, which was to be expected. But, with solos, closed to ideas was associated with a strong reduction in negative affect, as was disagreeability. Solos, who have a unique position of being intrinsically alone with no resources of a company to support them and have lower income, may be responding with unusual trait manifestations i.e. it may be a practical response to the need to generate sales, which require negotiation, which is related to disagreeability. As a sale is made, this can increase disagreeability due to negotiation, and lead to a lower negative affect, as a positive hedonic response. Being open to ideas is more likely to be necessary for the self-employed, who need to take on board others opinions, much as employees in organizations, but solos are not in such a situation and only need to listen to themselves, hence it may generate a positive hedonic response (through reduced negative affect) that is caused by a closing off of ideas to all but their own - i.e. it may even be necessary to increase their focus.

For HG5, the traits to eudaimonia path, while hedonic well-being is gaining traction in economic models, eudaimonia, the functional side of well-being, is still poorly understood. Ryff (1989) has led the field and has indicated that there may be overlap between traits and eudaimonia, yet there are few papers who explore this dynamic (Simmering et al., 2003; Barrick and Mount, 1993). One of the central contributions of this thesis is to distinguish between the personality and eudemonic self. In addition, while the trait to hedonic relationship is well-established, the relationship between traits and eudaimonia is relatively unexplored.

In the trait to eudaimonia direct effect, neuro, consci and extro were all rejected for solos, however, openness and agree was positively related and the effect was strongest for solos in the agree group, and second strongest in the openness. This was not the case for self, which only had consci rejected, and the employed, where all traits were positively associated with eudaimonia. This thesis is not concerned primarily with the self employed or the employed, but nonetheless, this finding adds to the literature for these groups. The trait to hedonic finding

is well-known, but this trait to eudemonic finding, while not well known, is equally important for economic and psychology researchers to consider.

For solos, there was little difference across the hedonic well-being models. Paradoxically, to the disagreeability to negative affect finding in the last section, it was agreeability, not disagreeability that was strongly related to eudaimonia, including in the negative affect model. However, the major caveat to this finding relates to the covariances. Recall that all models containing agreeability were required to covary with relationships and autonomy in the eudiamonia latent variable. In all models containing agreeability, the covariance of agreeability to autonomy was negative, unlike relationships. So, disagreeability may both increase autonomy and reduce negative affect for solos.

For HG6 the eudaimonia to hedonic path, this path should be the most expected most researched direct effect, given that this relationship is directly based on Aristotle, yet the relationship remains under-researched with few examples (e.g. Kashdan and Biswas-Diener, 2008; Starkey, 2006; Kauppinen, 2013; Epstein, 2003; Krull et al., 2006; McGregor and Little, 1998). This thesis adds to the literature by reemphasizing the Aristotelian delineation, distinguishing clearly between eudaimonic and hedonic well-being, and establishing that this relationship exists; and, demonstrating that the different employment types use their eudaimonic person and personality in tandem in very different ways to each other.

The thesis adds to the hedonic and personality literature in particular by contradicting the finding that "Personality is the strongest and most consistent cross-sectional predictor of high subjective well-being" (Boyce et al, 2013) even stronger than income – this is consistent with the first proposition (P1) listed in the theoretical model, that eudaimonia is the strongest predictor of hedonic well-being. The HG6 finding shows clearly that eudaimonia is a much stronger predictor (meaning it is positively associated) of hedonic well-being than either income and personality. For all employment types, average betas ranged from 0.05 to 0.11 for traits, and a much higher, 0.25 to 0.33 for eudaimonia, while average betas for income were all below 0.05.

While eudai had a much stronger impact on negative affect in the self-employed than the solo compared to all other groups on average, coefficients were very high for this path. The eudai to hedonic relationship was clearly important for all groups, traits, employment types - models containing openness were the strongest overall. Purpose, relationships, autonomy and

environmental mastery combined in a latent variable all led to the strong predicted hedonic well-being response in all groups. Positive affect was the most important relationship for solos on average. Compared to self, the biggest difference was in eudai to negative affect, with eudai having a much stronger response for self to negative affect. This indicates that while solos use their personality and autonomy to reduce negative affect, the self-employed with employees may use their whole eudemonic self only to reduce negative affect, not their personality. For solos in the neuro group, negative affect was rejected, this indicates that solos with mental health issues have worse negative affect than other groups.

As has been highlighted by the trait to eudemonic, income to eudemonic paths and trait to hedonic paths, disagreeability and eudaimonic autonomy (in particular) may be responsible for why solos derive more hedonic well-being on average from income than other groups. With increased disagreeability from negotiation leading to a lowering of negative affect, and an increase in eudaimonic autonomy, which leads to an increase in hedonic well-being, some solos find their sweet spot of life, which, even in the face of low income, may be better, on average, than other, richer, employees and self-employed individuals. While this conclusion taken from the direct effects seems counterintuitive and gives rise the "poor but happy" thesis, there are major caveats to be had when looking at total effects with trait and the hedonic variations.

While conclusions can be drawn about income to hedonic well-being, both personality and eudaimonia play important parts in explaining the *total effect for solos*.

HG7: For HG1 the income to hedonic path, mediated by traits, this thesis made explicit a mediation relationship with traits which connected two well-established findings, i.e., income is known to be associated with hedonic well-being and personality is also known to be associated with hedonic well-being. The finding does support Boyce et al (2012, 2015), i.e. the personality change hypothesis; but does not support Boyce and Wood (2011), Soto and Luhman (2013) or Proto and Rustichini (2012) i.e., the personality as a moderator hypothesis (both these trait change and trait moderator hypotheses were discussed in the theoretical model section). To account fully for a moderation effect, and to take into consideration existing traits which occur alongside income prior to income changing the trait itself, would require a "moderated mediation" model (Baron and Kenny, 1986), which is recommended as a line of future research as such a model does not yet exist in the literature. However, it is unlikely that such a model would unveil useful insights due to the nature of personality being "set like

plaster". (A moderated mediation model is not possible in the current thesis due to the dataset limitation [and many datasets], this is discussed in the methodology section i.e. more than 1 wave of trait data is required in order to track multiple points of personality). This thesis makes the assumption that personality can change following changes in income i.e., the model assumes that income causes a change in personality.

HG8: For the HG1 the income to hedonic path, mediated by eudaimonia, for solos, the income to hedonic mediated by eudaimonia model on average across all trait variations (excluding neuroticism), the strongest mediation was for cognitive well-being, with a 44% indirect effect. Negative affect and hedonic total mediated by 12% and 7% respectively. The neuroticism model excluded due to inconsistent mediation as the direct path in this model was negative, i.e., those high on neuroticism who had higher levels of income were likely to have lower cognitive well-being. Focusing on cognitive well-being, and excluding neuroticism, the total effect of income on cognitive well-being had a strong partial mediation for eudaimonia. But it is looking at the total effect of both trait and eudaimonic mediators where the theoretical contribution can best be explored.

HG9: For HG1, the income to hedonic path mediated by both traits and eudaimonia, excluding insignificant paths, there were 8 combined income to hedonic mediated by both trait and eudaimonia total effects calculable. This thesis adds to the literature in providing a precise estimation of the types of well-being effect that solos are expected to experience as they vary by trait or eudaimonic area. Income was found to be more important than traits or eudaimonia in raising hedonic total well-being (reminder than hedonic total includes both cogntive well-being and both affects) for those solos who are conscientious, extroverted or agreeable with a direct effect of over 75%. Income was also found to be more important (80% direct effect) than disagreeability or eudaimonia in improving negative affect in solos. It is not sufficient to argue that disagreeability is not a positive trait because agreeability is known to raise well-being (see Proto and Rustichini, 2012; Soto and Luhman, 2013; Boyce and Wood, 2011). This adds to the personality literature by showing that agreeability and extroversion do not raise well-being in solos, but disagreeability and introversion does. Those working with solos must be aware of this unique trait requirement and their eudemonic person. It is not negative in and of itself to be disagreeable and autonomous, quite the reverse, this is likely how the solo-self employed mitigates low income with their personality in order to manifest well-being.

In the income to cognitive well-being mediated by extroversion/agree and eudaimonia models, traits were both negative, meaning that the paths to the mediator were of opposite signs - both cases, income to trait was negative, meaning, income was associated with rises in introversion (-15%) and disagreeableness (-22%), however, rises in extroversion and agreeableness were associated with rises in eudaimonia, albeit the indirect trait effects were weaker than the indirect eudaimonia effects. In both cases the income to cognitive direct effect was strong at over 40%. This adds to the literature by demonstrating again that traits are less important than the income to cognitive path, and emphasizing that for the disagreeable and introverted solo, eudaimonia (with its negative covariance with autonomy) is more important than personality in determining cognitive well-being.

For income to cognitive well-being, neuroticism had 54% indirect effects, while the direct effect was -41% and the eudaimonia effect was 5%. The unusual strong negative direct relationship indicates that emotional stability strongly inflated the total effect. For income to positive affect, neuroticism had 68% indirect effects, while the direct effect was 26% and eudaimonia effect was 6%. For income to positive affect, emotional stability strongly inflated the total effect also. Both of these findings adds to the literature by partially supporting the claim that mental health is more important than income for hedonic well-being (Layard, 2013), but it goes further by specifying (for solos) that this is only the case for those who are already neurotic.

Thus, this thesis does not make the claim that eudaimonia is the strongest predictor of all, stronger than personality (as argued by Boyce, 2013) or stronger than mental illness (as argued by Layard, 2013). Rather, this thesis can only claim that eudaimonia is stronger than personality on average, which comprises neuroticism, a predictor of mental illness.

These findings have profound implications for researchers working on well-being and personality and on policy makers looking to improve the lives of solos.

HG9: For the HG2 path, income to eudaimonia, mediated by traits, only agreeableness mediated income to eudaimonia for solos with a negative indirect path due to the income to agreeability path being negative. This adds to the literature eudemonic literature by further delineating traits and eudaimonia as distinct constructs with overlap accounted for by correctly specifying covariances e.g., in agreeableness this was for autonomy (which negatively covaried) and relationships. For solo researchers, it highlights the importance of personality it

mitigating the lower income which is forced to prop up hedonic well-being, by the income to trait path.

HG10: For the HG4 path, traits to hedonic, mediated by eudaimonia, of note the total effect of agreeability to negative affect was negative for solos, reemphasizing the importance of disagreeability and autonomy for survival of the low income solo i.e, eudaimonia as a mediator greatly improved the total effect of agreeability to negative affect.

7.3 Practical Implications

This section discusses the practical implications of the findings, including those for policy. In this regard, it explores each hypothesis in terms of recommendations that solos themselves can take, which practitioners such as those working in Job Centres, can disseminate, as well as broader policies which can be adopted by law makers looking to increase the productivity and well-being of this large segment of society.

For HG1 the Income to Hedonic path, policy makers are encouraged to consider more than just cognitive well-being in their assessments of societal well-being, especially for solos, whose gains in positive and negative affect (especially negative affect) from small rises in income is particularly strong. Practitioners in jobs centers working with solos should be aware of the sensitivity of income to negative affect (the ability of small rises in income to reverse the tendency to feel down or in the dumps) that solos have is greater than other employment types. Both practitioners (either those working in job centres or psychologists, educators and social workers) and policy makers should be aware that the income to well-being relationship is important for all personality types, and that variations are more dependent on employment type e.g. solos who display conscientiousness and are able to "just get on with it" is only one aspect of personality; or those who are open to new ideas who are solos are particularly responsive to small rises in income. Practitioners and policy makers working on mental health should be aware that solos who display neurotic tendencies will require assistance in making gains in cognitive well-being from income, improving mental health may help these individuals. Finally, practitioners and policy makers should be aware of the isolation inherent in being a solo without an organization of support. It is tempting to consider those who work as gig economy workers in companies such as Uber (De Stefano et al, 2015) to have peer groups, to compare themselves to or work with, however, it could also be that workers consider each other

to be competitors and this coupled with a lack of unions (Friedman, 2014), they may not be in a position to interact in a collegial manner.

For HG2 the Income to Eudaimonia path, as income can be viewed as a determinant of eudaimonia, in this sense, income can be seen as empowering autonomy, relationships, environmental mastery and purpose. It is possible that policy makers wishing to improve the eudaimonic well-being of solo, seeing these findings, may consider income supports which can be used specifically for developing these aspects of eudaimonia for solos i.e., it could be argued that training programs which allow autonomy and relationships etc., to work together in successful ways may be used as proxy supports for income. However, the findings demonstrate that small income rises generate substantial rises in eudaimonia in solos without government training programs and that this may imply self-organizing is implicit in this class of worker.

Looking broader, policy makers building on recent advances in well-being policy which recommend looking at life satisfaction rather than just GDP (e.g. Beyond GDP), may go beyond Easterlin (1974, 2001) type theories of diminishing returns caused by relative income i.e. we know that as income rises at a national level there are diminishing returns to happiness and these are likely caused by comparisons with peers. However, unknown is the national level of eudaimonia, which is the functional flip-side of hedonic well-being, and both are necessary for a holistic perspective of well-being. Policy makers are recommended to examine and embrace national measurements of both hedonic and eudaimonic well-being measures.

For HG3 the Income to Traits path, practitioners need to be clear that successful solos in terms of rising income may undergo changes in their personality which may be viewed as negative, but which are in fact a necessary part of their mitigation of low income to begin with. It is not appropriate to attempt to change disagreeable solos into agreeable individuals as they would be more suited to employment, and if employment had been an option to begin with, they would likely have not stepped into the role of solo. Income will improve mental health and rather than trying to improve mental health directly, it is more important to recognize the health benefits of raising income so that solos can improve their own mental health - this is a very different proposition to raising the income of someone who is unemployed, a group not covered in this analysis. Solos are also more likely to become more introverted as their income is increased, and this is not to be discouraged, as this is likely linked to the intrinsic autonomy (discussed below) and isolation inherent in solos. As income does not change

conscientiousness much, it is important to recognize that solos are already conscientious. An awareness of these trait changes will help practitioners to focus more clearly on the task at hand, which should be to assist the solos raise their income, and changes in personality should be embraced as they succeed forward.

