The multidimensionality of well-being:
Theory, measurement and empirical investigations

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I certify that all material in this thesis which is not my own work has been identified and that no material has previously been submitted and approved for the award of a degree by this or any other University.

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ABSTRACT

Background: Well-being within this thesis is defined as the multidimensional quality of a person's life, which can be broken down into 'subjective' and 'objective' forms. Despite persistent study, researchers fail to agree on the meaning of well-being or how it should be studied.

Aim: The first half of the thesis aims to examine the meaning, measurement and theory of well-being. The second half of the thesis aims to investigate the factors associated with subjective well-being (SWB), and the influence of attributes of well-being on preferences for the future.

Methods: A systematic review was conducted to identify measures of well-being for use in adults (general population). The dimensions within these measures were organised into a framework using thematic analysis. Further, the theories underpinning these measures were identified and described. Fixed-effect regression models were used to study the factors important for SWB using data from a longitudinal (1996 – 2013) cohort of middle aged-older adults in the United States (n = 2049). Finally, preferences for life in the future were estimated in a sample of young 'emergent adults' (n =140) in the United Kingdom, using discrete choice experiments (DCEs).

Results: The systematic review identified 99 measures of well-being, which included 196 distinct dimensions. These measures were influenced by a diverse range of theories (n = 98). Mental health, social integration and satisfaction with work had a significant impact on each of the SWB outcome variables (life satisfaction, positive affect and negative affect) in the fixed-effects analysis. The DCE indicated that stated preferences for life in the future among emergent

adults were particularly driven by the prospect of social support from family and an aversion to experiencing mental health difficulties.

Conclusion: This thesis has investigated inconsistencies in how well-being is understood, measured and studied. In response to this, a framework has been developed which organises the many measures available around key themes. Following on from the fixed-effects analysis and the DCE, future empirical research should be undertaken to investigate the interdependence of well-being and mental health.

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ACRONYMS

Acronym	Description
AFH	Action for Happiness
AML	Antonieta Medina-Lara
CI	Confidence Interval
DCE	Discrete Choice Experiment
FE	Fixed-effects
FEELE	Finance and Economics Experimental Laboratory at Exeter University
GDP	Gross Domestic Product
GNH	Gross National Happiness
ICFDH	International Classification of Functioning, Disability and Health
MIDUS	Midlife in the United States
ML	Myles-Jay Linton
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
ONS	Office of National Statistics
OWB	Objective Well-being
PD	Paul Dieppe
RM	Ruben Mujica-Mota
RP	Revealed Preference
SD	Standard Deviation
SE	Standard Error
SP	Stated Preference
SWB	Subjective Well-being
TFW	Thematic Framework of Well-being
WHO	World Health Organisation

DISSEMINATION

The work in this thesis has been disseminated as described below:

Linton, M. J., Medina-Lara, A., Dieppe, P., & Mujica-Mota R. (2016). The pursuit of life satisfaction: a discrete choice experiment. Health Economists' Study Group Winter meeting, Birmingham 2017. (Appendix N)

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CHAPTER 1: INTRODUCTION

1.1.   Introduction

In 2015 the United Nations announced that one of its Sustainable Development Goals for 2030 would be to "ensure healthy lives and promote well-being for all ages", cementing the importance of well-being as a global academic and policy priority (United Nations, 2015). However, debate concerning the nature and attainment of well-being persists. This thesis presents a structured contribution to that debate.

The purpose of this chapter is to introduce the study of well-being and to outline how this thesis approaches the topic. This chapter provides: a background section focusing on the importance of the subject and some of the knowledge gaps that provide the rationale for the work conducted (1.2), an overview of the thesis purpose, overarching aims and approaches taken (1.3), and finally an outline of each of the subsequent chapters (1.4).

1.2.   Background

1.2.1. Significance of the topic

At a national level, well-being has become a highly prioritised and politicised concern. The French government's 'Commission on the Measurement of Economic, Personal and Social Progress' influentially suggested that there was a need to complement traditional indices of social progress such as Gross Domestic Product[1] (GDP) with insight on how individuals within countries perceive their own well-being (Stiglitz, Sen, & Fitoussi, 2010a). Influenced by this, the United Kingdom launched its own effort to monitor national well-being on an annual basis through the Office of National Statistics (Hicks, Tinkler, &

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[1] GDP per capita is a commonly used standard statistical account of economic progress (England, 1998).

Allin, 2013). Bhutan has also incorporated the 'pursuit of happiness' into its plans for development (Bates, 2009), and is currently the only country in the world that has replaced GDP with Gross National Happiness[2] (GNH). These initiatives share a common realisation that understanding how well people experience life within a country requires an examination of more than national income alone.

At a global level, well-being has become a highly-prized outcome for the purposes of cross-country comparison. International efforts include: The Gallup-Healthways Well-being Index (Gallup-Healthways, 2014), World Happiness Report (Helliwell, Layard, & Sachs, 2013) and the Organisation for Economic Co-operation and Development (OECD) Better Life Index (OECD, 2011b). Each of these resources provides a league table outlining the highest and lowest performing countries in the world, and often rank countries such as Denmark and Norway as high performers. This growing perception that a Nordic (Northern European) lifestyle is advantageous for well-being has been part of the driving force behind recent attempts to market the culture of 'hygge'[3] across the world (Linnet, 2011). As such, the attainment of well-being now appears to be (rightly or wrongly) an international competition.

Within the UK, research into the topic continues to result in new and interesting developments. One such development is the Action for Happiness (AFH) campaign which aims to increase the happiness levels of the nation (Layard, 2011). This initiative was devised by a collection of prominent

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[2] The GNH index is a multidimensional score composed of national data regarding performance in 9 key domains: psychological wellbeing, time use, community vitality, cultural diversity, ecological resilience, living standard, health, education and good governance (Ura, Alkire, & Zangmo, 2012).
[3] Hygge is a Danish term used to describe the way in which togetherness, a comfortable atmosphere and engagement in the present moment can induce contentment and relaxation (Brits, 2016).

academics with a shared interest in 'happiness economics' and 'positive psychology'. To date, the AFH 'movement' has: assembled groups, run local events, conducted short courses, compiled self-help resources and even opened up a 'happy café' in London (Action for Happiness, 2017). Campaigns like these are one way in which insight from research is being used to produce positive changes within communities.

Ongoing interest in the topic of well-being can also be attributed to its potential for producing unexpected results that challenge current assumptions. For example, a cross-cultural review into well-being studies within countries such as the United States, Taiwan and Japan highlighted that there are many instances in which people are 'averse' to happiness (Joshanloo & Weijers, 2014). These authors indicate instances in which people may expect bad things to happen to people who are happy, or feel guilty about expressing their own happiness, contradicting the assumption that well-being is simply a universally sought-after outcome. Studies such as these challenge beliefs, divide popular opinion and stimulate debate, which consequently fuels further study into the topic.

1.2.2. Challenges and knowledge gaps

Interestingly, these global initiatives and national campaigns have commenced amidst scepticism about the quality of research into the nature of well-being. One of the main criticisms of the topic surrounds the collection of self-reported data using standardised well-being measures (Frey & Stutzer, 2005). These

measures have been criticised because the 'ordinal'[4] nature of the data that they generate may be too subjective to compare across individuals (Oswald, 2010). This critique is part of a wider argument concerning the methodological rigor and reliability of the studies in question.

As the debate concerning whether well-being should be studied continues, extensive gaps in our knowledge of the subject persist. At least three critical challenges for the study of well-being have been recognised within the literature. The first challenge is that there is little agreement over exactly what well-being means or how it should be defined (Gasper, 2007; Veenhoven, 2009). Secondly, there is similar uncertainty regarding how well-being should be measured (Layard, 2010), and the options available to researchers. Finally, researchers have been unable to provide widely accepted insight on the determinants of well-being (Dolan, Peasgood, & White, 2008), or the wider matter of what type of life people would like to live. These three broad challenges provide the primary rationale for the development of this thesis.

1.3. The purpose of this thesis

This thesis is concerned with theory, measurement, associated factors and preferences, with regards to well-being. The central aim of this research is to provide a theoretically-driven, cross-disciplinary and methodologically diverse empirical investigation into the nature of well-being. This thesis will present and detail the research conducted towards this effort.

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[4] 'Ordinal' scales consist of categorical options such as 'strongly agree, agree, disagree and strongly disagree' while 'cardinal' scales are purely numerical and continuous, therefore the differences between scores on scales (such as temperature) are standard.

1.4.   Research aims

This thesis approaches the topic of well-being from five angles: its meaning, measurement, theory, associated factors and preferences. These avenues of research are translated into five key aims which are detailed in Table 1.1. Due to the broad nature of these overarching aims, they are broken down into more focussed sub-aims.

Table 1.1. The five overarching aims of the thesis

Overarching aims	Sub-aims
Exploring the meaning of well-being	To explore the definitions of well-being provided within dictionaries and the academic literature
	To explore the ambiguity arising from terms in the literature which are used interchangeable with 'well-being' - such as health, quality of life and happiness
	To provide an operational definition of well-being for use within the thesis
Identifying measures of well-being	To systematically identify and describe measures of well-being for use in the adult general population
	To explore how the measurement of well-being has developed over time
	To examine the variety of dimensions found within the instruments identified
	To organise the dimensions and instruments into a framework structured around key themes
Examining theories which have influenced the measurement of well-being	To examine the extent to which measures of well-being are based on a theoretical foundation
	To examine which specific theories have been the most influential across measures of well-being
	To investigate the ways in which the measures and theories identified are interconnected using network analysis methods
	To summarise a selection of the theories which have been influential in the measurement of well-being
Investigating the factors associated with subjective well-being (SWB)	To develop an empirical study into the factors associated with SWB (life satisfaction, positive affect and negative affect) informed by the OECD framework for measuring well-being
	To investigate the factors associated with: - Life satisfaction - Positive affect - Negative affect
Investigating which attributes of well-being influence the preferences that young emerging adults have for their life in the future	To use the thematic framework presented in Chapter 3 to inform the development of a discrete choice experiment (DCE)
	To examine whether the importance of the different attributes of well-being are dependent on the level of annual salary that a person would have in the future (interaction effects)
	To examine whether the level of cognitive demand in a DCE (length of the experiment) has an impact on the results yielded
	To explore why some respondents decide to opt-out of DCE scenarios

1.4.1. Disciplinary, theoretical and methodological approach

This thesis principally draws on input from economics and psychology. Other disciplines such as sociology, philosophy and biomedicine are implicitly essential to the research undertaken, and are explicitly mentioned in some of the chapters; however, it is not possible to present a cohesive thesis and do justice to each of the many disciplines which have influenced the study of well-being. Focusing on psychology and economics is particularly defensible due to the existence of well-documented joint endeavours on topics as broad as rationality (Kahneman, 2003), team performance (Wuchty, Jones, & Uzzi, 2007) and incentives (Kamenica, 2012).

Rather than advancing one theory throughout the thesis, a multitude of perspectives are highlighted. The work begins with a broad exploration of theoretical variety, which provides a characterisation of some of the dominant and lesser known approaches to the subject. Following this, later sections of the thesis provide a more focused examination of subjective well-being theory (Diener, 1994) and the economic principle of 'utility'. This approach follows the shape of a funnel, by beginning with a wider exploration and eventually narrowing the theoretical focus.

Well-being is a complex topic, which requires the application of multiple methodological approaches. The research documented in this thesis was undertaken with this mixed-methods ethos in mind. The methods used across the thesis are summarised in Table 1.2. Data are collected using systematic searches and from primary experiments, however existing sources of secondary data (Midlife in the United States study of health and well-being - MIDUS) are also utilised. Most of the quantitative data analyses were undertaken using

econometric methods; however qualitative methods (thematic analysis) are also employed. STATA is used for descriptive and inferential data analysis while SPSS was mainly used for data entry, cleaning and preparation. R Studio and Adobe CS3 were used to produce timelines, network diagrams and other visualisations. Microsoft Excel was used for a variety of purposes, including: randomisations, storing details on the participants, organising variables and other general administrative purposes.