For HG4 the Traits to Hedonic path, one of the strongest findings in personality research relates to how certain ends of the trait spectrum generate high levels of hedonic well-being i.e. being open, conscientious, extroverted, agreeable and emotional stable. Practitioners should be aware that some of these traits to hedonic patterns do not translate to solos. Solos who are closed to experience are likely to experience higher levels of hedonic response, and those who are disagreeable will provoke a reduction in negative affect. Policy makers and practitioners alike should adjust their preconceptions of these traits or risk endangering the career of the solo, who likely depends on the autonomy and disagreeableness inherent in negotiating for sales.

For HG5 the Traits to Eudaimonia path, For practitioners working with solos should be aware that while open individuals may elicit higher levels of eudaimonia and generally speaking, agreeable individuals may also, there is a caveat to the latter. Disagreeability is likely to increase eudaimonic autonomy, which is positive for solos. Policy makers looking to construct trait and eudaimonia programs to assist solos should be careful in distinguishing carefully between the types of eudaimonia they might elicit and ensure that this is not counter productive to solo self employment.

For HG6 Eudaimonia to Hedonic path, for policy makers this is a vitally contribution, in that it clearly shows that eudaimonia is the strongest predictor of well-being, not personality. Policy makers should not only look at measuring hedonic well-being but incorporate eudaimonia in efforts to improve societal well-being as a whole.

HG7: For HG1 Income to Hedonic mediated by Traits, policy makers should be aware of the mediation effect of personality in income and hedonic well-being and that these changes vary by employment type. Changes in income will lead to changes in personality and changes in both income and personality will lead to a total effect change in hedonic well-being. These personality changes should be expected and not discouraged especially for solos, whose trait of disagreeability may seem abhorrent, but to the isolated solo, this should provide a healthy eudemonic and hedonic response.

HG8: For HG1 Income to Hedonic mediated by Eudaimonia, policy makers should be aware that eudaimonia for all traits except for the neurotic, mediates the relationship between income and hedonic well-being. There is a major advantage for policy makers looking to economize in regards to solos. A solo derives a substantial indirect effect (44% for cognitive well-being) from eudaimonia and in this regard, small rises in income can allow solos to not be as concerned with "wealth" in the long run in order for them to have a satisfied and happy life.

For HG1, Income to Hedonic total effects of mediators (Traits and Eudaimonia): For HG1 Income to Cognitive Well-Being mediated by Agreeable/Extroversion and Eudaimonia: In both cases, raising eudaimonia and income will have an important effect on cognitive well-being. In both cases the indirect effect of trait was inconsistent due to income to trait path being negative while the trait to hedonic path was positive. As income rises solos can be expected to become disagreeable and introverted, but this is countered by agreeability and extroversion leading to rises in cognitive well-being. Agreeability also helps eudaimonia, but eudaimonic autonomy is negative covaried which compliments the disagreeability trait which is good for negotiating. Extroversion helps eudaimonia in total, but eudaimonic environmental master is negatively covaried, which indicates that introversion can assist in a solos sense of environmental mastery. Both these traits work together with eudaimonia in a sophisticated manner to increase cognitive well-being in solos, therefore practitioners must be aware of the web of interactions before suggesting interventions.

For HG1 Income to Negative affect/ Cognitive Well-Being mediated by Neuro and Eudaimonia, for those with high levels of neuroticism, income is less important, than improvements in mental health, and eudaimonia plays a very small role. Emotional stability (and mental health) is strongly impacted by income directly, whereas those who are neurotic will not benefit as much from gains in income in terms of positive affect gains and even potentially cognitive well-being losses. Practitioners will want to improve those low on emotional stability in order to improve mental health, this can be done by raising income, but in some cases, as this may result in losses in cognitive well-being, possibly due to misuse of funds due to instability, it is likely these interventions would require significant guidance for the neurotic solo.

For HG1 Income to Negative affect mediated by Disagreeability and Eudaimonia, to improve negative affect it is important to see how disagreeability and eudaimonia work together for

solos. Improving negotiating skills can increase disagreeability: but, questions are raised as to how this disagreeability is in fact put into practice. It needs to be done in such as way as to not lower the gains made from eudaimonia. While income can raise disagreeability, possibly as a result of an improved negotiation style, disagreeability can damage relationships and practitioners need to be careful when training solos that they delineate between negotiation targets and other relationships which would benefit from agreeableness. Those working to improve solos inform performance, such as those at job centres, will want to improve the negotiation skills of those low on disagreeability, for a better overall impact on negative affect.

HG9: For HG2, Income to eudaimonia mediated by traits, similar to the combined path, for solos, when looking directly at agreeability and eudaimonia in tandem as they affect hedonic well-being, practitioners will want to be careful in delineating between disagreeableness for negotiation, which can help both negative affect and eudaimonic autonomy in solos from agreeability which can benefit both eudaimonic relationships and cognitive well-being. How these traits and eudaimonic person aspects must be understood as a system if practitioners are to be helpful in aiding solos in their quest for better well-being.

HG10: For HG 4: Openness / Agreeability to Cognitive / Negative Affect / Hedonic mediated by eudaimonia, once again it becomes clear that it is necessary for practitioners to clearly delineate between the types of interventions and their outcomes appropriate for solos. Being closed to ideas is good for eudaimonia if the total effect relates to cognitive well-being, whereas the opposite is true if it relates to negative affect. Patterns are similar in the agreeability trait, with disagreeability adding to a better negative affect in but agreeability leading to a better eudiamonic position.

7.4 Limitations

The following limitations to the research are presented prior to an expanded conclusion. Please note, information on confounding and collider variables are discussed in section 5.5.2.

There are four main variable groups, income, hedonic well-being, traits and eudaimonic well-being. All variables except for income are latent variables derived from self-reported measures. Response bias (Rosenman et al, 2011) may occur whereby respondents have many mechanisms to bias their response e.g., they may want to give a good impression of themselves, even if the response is anonymous. This thesis uses a longitudinal analysis but also conducts a robustness check with a cross-sectional analysis. In this longitudinal analysis there is risk of 'response shift bias' (Howard, 1980) where a respondent's frame of reference shifts following a significant event e.g. a person may re-evaluate what happiness means to them e.g. as aspirations are met or not met. There may be other bias in the longitudinal analysis in terms of the mediation (Maxwell and Cole, 2007), whereby it could be argued that rather than using an XT and SVY function (discussed in the Methodology Chapter), three years of data should be used e.g. for the traits mediating income to hedonic well-being model, this should arguably be income in the first year, traits in the second year, hedonic well-being in the third year. Such a model in the given example is would provide entirely different results, as it would rely on a delay of 2 years before income is taken into consideration, it would also rely on a much smaller sample size.

For solos, the trait questions lead to questions which can be interpreted in different ways depending on the context. Clearly being a harder negotiator may leave an impression of more rudeness to the individual in question, but if this is not implemented for supply partners or family members, then how the respondent answers the question will be called into question. This puts a clear limitation on the personality trait measure itself. When looking at one's own personality trait questions, and answering those questions for the survey, does one answer this as an overall average of all relationships? This is a fundamental bias in the nature of measuring the Big 5.

In terms of the eudaimonia self-reported measures, levels of autonomy should be highlighted in particular in relation to their potential for external validity. The eudaimonia model itself is based off of Ryff (1987), and, generally speaking, the field itself is underdeveloped compared

to hedonic well-being. The model built in this thesis does not include self-acceptance or personal growth and this may be considered a limitation by eudaimonic researchers.

Running SVY in order to increase the sample size led to limitations regarding fit statistics available. In order to combat this a check was run on each year individually (see section 5.3.3.6.3), however, this greatly reduced the sample size and in particular, the trait to hedonic paths were affected, i.e. p values were almost all greater than 0.05 due to smaller sample size in most years. This raise issues surrounding one of the most interesting findings, i.e. that disagreeability leads to reduced negative affect. However, the test was also run on all years, without the SVY setting, which did lead to a positive result.

It could be argued that more could be done to exploit the longitudinal nature of the survey (i.e. transitions, changes at the individual level over time). However, the low sample size of each year in some groups (comparisons with a self group as a control in particular is not possible, see table 6.3.1, where it is noted that self ranged from 143 - 160 observations per wave and solos ranged from 359 – 446, making SVY necessary for statistical validity) prevented this from being practical (see section 5.3.3.6.3 for robustness discussion). The personality trait measure is only measured once; it would be more useful, given the position that income causes traits, to have more frequent measures of traits.

In terms of other confounding variables, there are a number of areas that are identified. The results are likely to have gendered findings (the population is more male dominated), and these have not been tested for. There could also be differences in heads of households which could be confounding factors not controlled for directly. Income could be usefully separated between low and high income to test for absolute income levels and livable wage effects. As discussed in Chapter 2, income may be underreported for solos. There may also be spatial differences (e.g. London is likely to have significant differences due to both higher living costs and higher income levels), although the dataset has been weighted in longitudinal tests. There are also likely to be seasonal changes not accounted for in solos who work in areas that do not have steady monthly income.

Generally speaking, reference income or relative income theorizing could be enhanced if more information was available regarding the “intrinsic isolation” that solos face.

There could be debate surrounding the direction of causality, endogeneity for the income to trait path, i.e. can income change traits? The logic of this was discussed in the Theoretical

model section. Future research could examine a non-recursive model if a larger sample size was possible.

7.5 Conclusion

In terms of the 6 direct paths, firstly, the analysis confirmed the existence of a relationship between income and both types of well-being. Solos were shown to derive the most hedonic and eudaimonic well-being from income compared to other employment types. Income was found to be positively associated with all personality traits, with rises in income being notably linked to disagreeability and introversion for solos. The analysis confirmed the existence of the relationship between traits and hedonic well-being, and notably for solos, disagreeability was positively linked to improvements in negative affect. Agreeability and extroversion traits were also found to be positively linked to eudaimonia, with observed eudaimonic autonomy negatively covarying with agreeability for solos. Finally, for the 6 direct paths, eudaimonia was found to be strongly positively associated with hedonic well-being, and, notably, stronger than both traits and income (in contrast to previous claims that traits are the strongest determinant of hedonic well-being), with affect(s) showing the strongest relationship. This has important implications for solos i.e., focusing on improvements in autonomy, purpose, environmental mastery and relationships (rather than just income), could have profound benefits to solos (with caveats related to certain trait types, revealed through the mediating indirect effects).

In terms of the 4 mediation relationships, the analysis demonstrated a mediation, not moderation (which is often confused (Baron and Kenny, 1986)), relationship for income to hedonic well-being and traits (the mediator); as well as income to hedonic and eudaimonia (the mediator). The analysis went further to examine the entire SEM model by combining total effects of mediations within the model. This provided a mechanism for researchers, practitioners and policy makers to examine the way solos could be expected to respond to changes in income through their traits as they manifest eudaimonic and hedonic well-being.

Notably, income was shown to be more important than traits or eudaimonia in raising total hedonic well-being or negative affect for those solos who were more conscientious, introverted or disagreeable. Finally, for the positive affect, neuroticism had a large indirect effect, emphasizing that mental health can be important than income (or even eudaimonia) for raising hedonic well-being for those with neurotic traits.

Chapter 8. Conclusion

Solos are the most populous component of the entrepreneurship domain, with close to 1 billion solos, yet there were less than 20 published academics found who have worked on the topic to date and none focused on their well-being. This topic needs substantial academic contribution.

In exploring the question of how the solo self-employed mitigate low income with their personality in order to manifest well-being, this thesis developed a 6-path structural equation model which contained 4 mediation relationships that provided several contributions to theory and practice. It firstly separated well-being into both eudaimonic and hedonic components and then by doing so was able to expose not only the relationship from income to life satisfaction or happiness, the most well-worn path in behavioural economics, but affect and the functional aspects of well-being (eudiamonia) as well. The utilization of personality in these relationships was also exposed, and the solo's unique approach to surviving their difficult conditions was characterized by an unusual relationship between disagreeability and negative affect in particular. In the income to hedonic path, with solos deriving a high level of cognitive well-being and both positive and negative affect from small rises in income, questions were raised regarding the inherent isolation of the solos. Negative affect especially (which relates to being down and in the dumps etc.) could be a negative symptom and trait of being a solo and this in relation to the malleability of traits is suggested as a possible avenue for future research. With solos being more isolated, relative income theory (Veblen, 1899; Duesenberry, 1949; Pollak, 1976; Easterlin, 1974, 1995, 2001; Veenhoven, 1988, 1991; Van de Stadt et al., 1985; Diener et al., 1993; Luttmer, 2005; Caporale et al., 2008; Clark et al., 2008; Oishi et al., 2011; Georgellis et al., 2017) was raised as a possible reason for their high level of hedonic well-being derivation from income i.e. because they have no peers to compare with, they only compare with themselves; more colloquially, they are insulated from "keeping up with the Joneses", because there are no Joneses. Solos derived the most eudaimonia from income, and this also can be explained by relative income theory in relation to autonomy in particular i.e. solos derive more autonomy from income, and autonomy relates to directly to being less concerned with the opinions of others. The eudaimonia coupled with hedonic responses in the context of intrinsic isolation doubles down on a lessening of the effect of relative income comparisons. Solos had the strongest income to trait effect, with solos deriving the most emotional stability in particular from rises in income. Rises in income were also associated with rises in disagreeability, and this raised questions as to whether low-income solos may be

unsuited to employment i.e., their disagreeable 'responses' to income changes precludes them from involvement in organizations and teamwork - this is difficult to establish without further research and was also recommended as an avenue for exploration. In the traits to hedonic path, the notable difference for solos was that the disagreeability to negative affect path was positive, unlike all other employment groups, raising the possibility that solos are using their negotiation skills to alleviate a negative affect which may be caused by their isolation. Further studies are recommended to examine the connection between isolation, negative affect and traits in solos, particularly in the context of relative income theory.

With only agreeableness and openness showing connections to eudaimonia this raised the distinction between eudaimonia and traits, where problems of construct overlap (Schumtte and Ryff, 1997) have been raised in the past. Autonomy was shown to negatively covary with agreeableness, an avenue suggested for future research. Finally, in terms of the direct effects of the thesis, eudaimonia was shown to be strongly related to hedonic well-being for all employment types, and for solos, positive affect had the strongest response. This further demonstrated the need to separate well-being into eudemonic and hedonic constructs in the literature.