Table 1.2. Main methodological approaches used within the thesis

Chapters	Data collection	Data analysis	Software
Chapter 2	- Literature review (non-systematic)	- Narrative synthesis	n/a
Chapter 3	- Systematic searches*	- Narrative synthesis - Thematic analysis	- Endnote - Microsoft Excel - Adobe CS3
Chapter 4	- Systematic searches*	- Narrative synthesis - Network analysis	- Endnote - R Studio - Microsoft Excel
Chapter 5	- Secondary data: Midlife in the United States study of health and well-being (MIDUS)	- Ordinary least squares regression models with longitudinal fixed-effects analyses	- SPSS - STATA - Microsoft Excel
Chapter 6	- Systematic searches	- Narrative synthesis	- Endnote
Chapter 7	- Primary data: Collected using discrete choice experiments	- Mixed logit regression models with marginal main effects and interactions	- Microsoft Excel - SPSS - STATA

Notes: * = Chapter 3 and Chapter 4 use data from the same systematic searches of the literature

1.5. Thesis overview

Chapter 2 tackles the first overarching theme of the thesis by focusing on the variety of well-being definitions in use. This chapter includes an examination of definitions within dictionaries and compares them to definitions of well-being in the academic literature. These approaches are taken together to synthesise a definition of well-being for use in the thesis.

Chapter 3 addresses the second overarching aim of the thesis and presents the results of a systematic search for measures of well-being. This work provides readers with a description of many of the tools in use and a

timeline tracking the development of these tools over time. Finally, a thematic framework to assist researchers seeking to measure well-being is presented.

Chapter 4 focuses on the third overarching aim and contains the main theoretical section of the thesis. This chapter includes an analysis of the interconnections between measures of well-being and the theories which have influenced their development. The most influential theories in the literature are grouped and summarised.

Chapter 5 advances the fourth overarching aim of the thesis. Data from a longitudinal sample of middle aged and older adults in the United States are analysed using fixed-effects methods and a model guided by the OECD framework for the measurement of well-being. The objective of this chapter is to examine the factors associated with three SWB outcomes (life satisfaction, positive affect and negative affect).

Chapter 6 introduces the use of DCEs and applications to the topic of well-being. The focus of this chapter is on the theoretical underpinnings and recommended steps for developing DCEs. A systematic search is run to identify studies which have used DCE methods to investigate the topic of well-being.

Chapter 7 is informed by the framework developed in Chapter 3 and the insight into DCEs described in Chapter 6. This section of the research addresses the fifth overarching aim of the thesis and details an investigation into the stated preferences of young 'emerging adults' for their life in future. A DCE is developed, piloted and administered to a sample of participants in the Finance and Economics Experimental Laboratory at Exeter University (FEELE).

Chapter 8 provides the thesis with its general discussion. The key findings and implications of the research are outlined in reference to the

overarching aims detailed in Table 1.1 of this chapter. Following this, the theoretical, methodological and empirical contributions made to the literature are described. The practical limitations encountered while undertaking the research are also outlined. Finally, a general conclusion is presented and lessons learned are briefly summarised.

CHAPTER 2: WHAT DOES 'WELL-BEING' MEAN?

2.1. Introduction

The meaning of well-being has been of interest to political leaders such as David Cameron (Cameron, 2010), religious figures such as the Dahli Lama (Lama, 2010) and authors throughout the ages (Dostoevsky & MacAndrew, 1961; Murakami, 2006; Plath, 1971). Governments (Cabinet Office - United Kingdom, 2013), charities (Mind, 2016), and think tanks (Aked, Marks, Cordon, & Thompson, 2009) have all also provided their own definitions and perspectives on the subject. Problematically, these and other attempts have yet to converge on a shared understanding of well-being.

This chapter focuses on three aspects of the meaning of well-being. To begin, the way in which well-being is defined within dictionaries is summarised (2.2). Next, academic approaches to understanding well-being, subjective well-being (SWB) and objective well-being (OWB) are discussed (2.3). Following this, some of the difficulties associated with the terms used interchangeably with 'well-being' are outlined (2.4). The goal of reflecting on these issues, was to inform the development and clarification of an operational definition of well-being for use in this thesis. This definition is presented at the end of the chapter (2.5).

2.2. Well-being – Definitions within dictionaries

Understanding how well-being is conceptualised outside of academia provides insight into how people understand and interpret their own experiences of well-being (McMahan & Estes, 2011). Dictionaries provide a 'reliable' source of

information on the meaning and usage of words, with a lay (non-expert)

readership in mind (Jackson, 2002). A collection of definitions for well-being

found within dictionaries are presented in Table 2.1[5]. These definitions

demonstrate that there are both similarities and disparities in how well-being is

defined.

Table 2.1. Dictionary definitions of well-being

Dictionary source	Definition
Merriam-Webster	The state of being happy, healthy, or prosperous
Oxford English	The state of being comfortable, healthy, or happy
Cambridge	The state of feeling healthy and happy
Collins English	The condition of being contented, healthy, or successful; welfare
Collins American English	The state of being well, happy, or prosperous; welfare
Your-dictionary	The state of being healthy, safe, comfortable and happy
Dictionary.com	A good or satisfactory condition of existence; a state characterized by health, happiness, and prosperity; welfare
Vocabulary.com	A state of health, happiness, and contentment. Everyone wants to enjoy well-being
Macmillan	The satisfactory state that someone or something should be in, that involves such things as being happy, healthy, and safe, and having enough money

The first observation from these definitions is that well-being is frequently

understood as existing in the form of a 'state' or 'condition'. The underlying

implication here is that well-being is something to be attained, or similarly lost. If

well-being is a state, then there may be other states that a person can be in,

such as a lack of well-being (a form of ill-being). This understanding of well-

being makes an implicit assumption that well-being is a static experience, in

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[5] These nine definitions were collected following a google search conducted in November 2016.

contrast to suggestions that it is a dynamic 'process' that ebbs and flows throughout life.