This thesis made a contribution to the literature by demonstrating theoretically and empirically that traits are a mediator (rather than moderator) of income and hedonic well-being. It brought forward the notion that future research might consider a moderated mediation model (Baron and Kenny, 1986) if one wished to consider traits as having a base state prior to income - however, this proposal would require more than one wave of personality data, which was not available in the BHPS. For solos, the thesis demonstrated that most of the effect of income on positive and negative affect was explained by emotional stability. The income to cogntive effect was also shown to be strongly inflated by emotional stability. Income to negative affect was shown to be mediated disagreeability, at 11% indirect effect, and that this small but unusual effect was unique to solos. No other employment group derived improvements in negative affect from disagreeability. This led to the conclusion that changes in personality related to disagreeability from those solos whose income had increased should not be discouraged, as there is a healthy hedonic benefit that could be related to disagreeability empowered negotiating prowess.

Eudiamonia was shown to mediate the income to hedonic path, with, of note, a 44% indirect effect for the income to cognitive path for solos.

However, it was looking at the total effects of traits and eudaimonia as mediators of the income to hedonic path where the most compelling findings for solos were revealed. 8 total effects were calculable. This provided a mechanism for researchers, practitioners and policy makers to examine the way solos could be expected to respond to changes in income and through their traits as they manifest eudaimonic and hedonic well-being. Income was shown to be more important than traits or eudaimonia in raising total hedonic well-being or negative affect for those solos who were conscientious, introverted or disagreeable.

For the positive affect, neuroticism had a large indirect effect, which added to the literature in emphasizing that mental health is more important than income for hedonic well-being in this case.

The negative affect and disagreeability model provided perhaps the most interesting finding of all. As disagreeability may improve negotiation skills and lowers negative affect and agreeability may raise eudaimonia and the ability to work together (i.e., the relationships component) and also increase autonomy (which negatively covaried with agreeability) this raised implications for well-being and personality researchers. If agreeability and disagreeability relate to kindness, rudeness and forgiveness, and eudaimonia relates to the quality of relationships along with autonomy (as well as environmental mastery and sense of purpose), then delineation must be made between which relationships are affected and how autonomy can manifest in a healthy manner. This is likely to relate to the work-life balance literature.

A eudaimonic overall score might change this and it could be useful to separate out personality traits into personal, professional and differing types of relationships. Clearly being a harder negotiator may leave an impression of more rudeness to the individual in question, but if this is not implemented for supply partners or family members, then how the respondent answers the question will be called into question. This puts a clear limitation on the personality trait measure itself. When looking at one's own personality trait questions, and answering those questions for the survey, does one answer this as an overall average of all relationships?

Finally, there were two other mediations (income to eudaimonia by traits; traits to hedonic by eudaimonia) which highlighted the importance of traits in mitigating low income and the importance of disagreeability and autonomy for survival, and eudaimonia total, especially, in reducing negative affect, which again, may be related to isolation.

8.1 Future Research

There are potential reasons why we could respond to situations in a disagreeable manner, and certainly, it seems clear that by acting in a disagreeable manner to others might make solos feel better, lower their nervousness etc. Understanding further (see Ode and Robinson, 2007) why this occurs would be useful.

There are other areas related to genetics. Is being a lower earning solo a consequence of trait disposition and affect responses? Do certain genetic factors predispose certain individuals to respond with eudemonic behaviours (see Huta, 2012) which lead to a sense of purpose, deeper relationships and a sense of autonomy?

If increasing income raises the plight of the solo, will this change their behaviour, and will this affect their desire to be a solo? There were no papers found that looked at entry into solo self-employment. Georgellis and Sankae (2016) found that "Extraversion, Openness, and Conscientiousness are generally positively associated with the propensity of individuals to become managers. In contrast, Agreeableness and Neuroticism exert a negative influence" (p.1), the findings were moderated by gender and differed by industry. Managers will, by definition, have a team, but solos, do not, so it could be possible that introversion and closed to ideas could lead to solo entry. If emotional stability is positively associated with entry into management, is neuroticism associated with entry into solos?

While it could seem likely that agreeableness could be positively associated with entry into solo, i.e., the opposite of managers, disagreeableness is more likely as managers and solos may share similar traits to self, e.g. a preference for total autonomy and, perhaps, a degree of abhorrence of the reverse. A potential stylised research question is "If you are not a team player you more likely to work for yourself or be the boss?"

It may be useful to build on the work on set-point adjustment responses to unemployment (Lucas et al., 2004, Clark et a., 2001, and Clark and Georgellis, 2013) or "scarring" (Clark et al., 2001) - and in particular on the "habituation" effect (Clark et al., 2001), which appears to

in part explain persistent unemployment. In "habituation", as the unemployed appear to adapt by not having as low a drop in well-being if they were previously unemployed; and, if their drop is not as low as before (i.e., the pain is not seen as that bad), they are more likely to be unemployed for longer than a year. At the point of the second unemployment spell, the "scar" seems to have set - this could be part of the cause of and long-term and intergenerational unemployment (a chronic problem in parts of Glasgow, Scotland (Lindsay, 2010; MacDonald et al., 2014)). The behaviour appears to be affected directly by the amount of "pain" endured during the spell of unemployment. As has been shown in this thesis, the solo self-employed, who earn the least, have the highest levels of happiness. While, not the whole picture, as evidenced by the other types of cognitive well-being, and complicated by eudaimonia and traits, the clear question raised is: could "managed" spells of solo self-employment following unemployment "scarring", produce a "healing" response? i.e. a raising of the long-term set-point? Or, can a sustained burst of high SWB from solo self-employment, undo the long-term damage done by unemployment?

The phrase "managed" spells are used to indicate that solo self-employment is not without its risks, particularly in regards to monthly income cycles for those without savings as a cushion. As Georgellis and Yusuf (2016) point out in their examination of the self-employed, if "expectations fail to materialize", their high initial job satisfaction will subside. Indeed, it is likely for solos with low savings (whose simpler aspirations of autonomy etc., are otherwise likely to be met) that if their income drops below minimum or livable wages for long periods of time, then their happiness or job satisfaction levels are likely to do more than subside; they may become destitute.

While Binder and Coad (2013) could find no change in life satisfaction when transitioning to self-employment from unemployment, the study did not look at solos and only looked at 2 years in advance – they note directly that "additional lags might be added in future work" (p.15) in reference to checking for "hedonic adaptation".

It is likely that solos happiness levels would remain elevated if their income were stabilised only to minimum or livable wage conditions. While there is the possibility that the increased risk of income is providing a source of pleasure, this is clearly unhealthy if income drops for months on end leading to basic needs not being met. If basic needs are met through some sort of monthly "income stabiliser" then the risk (standard deviation in income) will still

continue; it is likely that the levels of happiness derived from the solo condition would continue to remain higher than the employed population; and, would clearly be preferable to long-term unemployment. A first step could be to examine the difference in well-beings between those who earn below minimum or livable wages (on a monthly basis) and those who earn above it.

Building on this, the clear question is: is it possible to make solo-self-employment less vulnerable? i.e. in particular, a reduction in monthly income standard deviation. Will this reduction in vulnerability increase the population of solos?

There is a complex mix of traits, responses and behaviours which does explain why so many of our solos are able to survive and also, why, perhaps, they continue to remain vulnerable. Perhaps an increase in income should not lead to a disagreeable response, perhaps an agreeable response should lead to a lower negative affect, and perhaps all of those factors together could assist individuals to be more successful solos. These propositions are not possible to determine without future research.

The implication is that trait disposition changes could be the answer to how to reduce vulnerability, but this must be matched by an understanding of the impact of changes on well-being. It might be extremely difficult for an introvert to become an extrovert, for example.

Not looked at in this thesis is health, a clear cause of well-being. The lifestyle of solos is likely to be similar to self and other groups, i.e., long, unpredictable working hours which could cause health problems (see Scholarios, D., Hesselgreaves, H. and Pratt, R., 2017).

Another big question, which is naturally raised, but has not been addressed in the literature, is how do trait dispositions affect the well-being of others? This unknown part of the equation is perhaps the most pressing for solos (especially their customers) and for society (especially their family and communities) - this would require a large study which looks at the traits of a solo and the well-being of others they interact with on a regular basis. If the goal of policy is to increase well-being, then it is not useful to look at solos only in isolation.

Chapter 9. Appendix

9.1 1 Page Summary

ALL		Open				Consci				Extro				Agree				Neuro			
		cog	pos	neg	hed	cog	pos	neg	hed	cog	pos	neg	hed	cog	pos	neg	hed	cog	pos	neg	hed
HG1: Inc > Hed	So	0.01	0.07	0.12		0.00	0.06	0.10	0.01	0.01	0.07	0.10	0.01	0.01	0.07	0.09	0.02	-0.02	0.02	0.05	0.00
	P	*0.01*	*0.00*	*0.00*		*0.28*	*0.00*	*0.00*	*0.00*	*0.01*	*0.00*	*0.00*	*0.00*	*0.01*	*0.00*	*0.00*	*0.00*	*0.00*	*0.03*	*0.00*	*0.20*
	Se	0.00	0.04	0.09		0.00	0.05	0.09	0.01	0.01	0.06	0.09	0.01	0.01	0.07	0.08	0.01	0.00	0.02	0.05	0.00
	P	*0.67*	*0.00*	*0.00*		*0.96*	*0.00*	*0.00*	*0.00*	*0.02*	*0.00*	*0.00*	*0.00*	*0.01*	*0.00*	*0.00*	*0.00*	*0.62*	*0.10*	*0.00*	*0.19*
	Em	0.00	0.04	0.09		0.00	0.05	0.08	0.01	0.00	0.06	0.09	0.01	0.00	0.06	0.08	0.01	-0.02	0.01	0.04	0.00
	P	*0.62*	*0.00*	*0.00*		*0.54*	*0.00*	*0.00*	*0.00*	*0.25*	*0.00*	*0.00*	*0.00*	*0.06*	*0.00*	*0.00*	*0.00*	*0.00*	*0.27*	*0.00*	*0.48*
HG2: Inc > Eud	So	0.00	0.00	0.00		0.01	0.01	0.02	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02
	P	*0.83*	*0.85*	*0.96*		*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.01*	*0.02*	*0.01*	*0.01*
	Se	0.00	0.00	0.00		0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	-0.02	-0.02	-0.02	-0.02
	P	*0.87*	*0.80*	*0.70*		*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.08*	*0.07*	*0.11*	*0.09*
	Em	0.01	0.01	0.01		0.01	0.01	0.02	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.01	0.01	0.01	0.01
	P	*0.08*	*0.07*	*0.04*		*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.02*	*0.01*	*0.02*
HG3: Inc > Trait	So	0.13	0.13	0.13		0.02	0.02	0.01	0.02	-0.06	-0.06	-0.06	-0.06	-0.07	-0.07	-0.07	-0.07	-0.22	-0.22	-0.22	-0.22
	P	*0.00*	*0.00*	*0.00*		*0.03*	*0.03*	*0.04*	*0.03*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
	Se	0.11	0.11	0.11		0.02	0.02	0.02	0.02	-0.06	-0.06	-0.07	-0.06	-0.08	-0.08	-0.08	-0.08	-0.21	-0.21	-0.21	-0.21
	P	*0.00*	*0.00*	*0.00*		*0.02*	*0.03*	*0.04*	*0.02*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
	Em	0.09	0.09	0.09		0.01	0.01	0.01	0.01	-0.06	-0.06	-0.06	-0.06	-0.07	-0.07	-0.07	-0.07	-0.19	-0.19	-0.19	-0.19
	P	*0.00*	*0.00*	*0.00*		*0.06*	*0.08*	*0.10*	*0.06*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
HG4: Trait > Hed	So	-0.03	-0.04	-0.11		0.07	0.16	0.00	0.03	0.04	0.03	-0.01	0.01	0.07	0.09	-0.16	0.02	-0.13	-0.21	-0.26	-0.06
	P	*0.03*	*0.17*	*0.00*		*0.00*	*0.00*	*0.94*	*0.00*	*0.01*	*0.31*	*0.67*	*0.04*	*0.03*	*0.15*	*0.01*	*0.07*	*0.00*	*0.00*	*0.00*	*0.00*
	Se	0.04	0.11	-0.04		0.15	0.26	0.10	0.05	0.07	0.15	0.01	0.03	0.11	0.19	-0.07	0.04	-0.03	-0.18	-0.22	-0.05
	P	*0.09*	*0.04*	*0.46*		*0.00*	*0.00*	*0.15*	*0.00*	*0.00*	*0.00*	*0.88*	*0.00*	*0.00*	*0.03*	*0.36*	*0.01*	*0.13*	*0.00*	*0.00*	*0.00*
	Em	0.01	0.02	-0.05		0.07	0.12	0.07	0.02	0.05	0.11	0.03	0.02	0.08	0.12	-0.01	0.03	-0.10	-0.23	-0.29	-0.05
	P	*0.08*	*0.00*	*0.00*		*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.59*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
HG5: Trait > Eud	So	0.13	0.13	0.13		0.03	0.04	0.04	0.04	0.03	0.03	0.04	0.04	0.26	0.26	0.25	0.26	0.01	0.01	0.01	0.01
	P	*0.00*	*0.00*	*0.00*		*0.40*	*0.32*	*0.31*	*0.38*	*0.32*	*0.31*	*0.28*	*0.29*	*0.00*	*0.00*	*0.00*	*0.00*	*0.72*	*0.78*	*0.69*	*0.68*
	Se	0.18	0.18	0.18		0.07	0.07	0.07	0.07	0.10	0.10	0.10	0.10	0.21	0.22	0.21	0.22	-0.20	-0.20	-0.19	-0.20
	P	*0.00*	*0.00*	*0.00*		*0.23*	*0.28*	*0.24*	*0.29*	*0.02*	*0.02*	*0.02*	*0.02*	*0.00*	*0.00*	*0.01*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
	Em	0.09	0.09	0.09		0.12	0.12	0.12	0.12	0.08	0.08	0.07	0.07	0.16	0.15	0.15	0.16	-0.02	-0.03	-0.03	-0.03
	P	*0.00*	*0.00*	*0.00*		*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.08*	*0.00*	*0.00*	*0.01*
HG6: Eud > Hed	So	0.29	0.45	0.38		0.23	0.37	0.29	0.08	0.24	0.38	0.29	0.08	0.23	0.37	0.33	0.08	0.14	0.21	0.06	0.04
	P	*0.00*	*0.00*	*0.00*		*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*0.00*
	Se	0.29	0.38	0.65		0.26	0.40	0.55	0.11	0.27	0.37	0.58	0.11	0.27	0.39	0.61	0.11	0.27	0.26	0.33	0.07
	P	*0.00*	*0.00*	*0.00*		*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.01*	*0.00*	*0.00*
	Em	0.26	0.44	0.42		0.22	0.39	0.36	0.09	0.23	0.37	0.37	0.09	0.23	0.41	0.38	0.09	0.20	0.30	0.21	0.07
	P	*0.00*	*0.00*	*0.00*		*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*

Key: So = Solo; Se = Self Employed, Em = Employed; Hed = Hedonic; hed (lowercase) = Hedonic Total; Eud = Eudaimonia; cog = cognitive well-being; pos = positive affect; neg = negative affect.