The remaining descriptive terms found within definitions of well-being have been highlighted within Table 2.2. Icons are used to indicate terms which reoccur consistently across these definitions. Happiness (8/9) and health (8/9) were the most used terms found within the definitions, followed by welfare (3/9) and prosperity (3/9). These definitions however are not designed to be academic in nature, therefore they make little attempt to clarify whether well-being is the *experience* of being happy and healthy (Figure 2.1), or whether happiness and health *cause* people to attain a state of well-being (Figure 2.2). These unresolved discrepancies may be part of the reason why well-being remains a frequently misunderstood topic.

Table 2.2. Common terms used in dictionary definitions of well-being

Collins English	Collins American English	Marriam-Webster
The condition of being:	The state of being:	The state of being:
● contented,	◆ well,	■ happy,
● healthy, or	■ happy, or	● healthy, or
■ successful;	■ prosperous;	■ prosperous
● Welfare	● Welfare	
Your-dictionary	**Cambridge**	**Oxford English**
The state of being:	The state of feeling:	The state of being:
● healthy,	● healthy, and	◆ comfortable,
◆ safe,	■ Happy	● healthy, or
◆ comfortable and		■ happy
■ Happy		
Dictionary.com	**Vocabulary.com**	**Macmillan**
A good or satisfactory condition of existence; a state characterized by:	A state of:	The satisfactory state that someone or something should be in, that involves such things as being:
	● health,	
● health,	■ happiness, and	
■ happiness, and	● Contentment	■ happy,
■ prosperity;		● healthy,
● Welfare		◆ safe, and
		● having enough money

Figure 2.1. Happiness, health and other factors cause well-being
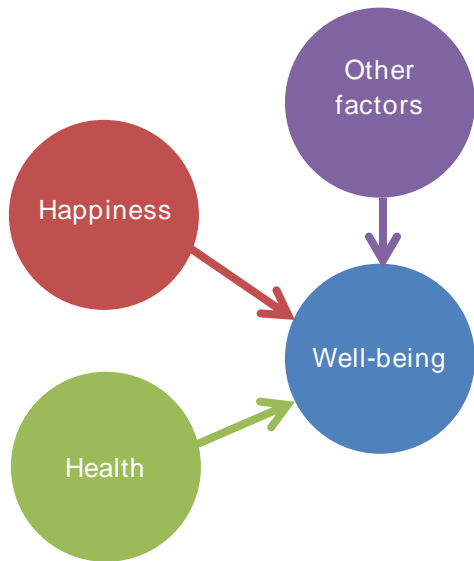
Figure 2.2. Happiness, health and other factors describe the state of well-being
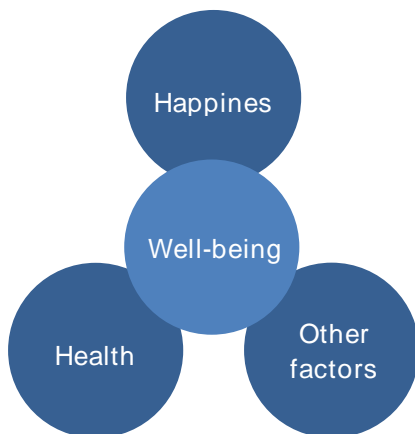
The definitions presented also suggested that well-being encompasses: comfort, safety, having enough money, success and contentment. These claims highlight that there is continued variability in the conditions assumed necessary for well-being. Further, it is unclear whether the attainment of each and every one of these conditions is necessary in order to achieve a state of well-being. If these conditions are taken together, well-being is not just about feeling happy and content with life; it is also about tangible qualities of life like money and physical safety.

The clearest message from these definitions is the implicit assumption that well-being is multidimensional. Although none of these definitions explicitly described well-being as being multidimensional, it is consistently implied by the collection of 'conditions' required to achieve this state. There are numerous differences in the conditions required for well-being, and a lack of detail concerning exactly how and why well-being occurs. Together, the definitions discussed so far suggest that well-being is a multidimensional state that encompasses feelings of happiness, good health and an acceptable level of economic provisions.

2.3. Well-being - Definitions in the academic literature

Adjacent to the lay description of well-being presented above, a much larger, academic and scholarly approach to the topic of well-being has been underway for many years. The next section will introduce this topic area as a way of further exploring the meaning of well-being and some of the challenges that arise when tackling this topic. The main focus will be on: the general distinction between subjective well-being (SWB) and objective well-being (OWB), and managing the many terms used synonymously with well-being.

2.3.1. Subjective and objective forms of well-being

Subjective well-being (SWB) originated within the discipline of psychology; however it is now notably used within economics and several other fields (Kahneman & Krueger, 2006). The most dominant approach to the topic describes SWB as having two core components: a cognitive aspect that

concerns how satisfied individuals are with their life on the whole (life satisfaction) and an emotional aspect that concerns experiences of positive emotions like happiness (positive affect) and negative emotions like anxiety (negative affect) (Diener, 1994). There are several other aspects of well-being that are 'subjective' or personally determined that are not covered by Diener's theory. Personal growth, self-acceptance and purpose in life are just a small selection of these (Ryff & Keyes, 1995).

Objective well-being (OWB) on the other hand concerns the arguably more tangible qualities that define a person's circumstances. These qualities include a person's socio-economic conditions, such as their income, level of education and the absence of illness (Schueller & Seligman, 2010). Like SWB, forms of OWB such as income provide an important, but nonetheless incomplete representation of well-being, hence why there have been continued efforts to study the two broad forms of well-being simultaneously (Oswald, 2010; Oswald & Stephen, 2010).