9.2 SEM Results, Chapter 6.

The following tables contain condensed STATA outputs of all structural equation models (SEM). Each table contains abbrevations identified in Table 6.2. Table 9, below, contains the specifications for all SEM models.

Table 9 SEM Model Specifications

Survey: Structural equation model

Number of strata =	8	Number of obs =	40179
Num PSUs =	40179	Population size	34770
Linearized		Design df =	40171

Key: PSUs = primary sampling units, obs = observations, df = degress of freedom, strata = stratification.

Key for Tables that Follow: Coef = coefficient, Std. Err = Standard Error, Conf. Interval= Confidence Interval. SRMR = Standardized Square Root Mean Residual, CD = Coefficient of Determination

Open Cog

			Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
cog <-	eudai	solo	0.293	0.039	7.520	0.000	0.217	0.369
		self	0.293	0.052	5.620	0.000	0.191	0.396
		employ	0.263	0.010	26.220	0.000	0.244	0.283
	open	solo	-0.031	0.014	-2.190	0.028	-0.059	-0.003
		self	0.042	0.025	1.680	0.092	-0.007	0.092
		employ	0.005	0.003	1.730	0.084	-0.001	0.012
	inc	solo	0.008	0.003	2.620	0.009	0.002	0.014
		self	-0.002	0.004	-0.430	0.668	-0.009	0.006
		employ	-0.001	0.002	-0.500	0.619	-0.006	0.004
eudai <-	open	solo	0.131	0.020	6.440	0.000	0.091	0.171
		self	0.181	0.040	4.530	0.000	0.103	0.259
		employ	0.089	0.005	17.340	0.000	0.079	0.099
	inc	solo	-0.001	0.005	-0.220	0.825	-0.012	0.009
		self	0.001	0.006	0.170	0.866	-0.011	0.014
		employ	0.008	0.004	1.780	0.076	-0.001	0.016
open <-	inc	solo	0.132	0.010	13.300	0.000	0.113	0.152
		self	0.110	0.011	10.090	0.000	0.088	0.131
		employ	0.094	0.009	10.530	0.000	0.077	0.112
		SRMR	*0.060*	*CD*	*0.009*			

Table 9.1

Table 9.2

Open Pos Affect

			Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
pos <-	eudai	solo	0.447	0.081	5.500	0.000	0.287	0.606
		self	0.383	0.124	3.090	0.002	0.140	0.626
		employ	0.441	0.019	22.870	0.000	0.403	0.478
	open	solo	-0.041	0.030	-1.390	0.166	-0.099	0.017
		self	0.111	0.054	2.070	0.039	0.006	0.216
		employ	0.025	0.007	3.580	0.000	0.011	0.038
	inc	solo	0.068	0.007	9.650	0.000	0.054	0.081
		self	0.039	0.009	4.520	0.000	0.022	0.056
		employ	0.045	0.005	8.150	0.000	0.034	0.055
eudai <-	open	solo	0.131	0.021	6.290	0.000	0.090	0.172
		self	0.179	0.040	4.420	0.000	0.100	0.258
		employ	0.088	0.005	17.050	0.000	0.078	0.098
	inc	solo	-0.001	0.005	-0.190	0.853	-0.012	0.010
		self	0.002	0.006	0.250	0.804	-0.011	0.014
		employ	0.008	0.004	1.850	0.065	0.000	0.017
open <-	inc	solo	0.132	0.010	13.270	0.000	0.112	0.151
		self	0.109	0.011	10.060	0.000	0.088	0.131
		employ	0.094	0.009	10.480	0.000	0.076	0.111
		SRMR	*0.057*	*CD*	*0.013*			

Open Neg Affect

			Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
neg <-	eudai	solo	0.376	0.078	4.810	0.000	0.223	0.530
		self	0.652	0.129	5.050	0.000	0.399	0.906
		employ	0.416	0.020	20.910	0.000	0.377	0.454
	open	solo	-0.108	0.032	-3.400	0.001	-0.170	-0.046
		self	-0.044	0.060	-0.740	0.461	-0.162	0.073
		employ	-0.053	0.008	-6.620	0.000	-0.069	-0.037
	inc	solo	0.116	0.008	15.140	0.000	0.101	0.132
		self	0.093	0.009	10.200	0.000	0.075	0.111
		employ	0.090	0.007	13.810	0.000	0.077	0.103
eudai <-	open	solo	0.130	0.021	6.200	0.000	0.089	0.171
		self	0.177	0.041	4.340	0.000	0.097	0.257
		employ	0.087	0.005	16.780	0.000	0.077	0.097
	inc	solo	0.000	0.005	-0.050	0.960	-0.011	0.010
		self	0.002	0.006	0.380	0.701	-0.010	0.015
		employ	0.009	0.004	2.010	0.044	0.000	0.017
open <-	inc	solo	0.131	0.010	13.190	0.000	0.111	0.150
		self	0.108	0.011	9.950	0.000	0.087	0.130
		employ	0.093	0.009	10.400	0.000	0.075	0.110
		SRMR	*0.069*	*CD*	*0.021*			

Table 9.4

Consci Cog

			Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
cog <-	eudai	solo	0.233	0.033	7.100	0.000	0.169	0.298
		self	0.262	0.043	6.080	0.000	0.177	0.346
		employ	0.221	0.009	23.980	0.000	0.203	0.239
	consci	solo	0.066	0.019	3.410	0.001	0.028	0.105
		self	0.148	0.035	4.200	0.000	0.079	0.217
		employ	0.066	0.005	14.160	0.000	0.056	0.075
	inc	solo	0.003	0.003	1.080	0.279	-0.002	0.008
		self	0.000	0.003	0.050	0.963	-0.006	0.006
		employ	-0.001	0.002	-0.620	0.536	-0.006	0.003
eudai <-	consci	solo	0.034	0.041	0.840	0.402	-0.046	0.114
		self	0.074	0.062	1.210	0.227	-0.046	0.195
		employ	0.121	0.009	13.100	0.000	0.103	0.139
	inc	solo	0.015	0.005	3.050	0.002	0.005	0.024
		self	0.019	0.005	3.750	0.000	0.009	0.029
		employ	0.014	0.004	3.260	0.001	0.006	0.023
consci <-	inc	solo	0.017	0.007	2.210	0.027	0.002	0.031
		self	0.017	0.008	2.290	0.022	0.002	0.032
		employ	0.013	0.007	1.880	0.060	-0.001	0.026
		SRMR	*0.056*	*CD*	*0.001*			

Consi Pos Affect

			Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
pos <-	eudai	solo	0.367	0.073	5.030	0.000	0.224	0.510
		self	0.400	0.108	3.720	0.000	0.190	0.611
		employ	0.392	0.018	22.380	0.000	0.357	0.426
	consci	solo	0.162	0.042	3.900	0.000	0.081	0.244
		self	0.255	0.083	3.060	0.002	0.092	0.418
		employ	0.117	0.010	11.300	0.000	0.096	0.137
	inc	solo	0.061	0.006	9.830	0.000	0.049	0.073
		self	0.046	0.007	6.520	0.000	0.032	0.060
		employ	0.046	0.006	8.400	0.000	0.036	0.057
eudai <-	consci	solo	0.040	0.040	1.000	0.319	-0.039	0.119
		self	0.067	0.062	1.070	0.284	-0.055	0.189
		employ	0.125	0.009	13.790	0.000	0.107	0.142
	inc	solo	0.015	0.005	3.030	0.002	0.005	0.024
		self	0.019	0.005	3.800	0.000	0.009	0.030
		employ	0.014	0.004	3.290	0.001	0.006	0.023
consci <-	inc	solo	0.016	0.007	2.120	0.034	0.001	0.030
		self	0.016	0.007	2.180	0.029	0.002	0.031
		employ	0.012	0.007	1.780	0.076	-0.001	0.025
		SRMR	*0.052*	*CD*	*0.005*			

Table 9.5

Table 9.6

Consci Neg Affect

			Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
neg <-	eudai	solo	0.294	0.070	4.200	0.000	0.157	0.431
		self	0.553	0.102	5.440	0.000	0.353	0.752
		employ	0.358	0.018	19.440	0.000	0.322	0.395
	consci	solo	0.003	0.040	0.070	0.941	-0.075	0.080
		self	0.103	0.072	1.430	0.152	-0.038	0.244
		employ	0.072	0.012	6.240	0.000	0.050	0.095
	inc	solo	0.103	0.007	15.060	0.000	0.090	0.117
		self	0.089	0.008	11.420	0.000	0.073	0.104
		employ	0.085	0.006	13.090	0.000	0.072	0.097
eudai <-	consci	solo	0.041	0.040	1.010	0.312	-0.038	0.120
		self	0.074	0.063	1.170	0.241	-0.050	0.197
		employ	0.125	0.009	13.820	0.000	0.107	0.143
	inc	solo	0.015	0.005	3.160	0.002	0.006	0.025
		self	0.020	0.005	3.910	0.000	0.010	0.030
		employ	0.015	0.004	3.460	0.001	0.007	0.024
consci <-	inc	solo	0.015	0.007	2.020	0.043	0.000	0.030
		self	0.016	0.007	2.070	0.038	0.001	0.030
		employ	0.011	0.007	1.670	0.096	-0.002	0.024

SRMR	*0.066*	*CD*	*0.012*

Consci Hedonic

			Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
hed <-	eudai	Solo	0.083	0.015	5.540	0.000	0.054	0.112
		Self	0.111	0.021	5.370	0.000	0.071	0.152
		Employ	0.089	0.005	18.750	0.000	0.080	0.098
	consci	Solo	0.031	0.008	4.000	0.000	0.016	0.046
		Self	0.055	0.017	3.290	0.001	0.022	0.087
		Employ	0.023	0.002	10.110	0.000	0.018	0.027
	inc	Solo	0.013	0.001	10.170	0.000	0.011	0.016
		Self	0.010	0.001	6.640	0.000	0.007	0.013
		Employ	0.010	0.001	8.570	0.000	0.008	0.012
eudai <-	consci	Solo	0.036	0.041	0.880	0.380	-0.044	0.116
		Self	0.067	0.063	1.060	0.288	-0.057	0.192
		Employ	0.123	0.009	13.320	0.000	0.105	0.141
	inc	Solo	0.015	0.005	3.000	0.003	0.005	0.024
		Self	0.019	0.005	3.710	0.000	0.009	0.029
		Employ	0.014	0.004	3.190	0.001	0.005	0.023
consci <-	inc	Solo	0.017	0.007	2.240	0.025	0.002	0.031
		Self	0.017	0.008	2.300	0.022	0.003	0.032
		Employ	0.013	0.007	1.910	0.056	0.000	0.026
		SRMR	*0.075*	*CD*	*0.006*			

Table 9.7

Table 9.8

Extro Cog

			Coef.	Std. Err.	T	P>|t|	[95% Conf.	Interval]
cog <-	eudai	solo	0.237	0.033	7.160	0.000	0.172	0.302
		self	0.271	0.045	6.000	0.000	0.183	0.360
		employ	0.228	0.008	27.020	0.000	0.212	0.245
	extro	solo	0.038	0.015	2.570	0.010	0.009	0.067
		self	0.071	0.020	3.610	0.000	0.033	0.110
		employ	0.045	0.003	15.010	0.000	0.039	0.051
	inc	solo	0.007	0.003	2.540	0.011	0.002	0.013
		self	0.008	0.003	2.380	0.017	0.001	0.015
		employ	0.003	0.002	1.150	0.250	-0.002	0.007
eudai <-	extro	solo	0.033	0.033	1.000	0.319	-0.032	0.099
		self	0.098	0.041	2.400	0.016	0.018	0.177
		employ	0.075	0.006	13.100	0.000	0.064	0.086
	inc	solo	0.020	0.005	3.930	0.000	0.010	0.031
		self	0.030	0.006	4.970	0.000	0.018	0.042
		employ	0.023	0.004	5.320	0.000	0.015	0.032
extro <-	inc	solo	-0.058	0.010	-5.680	0.000	-0.078	-0.038
		self	-0.063	0.010	-6.080	0.000	-0.083	-0.042

		employ	-0.058	0.009	-6.280	0.000	-0.076	-0.040
		SRMR	*0.053*	*CD*	*0.005*			

Extro Pos Affect

			Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
pos <-	eudai	solo	0.379	0.071	5.310	0.000	0.239	0.519
		self	0.369	0.104	3.540	0.000	0.165	0.573
		employ	0.369	0.016	22.620	0.000	0.337	0.400
	extro	solo	0.034	0.033	1.030	0.305	-0.031	0.099
		self	0.152	0.048	3.190	0.001	0.058	0.245
		employ	0.108	0.006	17.390	0.000	0.096	0.120
	inc	solo	0.067	0.006	10.350	0.000	0.054	0.079
		self	0.062	0.008	8.100	0.000	0.047	0.077
		employ	0.056	0.006	10.130	0.000	0.045	0.067
eudai <-	extro	solo	0.034	0.033	1.010	0.314	-0.032	0.099
		self	0.096	0.040	2.370	0.018	0.017	0.175
		employ	0.075	0.006	13.390	0.000	0.064	0.086
	inc	solo	0.020	0.005	3.900	0.000	0.010	0.031
		self	0.030	0.006	4.950	0.000	0.018	0.042
		employ	0.023	0.004	5.310	0.000	0.015	0.032
extro <-	inc	solo	-0.058	0.010	-5.730	0.000	-0.078	-0.038
		self	-0.063	0.010	-6.130	0.000	-0.083	-0.043
		employ	-0.058	0.009	-6.340	0.000	-0.076	-0.040
		SRMR	*0.049*	*CD*	*0.011*			

Table 9.10

Extro Neg Affect

			Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
neg <-	eudai	solo	0.294	0.068	4.300	0.000	0.160	0.429
		self	0.577	0.110	5.220	0.000	0.360	0.793
		employ	0.366	0.018	20.320	0.000	0.331	0.401
	extro	solo	-0.013	0.032	-0.430	0.670	-0.075	0.048
		self	0.007	0.047	0.150	0.884	-0.086	0.099
		employ	0.030	0.007	4.640	0.000	0.018	0.043
	inc	solo	0.104	0.007	14.320	0.000	0.089	0.118
		self	0.090	0.009	10.370	0.000	0.073	0.108
		employ	0.088	0.006	13.560	0.000	0.075	0.101
eudai <-	extro	solo	0.036	0.033	1.080	0.279	-0.029	0.101
		self	0.097	0.040	2.420	0.016	0.018	0.175
		employ	0.073	0.006	12.970	0.000	0.062	0.084
	inc	solo	0.021	0.005	3.980	0.000	0.011	0.031
		self	0.030	0.006	4.980	0.000	0.018	0.042
		employ	0.024	0.004	5.380	0.000	0.015	0.032
extro <-	inc	solo	-0.061	0.010	-5.900	0.000	-0.082	-0.041

		self	-0.066	0.011	-6.270	0.000	-0.087	-0.045
		employ	-0.061	0.009	-6.530	0.000	-0.080	-0.043
		SRMR	*0.067*	*CD*	*0.017*			

Extro Hedonic

			Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
hed <-	eudai	solo	0.083	0.015	5.630	0.000	0.054	0.112
		self	0.109	0.021	5.280	0.000	0.069	0.150
		employ	0.085	0.005	18.790	0.000	0.076	0.094
	extro	solo	0.014	0.007	2.110	0.035	0.001	0.027
		self	0.027	0.009	3.110	0.002	0.010	0.044
		employ	0.020	0.001	13.980	0.000	0.017	0.023
	inc	solo	0.015	0.001	10.680	0.000	0.012	0.017
		self	0.013	0.002	7.990	0.000	0.010	0.016
		employ	0.011	0.001	9.910	0.000	0.009	0.014
eudai <-	extro	solo	0.035	0.033	1.060	0.291	-0.030	0.100
		self	0.096	0.041	2.350	0.019	0.016	0.176
		employ	0.075	0.006	13.070	0.000	0.063	0.086
	inc	solo	0.020	0.005	3.890	0.000	0.010	0.031
		self	0.030	0.006	4.880	0.000	0.018	0.042
		employ	0.023	0.004	5.230	0.000	0.014	0.032
extro <-	inc	solo	-0.058	0.010	-5.720	0.000	-0.078	-0.038
		self	-0.063	0.010	-6.100	0.000	-0.083	-0.043
		employ	-0.058	0.009	-6.320	0.000	-0.076	-0.040
		SRMR	*0.074*	*CD*	*0.011*			

Table 9.11

Table 9.12

Agree Cognitive

			Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
hed <-	eudai	solo	0.232	0.035	6.700	0.000	0.164	0.300
		self	0.267	0.046	5.840	0.000	0.178	0.357
		employ	0.234	0.009	26.150	0.000	0.217	0.252
	agree	solo	0.067	0.030	2.210	0.027	0.008	0.126
		self	0.105	0.035	2.970	0.003	0.036	0.175
		employ	0.076	0.006	12.340	0.000	0.064	0.088
	inc	solo	0.009	0.004	2.520	0.012	0.002	0.016
		self	0.011	0.004	2.720	0.007	0.003	0.019
		employ	0.004	0.002	1.880	0.060	0.000	0.009
eudai <-	agree	solo	0.262	0.064	4.080	0.000	0.136	0.388
		self	0.210	0.073	2.880	0.004	0.067	0.353
		employ	0.155	0.013	12.190	0.000	0.130	0.180
	inc	solo	0.035	0.007	5.260	0.000	0.022	0.048
		self	0.038	0.008	4.930	0.000	0.023	0.053
		employ	0.027	0.004	5.970	0.000	0.018	0.035

agree <-	inc	solo	-0.071	0.006	-12.900	0.000	-0.082	-0.060
		self	-0.077	0.006	-13.510	0.000	-0.089	-0.066
		employ	-0.068	0.005	-13.640	0.000	-0.078	-0.058
		SRMR	*0.055*	*CD*	*0.020*			

Agree Pos Affect

Table 9.13

			Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
pos <-	eudai	solo	0.374	0.076	4.890	0.000	0.224	0.524
		self	0.388	0.118	3.300	0.001	0.157	0.618
		employ	0.410	0.017	23.830	0.000	0.376	0.443
	agree	solo	0.091	0.063	1.440	0.149	-0.033	0.215
		self	0.194	0.092	2.120	0.034	0.014	0.374
		employ	0.124	0.015	8.520	0.000	0.095	0.152
	inc	solo	0.070	0.008	8.750	0.000	0.054	0.085
		self	0.066	0.011	6.250	0.000	0.045	0.086
		employ	0.056	0.006	9.920	0.000	0.045	0.067
eudai <-	agree	solo	0.260	0.066	3.960	0.000	0.131	0.388
		self	0.218	0.075	2.910	0.004	0.071	0.365
		employ	0.153	0.013	11.920	0.000	0.128	0.178
	inc	solo	0.035	0.007	5.160	0.000	0.021	0.048
		self	0.038	0.008	4.930	0.000	0.023	0.054
		employ	0.027	0.004	5.920	0.000	0.018	0.035
agree <-	inc	solo	-0.071	0.006	-12.940	0.000	-0.082	-0.060
		self	-0.077	0.006	-13.530	0.000	-0.088	-0.066
		employ	-0.068	0.005	-13.700	0.000	-0.078	-0.058
		SRMR	*0.048*	*CD*	*0.025*			

Table 9.14

Agree Negative Affect

			Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
neg <-	eudai	solo	0.331	0.073	4.530	0.000	0.188	0.475
		self	0.609	0.112	5.420	0.000	0.389	0.830
		employ	0.382	0.018	20.830	0.000	0.346	0.418
	agree	solo	-0.164	0.063	-2.610	0.009	-0.287	-0.041
		self	-0.075	0.081	-0.920	0.355	-0.234	0.084
		employ	-0.008	0.016	-0.530	0.594	-0.040	0.023
	inc	solo	0.092	0.009	10.700	0.000	0.075	0.109
		self	0.084	0.011	7.910	0.000	0.063	0.104
		employ	0.085	0.007	12.840	0.000	0.072	0.098
eudai <-	agree	solo	0.252	0.064	3.920	0.000	0.126	0.378
		self	0.209	0.074	2.810	0.005	0.063	0.355
		employ	0.148	0.013	11.690	0.000	0.123	0.172
	inc	solo	0.034	0.007	5.210	0.000	0.021	0.047
		self	0.038	0.008	4.930	0.000	0.023	0.053

		employ	0.027	0.004	5.950	0.000	0.018	0.035
agree <-	inc	solo	-0.070	0.005	-12.770	0.000	-0.080	-0.059
		self	-0.076	0.006	-13.460	0.000	-0.087	-0.065
		employ	-0.067	0.005	-13.590	0.000	-0.076	-0.057
		SRMR	*0.062*	*CD*	*0.029*			

Agree Hedonic

Table 9.15

			Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
hed <-	eudai	solo	0.084	0.016	5.370	0.000	0.053	0.114
		self	0.109	0.022	5.000	0.000	0.067	0.152
		employ	0.092	0.005	19.260	0.000	0.083	0.101
	agree	solo	0.022	0.012	1.810	0.070	-0.002	0.046
		self	0.043	0.016	2.680	0.007	0.012	0.075
		employ	0.027	0.003	9.150	0.000	0.021	0.033
	inc	solo	0.015	0.002	9.280	0.000	0.012	0.018
		self	0.014	0.002	7.190	0.000	0.010	0.018
		employ	0.012	0.001	9.980	0.000	0.009	0.014
eudai <-	agree	solo	0.264	0.065	4.060	0.000	0.137	0.392
		self	0.220	0.074	2.960	0.003	0.074	0.366
		employ	0.155	0.013	12.050	0.000	0.130	0.181
	inc	solo	0.035	0.007	5.200	0.000	0.022	0.048
		self	0.038	0.008	4.920	0.000	0.023	0.054
		employ	0.027	0.005	5.890	0.000	0.018	0.035
agree <-	inc	solo	-0.072	0.006	-12.850	0.000	-0.083	-0.061
		self	-0.078	0.006	-13.410	0.000	-0.089	-0.066
		employ	-0.069	0.005	-13.580	0.000	-0.078	-0.059
		SRMR	*0.074*	*CD*	*0.025*			

Table 9.16

Neuro Cog

			Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
cog <-	eudai	solo	0.139	0.028	4.980	0.000	0.084	0.193
		self	0.269	0.048	5.570	0.000	0.174	0.364
		employ	0.204	0.008	25.910	0.000	0.189	0.220
	neuro	solo	-0.134	0.011	-12.040	0.000	-0.156	-0.112
		self	-0.030	0.020	-1.510	0.132	-0.069	0.009
		employ	-0.102	0.004	-27.090	0.000	-0.110	-0.095
	inc	solo	-0.022	0.004	-5.810	0.000	-0.030	-0.015
		self	-0.002	0.005	-0.500	0.616	-0.012	0.007
		employ	-0.018	0.002	-7.330	0.000	-0.023	-0.013
eudai <-	neuro	solo	0.009	0.025	0.360	0.719	-0.041	0.059
		self	-0.197	0.049	-4.010	0.000	-0.293	-0.100
		employ	-0.017	0.010	-1.730	0.084	-0.037	0.002
	inc	solo	0.019	0.008	2.480	0.013	0.004	0.034

		self	-0.019	0.011	-1.750	0.080	-0.040	0.002
		employ	0.014	0.005	2.860	0.004	0.004	0.023
		solo	-0.218	0.012	-18.280	0.000	-0.242	-0.195
neuro <-	inc	self	-0.210	0.013	-16.480	0.000	-0.235	-0.185
		employ	-0.185	0.011	-16.990	0.000	-0.207	-0.164
		SRMR	*0.061*	*CD*	*0.027*			

Table 9.17

Neuro Pos Affect

			Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
		solo	0.210	0.060	3.520	0.000	0.093	0.326
	eudai	self	0.260	0.097	2.690	0.007	0.070	0.449
		employ	0.300	0.015	19.590	0.000	0.270	0.331
		solo	-0.212	0.025	-8.560	0.000	-0.261	-0.164
pos <-	neuro	self	-0.179	0.038	-4.720	0.000	-0.253	-0.105
		employ	-0.228	0.006	-36.560	0.000	-0.240	-0.216
		solo	0.018	0.008	2.170	0.030	0.002	0.034
	inc	self	0.015	0.009	1.630	0.102	-0.003	0.034
		employ	0.006	0.005	1.090	0.274	-0.005	0.016
		solo	0.007	0.026	0.280	0.777	-0.043	0.058
	neuro	self	-0.203	0.051	-3.970	0.000	-0.303	-0.103
eudai <-		employ	-0.032	0.010	-3.280	0.001	-0.050	-0.013
		solo	0.018	0.008	2.410	0.016	0.003	0.033
	inc	self	-0.021	0.011	-1.810	0.070	-0.043	0.002
		employ	0.011	0.005	2.390	0.017	0.002	0.021
		solo	-0.219	0.012	-18.480	0.000	-0.243	-0.196
neuro <-	inc	self	-0.211	0.013	-16.610	0.000	-0.236	-0.186
		employ	-0.186	0.011	-17.180	0.000	-0.208	-0.165
		SRMR	*0.055*	*CD*	*0.022*			

Table 9.18

Neuro Neg Affect

			Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
		solo	0.057	0.053	1.070	0.286	-0.048	0.162
	eudai	self	0.325	0.094	3.460	0.001	0.141	0.509
		employ	0.211	0.016	12.920	0.000	0.179	0.243
		solo	-0.263	0.025	-10.520	0.000	-0.311	-0.214
neg <-	neuro	self	-0.223	0.032	-7.030	0.000	-0.285	-0.161
		employ	-0.286	0.006	-45.520	0.000	-0.298	-0.273
		solo	0.049	0.009	5.500	0.000	0.032	0.067
	inc	self	0.049	0.010	5.050	0.000	0.030	0.067
		employ	0.036	0.006	5.730	0.000	0.023	0.048
		solo	0.010	0.025	0.410	0.685	-0.039	0.059
eudai <-	neuro	self	-0.194	0.052	-3.750	0.000	-0.296	-0.093
		employ	-0.030	0.009	-3.190	0.001	-0.049	-0.012

	inc	solo	0.019	0.007	2.580	0.010	0.005	0.034
		self	-0.019	0.012	-1.620	0.105	-0.041	0.004
		employ	0.012	0.005	2.520	0.012	0.003	0.021
neuro <-	inc	solo	-0.221	0.012	-18.120	0.000	-0.244	-0.197
		self	-0.212	0.013	-16.200	0.000	-0.237	-0.186
		employ	-0.187	0.011	-16.760	0.000	-0.209	-0.165
		SRMR	*0.073*	*CD*	*0.023*			