2.3.2. Synonyms of well-being

One of the biggest challenges faced when studying well-being is managing the many terms it is used synonymously with. These synonymous include: flourishing, functioning, happiness, health, income, quality of life, stress, welfare and wellness. This list was in part informed by the definitions of well-being presented in Table 2.1. Any attempt to understand the meaning of well-being must also include some awareness of how well-being is distinct from these synonyms, if it is at all. There are additional terms that could be added to this

list; however, focus has been limited to synonyms that reoccur throughout the literature.

2.3.2.1. Flourishing

A person may be described as 'flourishing' if they are both free of mental illness and simultaneously possess good mental health (Keyes, 2007). This definition stresses the point that a good life requires more than simply the absence of mental illness. The absence of mental illness without the simultaneous experience of mental healthiness is not a true state of flourishing (Fredrickson & Losada, 2005). Flourishing can be broken down into positive emotional, psychological and social functioning (Keyes, 2007). Individuals who are flourishing often demonstrate growth and resilience (Fredrickson & Losada, 2005). In this way, the process of flourishing can be thought of as an adaptive response to a person's environment (Reschly, Huebner, Appleton, & Antaramian, 2008). Historically, flourishing has been linked to early writings by Aristotle (C. Rowe & Broadie, 2002), however over time the term has been used to describe a general sense of being high in well-being (Arneson, 1999). Flourishing has roots in many disciplines and thus has many interpretations.

2.3.2.2. Functioning

The World Health Organisation's (WHO) International Classification of Functioning, Disability and Health (ICFDH) defines functioning as: the way in which the bodily limitations of an individual with a health condition interact with that person's context, and influence the activities they are able to participate in

(World Health Organization, 2001). However like many terms within the health literature, the concept of functioning has been widened to include psychological coping, emotional experiences and states of mind (Ueda & Okawa, 2003). In general, functioning can be taken to describe how well individuals are able to look after themselves and participate in usual activities.

2.3.2.3. Happiness

Broad definitions of happiness describe it as the positive feelings, emotions and affectual states that characterise a person's life (Lyubomirsky, King, & Diener, 2005). Over time however the meaning of 'happiness' has changed (Mogilner, Kamvar, & Aaker, 2010), and remains one of the most contested aspects of well-being within the literature and lay discussions. Within the context of subjective well-being theory, the way in which positive feelings like happiness fluctuate over time is termed positive affect (Diener, 1994). Elsewhere, happiness is unhelpfully conceptualised as being synonymous with life satisfaction (Veenhoven, 1991). These definitions provide a partial description of some of the many uses of this term.

2.3.2.4. Health

Health is classically defined as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (World Health Organization, 1948). Many difficulties with this definition have been raised – one of these criticisms is that this description is too 'absolute' and inappropriate for an era in which chronic rather than acute conditions are endemic (Huber et al.,

2011). A more temporally-appropriate description of health would be the extent to which physical, social and psychological capacities are able to meet the demands of a person's circumstances and environment (Bircher, 2005). Health may also be defined by the way in which people remain resilient in the face of life's adversities (Zautra, Hall, & Murray, 2010). Many of these definitions nonetheless appear to overlap with how people understand well-being.

2.3.2.5. Income

Income has several units of analysis (i.e. individual, household, country, and numerous others). Personal and household incomes reflect the economic prosperity of individuals and families while GDP can reflect the economic prosperity of whole countries. Unlike other forms of well-being, the meaning of income is clearly described in the literature. The Oxford Dictionary of Economics defines personal income as "the amount an individual can spend in a period while leaving his or her capital unchanged" (Black, Hashimzade, & Myles, 2012). Income has been used interchangeably with the term well-being following the assumption that material prosperity is a rational desire that (when maximised) would improve the way in which people evaluate their lives (Diener & Oishi, 2000). Because income has been used as a proxy (indirect assessment) for well-being the two have become difficult to untangle.

2.3.2.6. Quality of life

Quality of life refers to the attainment of a 'good life' (Diener & Suh, 1997). Much like well-being, quality of life is assumed to be multidimensional and

contain physical, psychological, material and social dimensions (Felce & Perry, 1995). One of the principal differences between well-being and quality of life is that the latter phrasing has been the typical terminology within the disciplines of medicine and healthcare (Cella, 1994). 'Health related quality of life' refers to how a person or patient values, judges and perceives the state of their own life (Crosby, Kolotkin, & Williams, 2003). The WHO defines quality of life as a person's subjective perception of their own position in life, given their cultural context, goals, expectations and standards (The WHOQOL Group, 1998). There are clearly several interpretations of quality of life and it is difficult to disentangle them from health.

2.3.2.7. Stress (the absence of)

Stress can be understood as the interaction between an individual and the constraints of their environment (McGrath & Dunnette, 1976). People respond to stress in a variety of ways, which are often categorised into physiological, psychological and behavioural outcomes (Schuler, 1980). In relation to well-being, stress is sometimes associated with 'negative affect' - one of the emotional components of SWB (Kahneman & Deaton, 2010). Part of the reason why experiences of stress have been linked to well-being can be attributed to findings that exposure to stressful life events is a threat to both health and happiness (Hatch et al., 2007).

2.3.2.8. Welfare

Welfare has traditionally referred to the material (socio-economic) circumstances of a person or group (Veenhoven, 2000). Authors have noted that well-being and welfare are frequently linked (Veenhoven, 2000). This link may exist in part due to a belief that societies with larger welfare states should have happier and healthier populations (Veenhoven, 2000). It is assumed that a society with high levels of well-being is likely to be one where its citizens have their welfare catered for.

2.3.2.9. Wellness

Wellness refers to whether or not a person is living a fully functioning life, in mind, body and spirit (Smith, Myers, & Hensley, 2002). Like well-being, wellness is described as a multidimensional construct, consisting of intellectual, emotional, physical, social, occupational and spiritual components (Chandler, Holden, & Kolander, 1992). Elsewhere, the maintenance of: balance, maximised potential and purpose in life have each been described as key indicators of wellness (Dunn, 1959). On the whole, there is little consistency in how wellness is conceptualised, and it is often used interchangeably with well-being (Roscoe, 2009; Ryan & Huta, 2009).