Neuro Hedonic

			Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
hed <-	eudai	solo	0.040	0.011	3.590	0.000	0.018	0.062
		self	0.074	0.018	4.020	0.000	0.038	0.110
		employ	0.067	0.004	15.390	0.000	0.059	0.076
	neuro	solo	-0.057	0.005	-10.900	0.000	-0.067	-0.047
		self	-0.045	0.007	-6.020	0.000	-0.060	-0.030
		employ	-0.053	0.002	-21.720	0.000	-0.058	-0.049
	inc	solo	0.002	0.002	1.290	0.197	-0.001	0.005
		self	0.003	0.002	1.310	0.191	-0.001	0.006
		employ	0.001	0.001	0.710	0.481	-0.001	0.003
eudai <-	neuro	solo	0.011	0.025	0.420	0.677	-0.039	0.060
		self	-0.199	0.053	-3.770	0.000	-0.303	-0.096
		employ	-0.030	0.011	-2.770	0.006	-0.051	-0.009
	inc	solo	0.019	0.008	2.500	0.012	0.004	0.034
		self	-0.020	0.012	-1.710	0.088	-0.043	0.003
		employ	0.011	0.005	2.360	0.018	0.002	0.021
neuro <-	inc	solo	-0.219	0.012	-18.270	0.000	-0.242	-0.195
		self	-0.211	0.013	-16.400	0.000	-0.236	-0.185
		employ	-0.186	0.011	-16.980	0.000	-0.208	-0.165
		SRMR	*0.077*	*CD*	*0.021*			