2.4. This thesis's operational definition of well-being

In summary, there are many definitions of well-being in use, and many terms which it is confounded with. In spite of these difficulties, there is a practical need to state here how the term 'well-being' will be used within this thesis. To achieve

some degree of harmony between the many definitions in use, insight has been triangulated from many of the options presented. In this thesis well-being will broadly be defined as the 'Multidimensional quality of a person's life, which can be broken down into 'subjective' and 'objective' forms. This includes, but is not limited to a person's: happiness, health and income". This definition recognises the relevance of how people think and feel about the life they lead, alongside their socioeconomic, environmental and physical circumstances.

2.5.   Discussion

2.5.1. How should well-being be defined?

The overall message from this chapter is that the meaning of well-being remains a confusing and highly contested matter. Ongoing debates remain largely unresolved; therefore, researchers are often left to pick between available definitions, or provide their own contributions. Increasingly this has involved researchers from a diverse range of disciplinary backgrounds. Nonetheless, the many contributions to the discussion have not converged on a single, clear or consistent definition of well-being.

One point of common convergence between the definitions presented was the suggestion that well-being is multidimensional in nature. Dictionary and academic definitions alike frequently implied that well-being was a collection of important 'things'. In many of the dictionary definitions, 'health' and 'happiness' were consistently used to describe the meaning of well-being. In the academic literature, it was common for well-being to be described as simultaneously subjective, objective, physical, psychological and social in nature.

To clarify the term's usage within this thesis, an operation definition has been presented. Much like existing definitions described in the chapter, this conceptualisation may not yield universal acceptance. However, presenting this definition will at a minimum clarify to the reader how the term should be interpreted within this thesis. One strength of this definition is that it is broad enough to reflect the composite nature of well-being. In forthcoming chapters well-being will be used as an 'umbrella' term, rather than a singular concept. Specific facets of well-being, such as SWB will be referred to explicitly. The effectiveness of his definition will be revisited at the end of the thesis.

2.5.2. Difficulties defining well-being

One difficulty in defining well-being is finding the right words to convey the desired meaning. At the heart of this challenge is the way in which words used to describe well-being have multiple meanings, and thus may be misinterpreted. For example, where well-being is defined as a person's 'quality of life', it is unclear whether this refers to the literal 'quality' of a person's life, or to the formalised concept of quality of life developed within the discipline of medicine (Cella, 1994). Similarly, if well-being was defined as 'a person's sense of wellness' some readers will understand this to literally mean how 'well' a person is, however others will immediately begin to think about definitions of wellness they have read within the nursing or counselling literature (Smith et al., 2002). As such, subject-matter knowledge on the topic can bias how people interpret a definition. Words in definitions remain open to many interpretations, therefore the prospect of a universally accepted description for well-being is difficult to envision.

An additional point to consider is that people in society may choose to define well-being in their own way. For some people, well-being is thought of as a personal topic, therefore people are bound to form an opinion based on their own experiences or the experiences of those around them. This occurrence reflects the subjective nature of the topic.

2.5.3. Practical considerations

In response to continued ambiguity, stating what well-being *is not* should be prioritised just as much as stating what well-being *is.* The WHO embodied this philosophy when they defined health as "not merely the absence of disease" (World Health Organization, 1948). Theoretical and empirical work is required to distinguish how and where well-being and health differ. Similar clarification is required for terms like happiness, which carries multiple meanings. In the absence of shared definitions for these concepts, authors should as often as possible explicitly state how they define these terms, and why they have selected these definitions instead of competing options.

The common synonyms for well-being are clearly of importance; however, it should be noted that they may only give a partial description of well-being. Knowing a person's income level would not be enough to perfectly predict their happiness level. It is precisely this incompleteness that makes these terms insufficient synonyms. Investigating how predictive these concepts are of well-being in general is an empirical question that has yet to be fully answered. The way in which forms of OWB predict how people think and feel about their lives will be revisited in later sections of the thesis.

Several of the synonyms described were highly related. Health, functioning and wellness for example were each described as multidimensional constructs with psychological, physical and social components. This overlap makes it difficult to distinguish whether these terms are unique or simply alternative phrasings for the same underlying concepts. For this reason, it is important for researchers to provide some form of explicit rationale within their work for their choice of phrasing.

2.5.4. Limitations

One limitation of this overview is that the literature reviewed in this chapter was not sourced systematically. Given the goal of providing an overview of some of the ways in which well-being has been defined a systematic literature search was not deemed essential. The extent of literature examined was enough to demonstrate that there are inconsistencies in how well-being is understood. In future, it would be beneficial to undertake a more systematic search, and also to conduct a more thorough content analysis of the definitions identified. This process would help to better highlight some of the more subtle commonalities and differences present with definitions.

In this chapter dictionary definitions of well-being were examined as a pragmatic way of exploring how non-experts understand the topic. This was useful for the purposes of developing an operational definition, however in the future it would be interesting to conduct primary qualitative research into the ways in which people conceptualise their own well-being. For example, focus groups could be used to explore whether people are able to reach a consensus on how well-being should be defined. If people are not able to fully converge,

themes in the data collected could demonstrate where consistencies exist. The importance of health and happiness within well-being (as indicated by dictionary definitions) could also be probed.

2.5.5. The use of terms within the thesis

Happiness remains a contentious concept to define. With clarity in mind, happiness within this thesis will refer to the positive emotional experiences which are more formally described as feelings of 'positive affect' (Diener, 1994). Happiness will not be used synonymously with 'well-being' in general, as it currently is (Veenhoven, 1991).

The topic of stress was introduced; however, this term will not feature throughout the thesis. Much of the literature on stress draws on context-specific research concerning physiological and occupational matters which are out of the practical scope of this thesis. It remains important to consider the relationship between well-being and stress to better understand how people respond to the challenges they encounter in their lives; however this will not be undertaken in the current work.