Table 9.10

9.3 Stata 12 Do File

```
set matsize 800
set memory 128M
set more off

* Open all Data Files last 10 waves of BHPS dataset.  use "b1s12.dta" etc.
* For each rename those coded with number suffix with a letter suffix for renumbering later.
* Wave 7 only additional Big 5 variables, renamed also so there is a letter suffix.
* Sort by PID, main identifier variable.
* Keep relevant variables for examination.
* For each wave after performing above processes save as a new separate dta file.
* Then Merge - Merge Comments start on line 157

use "C:\Users\Johan\Desktop\Stata Export\b1s12.dta", clear
```

```
*i

rename irach16 irachb
rename ihlghq1 ihlghqa
rename irace race1

gen incsource = 1 if     if101    ==1
replace incsource = 1 if         if102    ==1
replace incsource = 1 if         if103    ==1
replace incsource = 1 if         if104    ==1
replace incsource = 1 if         if105    ==1
replace incsource = 1 if         if106    ==1
replace incsource = 1 if         if116    ==1
replace incsource = 1 if         if118    ==1
replace incsource = 1 if         if119    ==1
replace incsource = 1 if         if121    ==1
replace incsource = 1 if         if122    ==1
replace incsource = 1 if         if124    ==1
replace incsource = 1 if         if125    ==1
replace incsource = 1 if         if126    ==1
replace incsource = 1 if         if127    ==1
replace incsource = 1 if         if128    ==1
replace incsource = 1 if         if132    ==1
replace incsource = 1 if         if142    ==1
replace incsource = 1 if         if135    ==1
replace incsource = 1 if         if136    ==1
replace incsource = 1 if         if137    ==1
replace incsource = 1 if         if138    ==1
replace incsource = 1 if         if139    ==1
replace incsource = 1 if         if140    ==1
replace incsource = 1 if         if141    ==1
replace incsource = 1 if         if151    ==1
replace incsource = 1 if         if152    ==1
replace incsource = 1 if         if153    ==1
replace incsource = 1 if         if154    ==1
replace incsource = 1 if         if155    ==1
replace incsource = 1 if         if156    ==1
replace incsource = 1 if         if157    ==1
replace incsource = 1 if         if158    ==1
rename incsource        iincsource



sort pid
keep pid   ihoh ifisitc ihlprbi ighqi ijbsoc ijulkjb ijbgold ifiyrdb1 ifisit ijsprf iincsource ighqa
ifiyrl irachb ihlghqa ijbsemp injusp ijbft ij2semp iage isex irachb ilfsato ighql ihlghqa ifimn
ijsprof race1 ijssize iqfachi iregion
```

```
save "C:\Users\Johan\Desktop\Stata Export\b1y467.dta", replace

*j
use "C:\Users\Johan\Desktop\Stata Export\b2s12.dta", clear

rename jrach16 jrachb
rename jhlghq1 jhlghqa
rename jrace race2

gen incsource = 1 if     jf101    ==1
replace incsource = 1 if         jf102    ==1
replace incsource = 1 if         jf103    ==1
replace incsource = 1 if         jf104    ==1
replace incsource = 1 if         jf105    ==1
replace incsource = 1 if         jf106    ==1
replace incsource = 1 if         jf116    ==1
replace incsource = 1 if         jf118    ==1
replace incsource = 1 if         jf119    ==1
replace incsource = 1 if         jf121    ==1
replace incsource = 1 if         jf122    ==1
replace incsource = 1 if         jf124    ==1
replace incsource = 1 if         jf125    ==1
replace incsource = 1 if         jf126    ==1
replace incsource = 1 if         jf127    ==1
replace incsource = 1 if         jf128    ==1
replace incsource = 1 if         jf132    ==1
replace incsource = 1 if         jf142    ==1
replace incsource = 1 if         jf135    ==1
replace incsource = 1 if         jf136    ==1
replace incsource = 1 if         jf137    ==1
replace incsource = 1 if         jf138    ==1
replace incsource = 1 if         jf139    ==1
replace incsource = 1 if         jf140    ==1
replace incsource = 1 if         jf141    ==1
replace incsource = 1 if         jf151    ==1
replace incsource = 1 if         jf152    ==1
replace incsource = 1 if         jf153    ==1
replace incsource = 1 if         jf154    ==1
replace incsource = 1 if         jf155    ==1
replace incsource = 1 if         jf156    ==1
replace incsource = 1 if         jf157    ==1
replace incsource = 1 if         jf158    ==1
rename incsource        jincsource

sort pid
keep pid    jhoh jfisitc jhlprbi jghqi  jjbsoc jjulkjb jjbgold jfiyrdb1 jfisit jjsprf  jincsource
jghqa jfiyrl jrachb jhlghqa jjbsemp jnjusp jjbft jj2semp jage jsex jrachb jlfsato jghql jhlghqa
jfimn jjsprof race2 jjssize jqfachi jregion
```

```
save "C:\Users\Johan\Desktop\Stata Export\b2y467.dta", replace

*k

use "C:\Users\Johan\Desktop\Stata Export\b3s12.dta", clear

rename krach16 krachb
rename khlghq1 khlghqa
rename krace race3

gen incsource = 1 if     kf101   ==1
replace incsource = 1 if         kf102   ==1
replace incsource = 1 if         kf103   ==1
replace incsource = 1 if         kf104   ==1
replace incsource = 1 if         kf105   ==1
replace incsource = 1 if         kf106   ==1
replace incsource = 1 if         kf116   ==1
replace incsource = 1 if         kf118   ==1
replace incsource = 1 if         kf119   ==1
replace incsource = 1 if         kf121   ==1
replace incsource = 1 if         kf122   ==1
replace incsource = 1 if         kf124   ==1
replace incsource = 1 if         kf125   ==1
replace incsource = 1 if         kf126   ==1
replace incsource = 1 if         kf127   ==1
replace incsource = 1 if         kf128   ==1
replace incsource = 1 if         kf132   ==1
replace incsource = 1 if         kf142   ==1
replace incsource = 1 if         kf135   ==1
replace incsource = 1 if         kf136   ==1
replace incsource = 1 if         kf137   ==1
replace incsource = 1 if         kf138   ==1
replace incsource = 1 if         kf139   ==1
replace incsource = 1 if         kf140   ==1
replace incsource = 1 if         kf141   ==1
replace incsource = 1 if         kf151   ==1
replace incsource = 1 if         kf152   ==1
replace incsource = 1 if         kf153   ==1
replace incsource = 1 if         kf154   ==1
replace incsource = 1 if         kf155   ==1
replace incsource = 1 if         kf156   ==1
replace incsource = 1 if         kf157   ==1
replace incsource = 1 if         kf158   ==1
rename incsource        kincsource

sort pid
keep pid   khoh kqlfa kqlfb kqlfc kqlfd kqlfe kqlff kqlfg kqlfh kqlfi kqlfj kqlfk kqlfl kqlfm
kqlfn kqlfo kqlfp kqlfq kqlfr kqlfs   kfisitc  kghqi kjbsoc khlprbi kjulkjb kjbgold kfiyrdb1
```

```
kfisit kjsprf kincsource kghqa kfiyrl krachb khlghqa kjbsemp knjusp kjbft kj2semp kage ksex
krachb kghql khlghqa kfimn kjsprof race3 kjssize kqfachi kregion

save "C:\Users\Johan\Desktop\Stata Export\b3y467.dta", replace

*l

use "C:\Users\Johan\Desktop\Stata Export\b4s12.dta", clear

rename lrach16 lrachb
rename lhlghq1 lhlghqa
rename lrace race4

gen incsource = 1 if     lf101    ==1
replace incsource = 1 if         lf102    ==1
replace incsource = 1 if         lf103    ==1
replace incsource = 1 if         lf104    ==1
replace incsource = 1 if         lf105    ==1
replace incsource = 1 if         lf106    ==1
replace incsource = 1 if         lf116    ==1
replace incsource = 1 if         lf118    ==1
replace incsource = 1 if         lf119    ==1
replace incsource = 1 if         lf121    ==1
replace incsource = 1 if         lf122    ==1
replace incsource = 1 if         lf124    ==1
replace incsource = 1 if         lf125    ==1
replace incsource = 1 if         lf126    ==1
replace incsource = 1 if         lf127    ==1
replace incsource = 1 if         lf128    ==1
replace incsource = 1 if         lf132    ==1
replace incsource = 1 if         lf142    ==1
replace incsource = 1 if         lf135    ==1
replace incsource = 1 if         lf136    ==1
replace incsource = 1 if         lf137    ==1
replace incsource = 1 if         lf138    ==1
replace incsource = 1 if         lf139    ==1
replace incsource = 1 if         lf140    ==1
replace incsource = 1 if         lf141    ==1
replace incsource = 1 if         lf151    ==1
replace incsource = 1 if         lf152    ==1
replace incsource = 1 if         lf153    ==1
replace incsource = 1 if         lf154    ==1
replace incsource = 1 if         lf155    ==1
replace incsource = 1 if         lf156    ==1
replace incsource = 1 if         lf157    ==1
replace incsource = 1 if         lf158    ==1
rename incsource        lincsource

sort pid
```

```
keep pid    lhoh  lfisitc lhlprbi lghqi ljbsoc ljulkjb ljbgold ljbsic92 lfiyrdb1 lfisit ljsprf
lincsource lghqa lfiyrl lrachb lhlghqa ljbsemp lnjusp ljbft lj2semp lage lsex lrachb llfsato
lghql lhlghqa lfimn ljsprof race4 ljssize lqfachi lregion

save "C:\Users\Johan\Desktop\Stata Export\b4y467.dta",replace

*m

use "C:\Users\Johan\Desktop\Stata Export\b5s12.dta", clear

rename mrach16 mrachb
rename mhlghq1 mhlghqa
rename mrace race5

gen incsource = 1 if     mf101          ==1
replace incsource = 1 if          mf102          ==1
replace incsource = 1 if          mf103          ==1
replace incsource = 1 if          mf104          ==1
replace incsource = 1 if          mf105          ==1
replace incsource = 1 if          mf106          ==1
replace incsource = 1 if          mf116          ==1
replace incsource = 1 if          mf118          ==1
replace incsource = 1 if          mf119          ==1
replace incsource = 1 if          mf121          ==1
replace incsource = 1 if          mf122          ==1
replace incsource = 1 if          mf124          ==1
replace incsource = 1 if          mf125          ==1
replace incsource = 1 if          mf126          ==1
replace incsource = 1 if          mf127          ==1
replace incsource = 1 if          mf128          ==1
replace incsource = 1 if          mf132          ==1
replace incsource = 1 if          mf142          ==1
replace incsource = 1 if          mf135          ==1
replace incsource = 1 if          mf136          ==1
replace incsource = 1 if          mf137          ==1
replace incsource = 1 if          mf138          ==1
replace incsource = 1 if          mf139          ==1
replace incsource = 1 if          mf140          ==1
replace incsource = 1 if          mf141          ==1
replace incsource = 1 if          mf151          ==1
replace incsource = 1 if          mf152          ==1
replace incsource = 1 if          mf153          ==1
replace incsource = 1 if          mf154          ==1
replace incsource = 1 if          mf155          ==1
replace incsource = 1 if          mf156          ==1
replace incsource = 1 if          mf157          ==1
replace incsource = 1 if          mf158  ==1
rename incsource        mincsource
```

```
sort pid
keep pid    mhoh  mfisitc mhlprbi mghqi mjbsoc mhlprbi mjulkjb mjbgold mjbsic92 mfiyrdb1
mfisit mjsprf  mincsource mghqa mfiyrl mrachb mhlghqa mjbsemp mnjusp mjbft mj2semp
mage msex mrachb mlfsato mghql mhlghqa mfimn mjsprof race5 mjssize mqfachi mregion

save "C:\Users\Johan\Desktop\Stata Export\b5y467.dta", replace

*n

use "C:\Users\Johan\Desktop\Stata Export\b6s12.dta", clear

rename nrach16 nrachb
rename nhlghq1 nhlghqa
rename nrace race6

gen incsource = 1 if     nf101   ==1
replace incsource = 1 if         nf102   ==1
replace incsource = 1 if         nf103   ==1
replace incsource = 1 if         nf104   ==1
replace incsource = 1 if         nf105   ==1
replace incsource = 1 if         nf106   ==1
replace incsource = 1 if         nf116   ==1
replace incsource = 1 if         nf118   ==1
replace incsource = 1 if         nf119   ==1
replace incsource = 1 if         nf121   ==1
replace incsource = 1 if         nf122   ==1
***replace incsource = 1 if     nf124   ==1 not measured
replace incsource = 1 if         nf125   ==1
replace incsource = 1 if         nf126   ==1
replace incsource = 1 if         nf127   ==1
replace incsource = 1 if         nf128   ==1
replace incsource = 1 if         nf132   ==1
replace incsource = 1 if         nf142   ==1
replace incsource = 1 if         nf135   ==1
replace incsource = 1 if         nf136   ==1
replace incsource = 1 if         nf137   ==1
replace incsource = 1 if         nf138   ==1
replace incsource = 1 if         nf139   ==1
replace incsource = 1 if         nf140   ==1
replace incsource = 1 if         nf141   ==1
replace incsource = 1 if         nf151   ==1
replace incsource = 1 if         nf152   ==1
replace incsource = 1 if         nf153   ==1
replace incsource = 1 if         nf154   ==1
replace incsource = 1 if         nf155   ==1
replace incsource = 1 if         nf156   ==1
replace incsource = 1 if         nf157   ==1
replace incsource = 1 if         nf158   ==1
rename incsource        nincsource
```

```
sort pid
keep pid   nhoh  nhlsf9a nhlsf9b nhlsf9c nhlsf9d nhlsf9e nhlsf9f nhlsf9g nhlsf9h nhlsf9i
nhlsf9d nfisitc nhlprbi nghqi njbsoc nhlprbi njulkjb njbgold njbsic92 nfiyrdb1 nfisit njsprf
nincsource nghqa nfiyrl nrachb nhlghqa njbsemp nnjusp njbft nj2semp nage nsex nrachb
nlfsato nghql nhlghqa nfimn njsprof race6 njssize nqfachi nregion

save "C:\Users\Johan\Desktop\Stata Export\b6y467.dta", replace

*o

use "C:\Users\Johan\Desktop\Stata Export\b7s12.dta", clear

rename orach16 orachb
rename ohlghq1 ohlghqa
rename orace race7

renameoptrt5a3 big5ac
renameoptrt5a2 big5ab
renameoptrt5a1 big5aa
renameoptrt5c3 big5cc
renameoptrt5c2 big5cb
renameoptrt5c1 big5ca
renameoptrt5o3 big5oc
renameoptrt5o2 big5ob
renameoptrt5o1 big5oa
renameoptrt5n1 big5na
renameoptrt5n3 big5nc
renameoptrt5n2 big5nb
renameoptrt5e3 big5ec
renameoptrt5e2 big5eb
renameoptrt5e1 big5ea

gen incsource = 1 if     of101  ==1
replace incsource = 1 if         of102  ==1
replace incsource = 1 if         of103  ==1
replace incsource = 1 if         of104  ==1
replace incsource = 1 if         of105  ==1
replace incsource = 1 if         of106  ==1
replace incsource = 1 if         of116  ==1
replace incsource = 1 if         of118  ==1
replace incsource = 1 if         of119  ==1
replace incsource = 1 if         of121  ==1
replace incsource = 1 if         of122  ==1
*replace incsource = 1 if        of124  ==1
replace incsource = 1 if         of125  ==1
replace incsource = 1 if         of126  ==1
replace incsource = 1 if         of127  ==1
replace incsource = 1 if         of128  ==1
```

```
replace incsource = 1 if        of132  ==1
replace incsource = 1 if        of142  ==1
replace incsource = 1 if        of135  ==1
replace incsource = 1 if        of136  ==1
replace incsource = 1 if        of137  ==1
replace incsource = 1 if        of138  ==1
replace incsource = 1 if        of139  ==1
replace incsource = 1 if        of140  ==1
replace incsource = 1 if        of141  ==1
replace incsource = 1 if        of151  ==1
replace incsource = 1 if        of152  ==1
replace incsource = 1 if        of153  ==1
replace incsource = 1 if        of154  ==1
replace incsource = 1 if        of155  ==1
replace incsource = 1 if        of156  ==1
replace incsource = 1 if        of157  ==1
replace incsource = 1 if        of158  ==1
rename incsource       oincsource

sort pid
keep pid     ohoh  ofisitc ohlprbi oghqi ojbsoc ohlprbi ojulkjb ojbgold ojbsic92 ofiyrdb1 ofisit
ojsprf  oincsource oghqa ofiyrl big5ac big5ab big5aa big5cc big5cb big5ca big5oc big5ob
big5oa big5na big5nc big5nb big5ec big5eb big5ea orachb ohlghqa ojbsemp onjusp ojbft
oj2semp oage osex orachb olfsato oghql ohlghqa ofimn ojsprof race7 ojssize oqfachi oregion

save "C:\Users\Johan\Desktop\Stata Export\b7y467.dta", replace

*p

use "C:\Users\Johan\Desktop\Stata Export\b8s12.dta", clear

rename prach16 prachb
rename phlghq1 phlghqa
rename prace race8

gen incsource = 1 if     pf101  ==1
replace incsource = 1 if        pf102  ==1
replace incsource = 1 if        pf103  ==1
replace incsource = 1 if        pf104  ==1
replace incsource = 1 if        pf105  ==1
replace incsource = 1 if        pf106  ==1
replace incsource = 1 if        pf116  ==1
replace incsource = 1 if        pf118  ==1
replace incsource = 1 if        pf119  ==1
replace incsource = 1 if        pf121  ==1
replace incsource = 1 if        pf122  ==1
*replace incsource = 1 if       pf124  ==1
replace incsource = 1 if        pf125  ==1
replace incsource = 1 if        pf126  ==1
```

```
replace incsource = 1 if          pf127   ==1
replace incsource = 1 if          pf128   ==1
replace incsource = 1 if          pf132   ==1
replace incsource = 1 if          pf142   ==1
replace incsource = 1 if          pf135   ==1
replace incsource = 1 if          pf136   ==1
replace incsource = 1 if          pf137   ==1
replace incsource = 1 if          pf138   ==1
replace incsource = 1 if          pf139   ==1
replace incsource = 1 if          pf140   ==1
replace incsource = 1 if          pf141   ==1
replace incsource = 1 if          pf151   ==1
replace incsource = 1 if          pf152   ==1
replace incsource = 1 if          pf153   ==1
replace incsource = 1 if          pf154   ==1
replace incsource = 1 if          pf155   ==1
replace incsource = 1 if          pf156   ==1
replace incsource = 1 if          pf157   ==1
replace incsource = 1 if          pf158   ==1
rename incsource        pincsource

sort pid
keep pid      phoh  pfisitc phlprbi pghqi pjbsoc  phlprbi pjulkjb pjbgold pjbsic92 pfiyrdb1
pfisit pjsprf  pincsource pghqa pfiyrl prachb phlghqa pjbsemp pnjusp pjbft pj2semp page
psex prachb plfsato pghql phlghqa pfimn pjsprof race8 pjssize pqfachi pregion




save "C:\Users\Johan\Desktop\Stata Export\b8y467.dta", replace

*q

use "C:\Users\Johan\Desktop\Stata Export\b9s12.dta", clear

rename qrach16 qrachb
rename qhlghq1 qhlghqa
rename qrace race9

gen incsource = 1 if     qf101   ==1
replace incsource = 1 if          qf102   ==1
replace incsource = 1 if          qf103   ==1
replace incsource = 1 if          qf104   ==1
replace incsource = 1 if          qf105   ==1