2.5.6. Conclusion

The meaning of well-being continues to be a contentious issue and there is little consistency among the definitions provided. Health and happiness, among other terms continue to be conflated with well-being, within both academic and non-expert definitions. The difference between well-being and its many synonyms is often unclear. One aspect of agreement among the approaches

provided concerns the multidimensionality of well-being. For practical purposes, within this thesis well-being will be understood as: "the multidimensional quality of a person's life, which can be broadly broken down into 'subjective' and 'objective' forms. This includes, but is not limited to a person's: happiness, health and income".

CHAPTER 3: A REVIEW OF WELL-BEING MEASURES: DIMENSIONS, DEVELOPMENTS OVER TIME AND A THEMATIC FRAMEWORK

3.1. Introduction

Measuring well-being by asking people how they feel about their lives has become an international priority (Layard, 2010). Despite extensive study the measurement of well-being remains a contentious topic (Deci & Ryan, 2008). Some critics have condemned the practice and argued that is impossible to measure well-being (White, 2013) while others have suggested that these critics have misunderstood the nature of the instruments in use (Wren-Lewis, 2014). As this debate continues, there is an ongoing need to review and better understand the growing number of instruments in use. This review addresses this requirement directly.

3.1.1. Measures of well-being

Measuring well-being can take place at a group or an individual level. At a large-scale well-being can be measured for countries using a variety of standard statistical national accounts[6] or by averaging the responses to surveys answered by people living in a country. In contrast to this, well-being can be measured at a personal level, by assessing the tangible resources that an individual has access to[7], or by asking them about how they evaluate the state of their own life. Each of these approaches is associated with advantages and disadvantages; however the use of self-report instruments for the assessment

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[6] Life expectancy, GDP or the level of crime are indicators of the type of life an indication of what it is like to live in a particular country.
[7] These resources may include their income or level of education.

of well-being has been a particularly contentious issue (White, 2013). Nonetheless, the usage of these instruments has persisted.

3.1.2. Why is well-being measured?

The measurement of well-being has become increasingly relevant for policy (Steptoe, Deaton, & Stone, 2015; Stewart, Skinner, Weiss, & Middleton, 2015). Academics and politicians have argued that there is a need to utilise measures which tap into how individuals feel about their lives, rather than solely the resources they 'have' (Stiglitz et al., 2010a). The measurement of well-being also has the capacity to highlight inequalities in who is well and who is not. Towards this effort, the Office of National Statistics (ONS) measures and monitors well-being across the UK using a set of routinely administered surveys[8] (Hicks et al., 2013). These data, among other sources already in use may help governments to design more appropriate, equitable and socially responsive policies.

The measurement of well-being is also essential for empirical studies into the topic. For example, to test whether well-being is higher amongst those who participate in meditation programmes (Goyal et al., 2014), or to assess whether well-being is positively affected by income (Kahneman & Deaton, 2010), it is necessary to measure the outcome in question. Because of this dependence on measurement, it is increasingly important to understand the nature, range and characteristics of the measures in use.

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[8] Subjective well-being questions are now featured in the Annual Population Survey (APS) and the Opinions and Lifestyles Survey (OPN). The four main questions used by the ONS are: "Overall, how satisfied are you with your life nowadays?", "Overall, to what extent do you feel the things you do in your life are worthwhile?", "Overall, how happy did you feel yesterday?" and "Overall, how anxious did you feel yesterday?".

The subject of how well-being should be measured is also a topic of purely academic interest. Prior to its political relevance, researchers had been intrigued by the factors which are necessary to live a 'good life' (Eid & Larsen, 2008). Efforts to understand the nature of well-being predate its measurement; however, the latter topic has still been of interest for centuries. For example, in 1881 the prominent economist Francis Edgeworth discussed how beneficial it would be to develop a psychophysical instrument called a 'hedonometer' capable of yielding precise assessments of happiness (Edgeworth, 1881). To date, researchers have not been able to develop a perfect hedonometer, however interest in the measurement of happiness and other conceptions of well-being has been the subject of considerable academic effort.

3.1.3. Existing reviews on the measurement of well-being

One of the most informative reviews in the literature details the existence of both short single item tools and questionnaires with multiple items (McDowell, 2010). This work focuses on how well-being is conceived, some of the scales which have been used to study the topic, and describes the psychometric validity and reliability of each tool. Beyond simply stating that several tools are available, McDowall suggests that well-being is relative, informed by both subjective and objective influences and is related to a person's aspirations. This review highlights the existence of 8 specific questionnaire measures[9] and a handful of single item measures. One limitation of this work that the author acknowledges is that the instruments reviewed were subjectively selected for

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[9] These measures include: Life Satisfaction Index, Bradburn Affect Balance Scale, Philadelphia Morale scale, General Well-Being Schedule, Satisfaction with Life scale, the Positive and Negative Affect Scale, World Health Organization 5-item Well-being index, and the Ryff's scales of psychological wellbeing.

inclusion. Further, although the conceptual dimensions[10] within each measure are stated there is little examination of how they differ across tools.

Shorter reviews have also been published in the literature (Schiaffino, 2003). Within this brief literature review the: Affect Balance Scale, General Health Questionnaire, Life Satisfaction Index-A, Rosenberg Self-Esteem Scale, Satisfaction with Life Scale and State-Trait Anxiety Index are each described as available measures of 'psychological well-being'. This summary outlines the characteristics, psychometric findings, and a critical commentary for each tool named. This review highlights the existence of commonly used tools, and is a quick introduction to the topic; however little justification was provided for the selection of measures reviewed and newer reviews have highlighted the existence of many more relevant tools.

One of the largest reviews on the measurement of well-being was conducted using systematic search techniques. In total this work identified 60 measures of well-being, and reviewed the psychometric evidence available on each tool (Lindert, Bain, Kubzansky, & Stein, 2015). This review provided a thorough examination of the reliability and validity of the tools whilst also noting some of the dimensions available. Although this work highlighted many of the tools available, the scope of this review is not as broad as the operational definition of well-being in use in this thesis. Further, Chapter 2 demonstrated that 'happiness' is a defining characteristic of well-being, yet relatively few measures within Lindert et al's (2015) review capture this.