replace incsource = 1 if          qf106   ==1
replace incsource = 1 if          qf116   ==1
replace incsource = 1 if          qf118   ==1
replace incsource = 1 if          qf119   ==1
```

```
replace incsource = 1 if        qf121   ==1
replace incsource = 1 if        qf122   ==1
*replace incsource = 1 if       qf124   ==1
replace incsource = 1 if        qf125   ==1
replace incsource = 1 if        qf126   ==1
replace incsource = 1 if        qf127   ==1
replace incsource = 1 if        qf128   ==1
replace incsource = 1 if        qf132   ==1
replace incsource = 1 if        qf142   ==1
replace incsource = 1 if        qf135   ==1
*replace incsource = 1 if       qf136   ==1
replace incsource = 1 if        qf137   ==1
replace incsource = 1 if        qf138   ==1
replace incsource = 1 if        qf139   ==1
replace incsource = 1 if        qf140   ==1
replace incsource = 1 if        qf141   ==1
replace incsource = 1 if        qf151   ==1
replace incsource = 1 if        qf152   ==1
replace incsource = 1 if        qf153   ==1
replace incsource = 1 if        qf154   ==1
replace incsource = 1 if        qf155   ==1
replace incsource = 1 if        qf156   ==1
replace incsource = 1 if        qf157   ==1
replace incsource = 1 if        qf158   ==1
rename incsource        qincsource

sort pid
keep pid    qhoh  qfisitc  qhlprbi qghqi qjbsoc qhlprbi qjulkjb qlrwtuk1 qlrwtsw1 qjbgold
qjbsic92 qfiyrdb1 qfisit qjsprf  qincsource qghqa qfiyrl qrachb qhlghqa qjbsemp qnjusp qjbft
qj2semp qage qsex qrachb qlfsato qghql qhlghqa qfimn qjsprof race9 qjssize qqfachi qregion

save "C:\Users\Johan\Desktop\Stata Export\b9y467.dta", replace

*r


***


***

use "C:\Users\Johan\Desktop\Stata Export\b10s12.dta", clear

rename rrach16 rrachb
rename rhlghq1 rhlghqa
rename rrace race10

gen incsource = 1 if    rf101   ==1
replace incsource = 1 if        rf102   ==1
```

```
replace incsource = 1 if          rf103   ==1
replace incsource = 1 if          rf104   ==1
replace incsource = 1 if          rf105   ==1
replace incsource = 1 if          rf106   ==1
replace incsource = 1 if          rf116   ==1
replace incsource = 1 if          rf118   ==1
replace incsource = 1 if          rf119   ==1
replace incsource = 1 if          rf121   ==1
replace incsource = 1 if          rf122   ==1
*replace incsource = 1 if         rf124   ==1
replace incsource = 1 if          rf125   ==1
replace incsource = 1 if          rf126   ==1
replace incsource = 1 if          rf127   ==1
replace incsource = 1 if          rf128   ==1
replace incsource = 1 if          rf132   ==1
replace incsource = 1 if          rf142   ==1
replace incsource = 1 if          rf135   ==1
*replace incsource = 1 if         rf136   ==1
replace incsource = 1 if          rf137   ==1
replace incsource = 1 if          rf138   ==1
replace incsource = 1 if          rf139   ==1
replace incsource = 1 if          rf140   ==1
replace incsource = 1 if          rf141   ==1
replace incsource = 1 if          rf151   ==1
replace incsource = 1 if          rf152   ==1
replace incsource = 1 if          rf153   ==1
replace incsource = 1 if          rf154   ==1
replace incsource = 1 if          rf155   ==1
replace incsource = 1 if          rf156   ==1
replace incsource = 1 if          rf157   ==1
replace incsource = 1 if          rf158   ==1
rename incsource        rincsource


sort pid
keep pid   rhoh  rfisitc rhlprbi rghqi rjbsoc rriska rhlprbi rlfimpb rjulkjb rjbgold rjbsic92
rfiyrdb1 rfisit rjsprf  rincsource rghqa rfiyrl rrachb rhlghqa rjbsemp rnjusp rjbft rj2semp rage
rsex rrachb rlfsato rghql rhlghqa rfimn rjsprof race10 rjssize rqfachi rregion

save "C:\Users\Johan\Desktop\Stata Export\b10y467.dta", replace

use "C:\Users\Johan\Desktop\Stata Export\b1y467.dta", clear

* Merge all 10 new files that have been saved

merge m:1 pid using "C:\Users\Johan\Desktop\Stata Export\b2y467.dta"
drop _merge
sort pid
```

```
merge m:1 pid using "C:\Users\Johan\Desktop\Stata Export\b3y467.dta"
drop _merge
sort pid

merge m:1 pid using "C:\Users\Johan\Desktop\Stata Export\b4y467.dta"
drop _merge
sort pid

merge m:1 pid using "C:\Users\Johan\Desktop\Stata Export\b5y467.dta"
drop _merge
sort pid

merge m:1 pid using "C:\Users\Johan\Desktop\Stata Export\b6y467.dta"
drop _merge
sort pid

merge m:1 pid using "C:\Users\Johan\Desktop\Stata Export\b7y467.dta"
drop _merge
sort pid

merge m:1 pid using "C:\Users\Johan\Desktop\Stata Export\b8y467.dta"
drop _merge
sort pid

merge m:1 pid using "C:\Users\Johan\Desktop\Stata Export\b9y467.dta"
drop _merge
sort pid

merge m:1 pid using "C:\Users\Johan\Desktop\Stata Export\b10y467.dta"
drop _merge
sort pid

* renumber all letter suffix with number suffix
* syntax : rename ?sex sex(#), renumber

rename ?hoh  hoh(#), renumber

rename ?rachb rachb(#)         , renumber
rename ?hlghqa         hlghqa(#)       , renumber
rename ?jbsemp         jbsemp(#)       , renumber
rename ?njusp          njusp(#)        , renumber
rename ?jbft    jbft(#)  , renumber
rename ?j2semp j2semp(#)    , renumber
rename ?age    age(#)  , renumber
rename ?sex    sex(#)  , renumber
rename ?ghql   ghql(#), renumber
rename ?fimn  fimn(#)          , renumber
rename ?jsprof jsprof(#)       , renumber
rename ?jssize jssize(#)       , renumber
```

```
rename ?qfachi qfachi(#)       , renumber
rename ?region          region(#)       , renumber
rename ?fiyrl fiyrl(#), renumber
rename ?ghqa  ghqa(#), renumber
rename ?incsource incsource(#), renumber
rename ?fisit finsit(#), renumber
rename ?jsprf netprofit(#), renumber
rename ?jbgold jbgold(#), renumber
rename ?hlprbi hlprbi(#), renumber

rename ?jbsoc jbsoc(#), renumber
rename ?ghqi    ghqi(#), renumber
rename ?fisitc  fisitc(#), renumber
rename ?julkjb julkjb(#), renumber



rename ifiyrdb1 idividend
rename jfiyrdb1 jdividend
rename kfiyrdb1 kdividend
rename lfiyrdb1 ldividend
rename mfiyrdb1 mdividend
rename nfiyrdb1 ndividend
rename ofiyrdb1 odividend
rename pfiyrdb1 pdividend
rename qfiyrdb1 qdividend
rename rfiyrdb1 rdividend

rename ?dividend dividend(#), renumber

gen isic = .
gen jsic = .
gen ksic = .
gen lsic = ljbsic92
gen msic = mjbsic92
gen nsic = njbsic92
gen osic = ojbsic92
gen psic = pjbsic92
gen qsic = qjbsic92
gen rsic = rjbsic92
rename ?sic sic(#), renumber

drop ljbsic92
drop mjbsic92
drop njbsic92
drop ojbsic92
drop pjbsic92
drop qjbsic92
```

```
drop rjbsic92

gen isat = ilfsato
gen jsat = jlfsato
gen ksat = .
gen lsat = llfsato
gen msat = mlfsato
gen nsat = nlfsato
gen osat = olfsato
gen psat = plfsato
gen qsat = qlfsato
gen rsat = rlfsato
drop ilfsato jlfsato llfsato mlfsato nlfsato olfsato plfsato qlfsato rlfsato
rename ?sat sat(#), renumber



**********
*RESHAPE into Long Format.
reshape long hoh fisitc sic  ghqi  jbsoc  julkjb sat jbgold dividend netprofit finsit ghqa fiyrl
jbsemp njusp jbft j2semp age sex rachb ghql hlghqa fimn jsprof race jssize qfachi region,
i(pid) j(year)


***RENAME variables for easier use in regressions.

rename jbgold gold



*Regular Job

*self employment status
rename jbsemp semp

*unemployment spells
rename njusp unemp

*employed full time
rename jbft fulltime

*Employed, Self Employed second job
rename j2semp second

*Self Employ, no of employees
rename jssize size

*annual income
```

```
rename fiyrl aninc

*concentration
rename ghqa concentrate

*Age, Gender, Education*age
*sex
rename qfachi edu

*Parent
rename rachb parent

*region

*satisfaction & happiness * SWB derived
rename ghql happy
rename hlghqa swb

*income last month, monthly profit
rename fimn inclm
rename jsprof profit

*ethnicity
rename race ethnic



* Generate Age Ranges
rename age rage
generate age = 1 if rage <25
replace age = 2 if rage >24 & rage <35
replace age = 3 if rage > 34 & rage <45
replace age = 4 if rage > 44 & rage <55
replace age = 5 if rage >54
label variable age "Age"
label define age 1 "18 - 24" 2 "25 - 34" 3 "35 - 44" 4 "45 - 54" 5 "55 - 65"
label values age age
*drop rage

* Save before Interim Transformations Post Merge in separate Do File called: 2 Merge Interim.

save "C:\Users\Johan\Desktop\Stata Export\merge1.dta", replace

---

rename ?qlfa qlfa(#), renumber
rename ?qlfb qlfb(#), renumber
rename ?qlfc qlfc(#), renumber
```

```
rename ?qlfd qlfd(#), renumber
rename ?qlfe qlfe(#), renumber
rename ?qlff qlff(#), renumber
rename ?qlfg qlfg(#), renumber
rename ?qlfh qlfh(#), renumber
rename ?qlfi qlfi(#), renumber
rename ?qlfj qlfj(#), renumber
rename ?qlfk qlfk(#), renumber
rename ?qlfl qlfl(#), renumber
rename ?qlfm qlfm(#), renumber
rename ?qlfn qlfn(#), renumber
rename ?qlfo qlfo(#), renumber
rename ?qlfp qlfp(#), renumber
rename ?qlfq qlfq(#), renumber
rename ?qlfr qlfr(#), renumber
rename ?qlfs qlfs(#), renumber
use "C:\Users\Johan\Desktop\Stata Export\merge1.dta", clear
set more off
* This post Merge interim file prepares the variables used in: "3 Primary Do File".


****SELF EMP STATUS ******
* For Self Employment Status
* Set Self Employed to 1, Employed to 0, drop missing.

gen sempy = 0 if semp==1
replace sempy=1 if semp==2
rename semp semp_old
rename sempy semp

***Micro Ent Variable
* Create a Micro Entrepreneurship variable where Self Employed variable is segmented.
* 3 categories are: 1. Micro, for no employees, 2. Self employed for 1 or more, 3. Employed.
gen micro = 1 if semp == 1 & size ==-8
replace micro = 2 if semp==1 & size > 0
replace micro = 3 if semp==0
label variable micro "Status"
label define micro 1 "Micro" 2 "Self Employed" 3 "Employed"
label values micro micro



* Reverse Happiness variable so it moves from negative to positive.
rename happy neghap
gen happy = 4 if neghap ==1
replace happy = 3 if neghap ==2
replace happy = 2 if neghap ==3
replace happy = 1 if neghap ==4
```

```
*GENDER
* Change female from 2 to 0, male remains 1.

replace sex =0 if sex ==2

*PARENT
* Change parental status to 0 for "not a parent", and 1 to for "is a parent".

gen par = 1 if parent ==1
replace par = 0 if parent ==2
drop parent
rename par parent

****REVERSE EDU LABELS.
* Remove missing Edu cases.

drop if edu <0

* reverse Edu so no education is 0.
* Merge HND, HNC, Teaching into same variable

replace edu = 0 if edu ==7
replace edu =8 if edu ==6
replace edu =8 if edu ==5

replace edu =9 if edu ==4
replace edu =10 if edu ==3
replace edu =11 if edu ==2
replace edu =12 if edu ==1

replace edu =1 if edu ==8
replace edu =2 if edu ==9
replace edu =3 if edu ==10
replace edu =4 if edu ==11
replace edu =5 if edu ==12

gen edu1 =0 if edu == 0
replace edu1 = 1 if edu == 1
replace edu1 = 2 if edu == 2
replace edu1 = 3 if edu == 3
replace edu1 = 4 if edu == 4
replace edu1 = 5 if edu == 5
tab edu1, nolabel

label define edu1 0 "none" 1 "cse + o level" 2 "a level" 3 "hnd, hnc, teaching" 4 "1st degree"
5 "higher degree", modify
label variable edu1 "Highest Education"
label values edu1 edu1
```

```
tab edu1
drop edu
rename edu1 edu
tab edu

****BIG 5
* Drop missing variables.

drop if big5oa  ==.
drop if big5ob  ==.
drop if big5oc  ==.
drop if big5ca  ==.
drop if big5cb  ==.
drop if big5cc  ==.
drop if big5ea  ==.
drop if big5eb  ==.
drop if big5ec  ==.
drop if big5aa  ==.
drop if big5ab  ==.
drop if big5ac  ==.
drop if big5na  ==.
drop if big5nb  ==.
drop if big5nc  ==.

drop if big5oa  < 0
drop if big5ob  < 0
drop if big5oc  < 0
drop if big5ca  < 0
drop if big5cb  < 0
drop if big5cc  < 0
drop if big5ea  < 0
drop if big5eb  < 0
drop if big5ec  < 0
drop if big5aa  < 0
drop if big5ab  < 0
drop if big5ac  < 0
drop if big5na  < 0
drop if big5nb  < 0
drop if big5nc  < 0

* reorder Big 5 variables so questions move in the same direction.

gen interim = 1 if big5nc ==7
replace interim = 2 if big5nc ==6
replace interim = 3 if big5nc ==5
replace interim = 4 if big5nc ==4
replace interim = 5 if big5nc ==3
replace interim = 6 if big5nc ==2
replace interim = 7 if big5nc ==1
```

```
drop big5nc
rename interim big5nc

gen interim = 1 if big5aa ==7
replace interim = 2 if big5aa ==6
replace interim = 3 if big5aa ==5
replace interim = 4 if big5aa ==4
replace interim = 5 if big5aa ==3
replace interim = 6 if big5aa ==2
replace interim = 7 if big5aa ==1

drop big5aa
rename interim big5aa

gen interim = 1 if big5ec ==7
replace interim = 2 if big5ec ==6
replace interim = 3 if big5ec ==5
replace interim = 4 if big5ec ==4
replace interim = 5 if big5ec ==3
replace interim = 6 if big5ec ==2
replace interim = 7 if big5ec ==1

drop big5ec
rename interim big5ec

gen interim = 1 if big5cb ==7
replace interim = 2 if big5cb ==6
replace interim = 3 if big5cb ==5
replace interim = 4 if big5cb ==4
replace interim = 5 if big5cb ==3
replace interim = 6 if big5cb ==2
replace interim = 7 if big5cb ==1

drop big5cb
rename interim big5cb

* Generate Big 5 variables using Factor analysis.

global xlist big5oa big5ob big5oc big5ca big5cb big5cc big5ea big5eb big5ec big5aa big5ab
big5ac big5na big5nb big5nc
global ncomp 5


factor $xlist, factor($ncomp)
rotate, promax(1)
predict cp1 op1 ep1 ap1 np1

factor $xlist, factor($ncomp) blanks(0.3)
```

```
rotate, promax(4) blanks(0.3)
predict cp4 op4 ep4 ap4 np4

factor $xlist, factor($ncomp)
rotate, promax(6)
predict cp6 op6 ep6 ap6 np6

factor $xlist, factor($ncomp)
rotate, varimax
predict cv ov ev av nv

factor $xlist, factor($ncomp)
rotate
predict cr or er ar nr



*big5oa big5ob big5oc big5ca big5cb big5cc big5ea big5eb big5ec big5aa big5ab big5ac
big5na big5nb big5nc

*  Drop missing variables:

drop if happy <0
drop if happy ==.
drop if age ==.
drop if sex ==.
drop if edu ==.
drop if parent ==.


save "C:\Users\Johan\Desktop\Stata Export\merge2b.dta", replace
* Now ready to use 3 Primary Do File.
use  "C:\Users\Johan\Desktop\Stata Export\merge2b.dta", clear
xtset pid year, yearly

set matsize 800
set more off
set more off, perm
set showbaselevels off

drop if region == 19
drop if region == -9
drop if year ==3
drop if year ==10

gen purpose = 1 if kqlfk  == 4
replace purpose = 2 if kqlfk  == 3
replace purpose = 3 if kqlfk  == 2
replace purpose = 4 if kqlfk  == 1
```

```
gen autonomy= 1 if kqlfg  == 4
replace autonomy= 2 if kqlfg  == 3
replace autonomy= 3 if kqlfg  == 2
replace autonomy= 4 if kqlfg  == 1

gen environmastery = 1 if kqlfe  == 4
replace environmastery = 2 if kqlfe  == 3
replace environmastery = 3 if kqlfe  == 2
replace environmastery = 4 if kqlfe  == 1

gen relationships = 1 if kqlfm  == 4
replace relationships = 2 if kqlfm  == 3
replace relationships = 3 if kqlfm  == 2
replace relationships = 4 if kqlfm  == 1

gen happy2 = 1 if kqlfn  == 4
replace happy2 = 2 if kqlfn  == 3
replace happy2 = 3 if kqlfn  == 2
replace happy2 = 4 if kqlfn  == 1

rename happy2 happytwo

drop if relationships < 0
drop if autonomy < 0
drop if purpose < 0
drop if environmastery < 0

drop if sat < 0
drop if aninc < 0
gen aninc1 = aninc +10
gen lnaninc1 = ln(aninc1)
drop if lnaninc1 < 5

rename lnaninc1 income
rename environmastery environ
rename relationship relation
rename autonomy auto

. drop if purpose ==.
. drop if auto==.
. drop if environ==.
. drop if relation ==.
drop if micro==.
drop if qlrwtsw1==.

rename ar agree
rename or open
rename cr consci
```

```
rename er extro
rename nr neuro

keep hoh age sex edu happytwo nhlsf9a nhlsf9b nhlsf9c nhlsf9d nhlsf9e nhlsf9f nhlsf9g
nhlsf9h nhlsf9i auto happy big5ca big5ea big5na big5oa big5ab big5eb big5nb big5ob big5ac
big5cc big5oc big5nc big5aa big5ec big5cb environ purpose relation income sat open consci
agree extro neuro  sat qlrwtsw1 region micro pid year

drop if nhlsf9a ==.
drop if nhlsf9b ==.
drop if nhlsf9c ==.
drop if nhlsf9d ==.
drop if nhlsf9e ==.
drop if nhlsf9f ==.
drop if nhlsf9g ==.
drop if nhlsf9h ==.
drop if nhlsf9i==.


drop if nhlsf9a < 0
drop if nhlsf9b < 0
drop if nhlsf9c < 0
drop if nhlsf9d < 0
drop if nhlsf9e < 0
drop if nhlsf9f < 0
drop if nhlsf9g < 0
drop if nhlsf9h < 0
drop if nhlsf9i < 0

reshape wide age edu hoh happytwo happy region sat micro income, i(pid) j(year)

rename nhlsf9a fulllife
rename nhlsf9b  nervy
rename nhlsf9c dumps
rename nhlsf9d cheerful
rename nhlsf9e energy
rename nhlsf9f downhearted
rename nhlsf9g wornout
rename nhlsf9h happymonth
rename nhlsf9i tired

reshape long age edu happytwo hoh nhlsf9d affect happy gain loss region sat micro income,
i(pid) j(year)
drop if sat==.
rename income inc
rename environ env
rename relation rel
rename purpose pur
```

```
rename big5aa aa
rename big5ab ab
rename big5ac ac

rename big5ea ea
rename big5eb eb
rename big5ec ec

rename big5na na
rename big5nb nb
rename big5nc nc

rename big5ca ca
rename big5cb cb
rename big5cc cc

rename big5oa oa
rename big5ob ob
rename big5oc oc

gen cheerful2 = 1 if cheerful  == 6
replace cheerful2 = 2 if cheerful == 5
replace cheerful2 = 3 if cheerful == 4
replace cheerful2 = 4 if cheerful  == 3
replace cheerful2 = 5 if cheerful == 2
replace cheerful2 = 6 if cheerful  == 1
drop cheerful
rename cheerful2 cheerful


gen fulllife2 = 1 if fulllife  == 6
replace fulllife2 = 2 if fulllife == 5
replace fulllife2 = 3 if fulllife == 4
replace fulllife2 = 4 if fulllife  == 3
replace fulllife2 = 5 if fulllife == 2
replace fulllife2 = 6 if fulllife  == 1
drop fulllife
rename fulllife2 fulllife


gen energy2 = 1 if energy  == 6
replace energy2 = 2 if energy == 5
replace energy2 = 3 if energy == 4
replace energy2 = 4 if energy  == 3
replace energy2 = 5 if energy == 2
replace energy2 = 6 if energy  == 1
drop energy
rename energy2 energy
```

```
drop  nhlsf9d
drop consci open extro agree neuro
drop happytwo
drop affect gain loss
drop tired wornout
. rename downhearted down
. rename happymonth hapmnth
rename micro solo
. label define solo 1 "solo" 2 "self" 3 "employ", modify
. label values solo solo
```

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