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[10] A dimension is a concept or specific collection of items within an instrument which are designed to assess some distinct aspect of well-being – examples include: include self-acceptance, life satisfaction or social integration (M. W. Gallagher, Lopez, & Preacher, 2009; Gasper, 2010; Keyes & Waterman, 2003).

3.1.4. Ongoing difficulties and challenges in the measurement of well-being

The difficulty of defining well-being, as seen in Chapter 2 has made it a challenging concept to measure. The many options for measurement available reflect the variety of definitions in use throughout the literature (Dodge, Daly, Huyton, & Sanders, 2012). Until a widely agreed and concise definition of well-being is developed it is likely that researchers will use existing and newly developed tools that reflect their personally endorsed perspectives.

Dealing with the many measurement options available is one challenge faced by researchers in the field. Despite the continued development of new instruments, no universally accepted measure has emerged (Layard, 2010). This is problematic because it is increasingly difficult for researchers to know which of the many options available is the most appropriate for them. As with most domains of measurement, there is no agency or group that oversees and coordinates the development and organisation of well-being measures. Instruments are scattered across disciplines, inconsistently labelled, and the differences between them are unclear (Gasper, 2010). Despite efforts by the Organisation for Economic Co-operation and Development (OECD) to formalise the measurement of well-being (OECD, 2013), not enough exhaustive advice is provided on how researchers can effectively utilise the many self-report instruments that have already been developed within the existing literature. Researchers aiming to measure well-being are left to select instruments based on: what is familiar to them within their discipline, what is most often used by others, or to create yet another new instrument.

Reviews to date have rightly focused on the psychometric properties of these tools, however as a result there has been little focus on the conceptual

dimensions that make up each tool. The contents of these instruments are highly diverse, which suggests that there is a need to undertake an in-depth analysis into the ways in which these instruments differ. It may also be informative to identify whether there are any themes that characterise these dimensions. If patterns in the characteristics of the instruments can be identified, it would be useful if they could be organised into a framework for use by other researchers.

Finally, existing reviews have provided little commentary on how the measurement of well-being has developed over time. Reviews to date have largely assumed that readers already understand how and when growth in the use of these instruments occurred. This is problematic because an awareness of this history provides important contextual information. A historical perspective would also highlight how the first wave of tools compares to contemporary measures. Finally, some form of historical reflection could provide numerical evidence to corroborate (or refute) suggestions that there are increasingly more measures of well-being being developed.

3.1.5. The current review

Variety in definitions and understandings has made it difficult for researchers to agree on how well-being should be measured. Growing policy implications and the ongoing use of these instruments in empirical studies suggest that the measurement of well-being is an important topic for investigation. Existing reviews have been mainly narrow in scope and focus on psychometric properties, however there is simultaneously a need to further examine the range of dimensions found within measures of well-being. The dimensions within

these measures differ widely, however there is little guidance within the literature about the range of these different dimensions within measures.

3.1.6. Aims

The aims of the current review were as follows:

Aim 1: To systematically identify and describe measures of well-being for use in the adult general population

Aim 2: To explore how the measurement of well-being has developed over time

Aim 3: To examine the variety of dimensions found within the instruments identified

Aim 4: To organise the dimensions and instruments into a thematic framework

3.2. Methods

3.2.1. Search strategy

Searches were conducted in MEDLINE, EMBASE, EconLit, PsycINFO, Cochrane Library and CINAHL databases (Appendix A). 'Systematic' within the context of the current review refers to the fact that a specific and structured search strategy was used. Additional manual hand and web searching was undertaken through to November 2015 using online resources, search engines and consultations with subject-matter experts. Given that this review has been published, the searches have not been updated. The systematic search was limited to records as far back as January 1993 to maintain focus on old and new instruments that were being used in the last 20 years. Well-being measures were identified by searching through identified publications.

3.2.2. Inclusion and exclusion criteria

Titles and abstracts were screened by two reviewers (ML and AML). Both reviewers read the full texts to determine whether the instruments met the inclusion criteria, and differs were resolved through discussions with a third reviewer (PD). The inclusion criteria were as follows: (1) designed for general use either in population studies or as generic tools across contexts; (2) designed for use in adults; (3) designed for assessing well-being, including concepts such as quality of life, happiness and wellness; and (4) available in an English translation. Instruments were excluded if their primary focus was: (1) disease specific (i.e. cancer or stroke specific tools); (2) context specific (i.e. pregnancy); and (3) instruments designed for children or adolescents.

3.2.3. Data extraction

Data extraction was undertaken by two reviewers (ML and AML). Details extracted included: the name of the instrument, its acronym, authorship, date of publication, number of items and response format, theories referenced, date of initial development, and the date of the latest available version of the instrument. Details about the dimensions within each instrument as specified by the author were recorded using a similar form.

3.2.4. Thematic analysis

The dimensions extracted from identified instruments were organised using thematic analysis (Braun & Clarke, 2006) in order to categorise them into themes. First, the dimensions (and their definitions) were tabulated. Prior to the analysis, the review team (ML, AML and PD) examined the full set of

dimensions and combined dimensions that were unanimously identified as being indistinguishable, to keep the analysis manageable and informative. After a process of familiarisation with the data, each dimension was qualitatively coded. For example, dimensions such as hearing and vision clustered around the code 'physical senses'. Two reviewers coded all of the dimensions independently (ML and AML), and any discrepancies that arose were solved through discussion with the third member of the review team (PD).

These clusters of coded dimensions were gradually assembled into larger groupings that formed preliminary themes. Once these key themes were reviewed and amended by the review team, they were defined and named. It was anticipated that themes might overlap and that dimensions could fit within multiple themes, however, the categories provided by the technique provided some order to the otherwise unmanageably large range of dimensions. The review team included academics with backgrounds in psychology, economics and clinical medicine/public health, helping to minimise disciplinary biases. Results were synthesised as a narrative review.

3.3.   Results

3.3.1. Identification of instruments

The PRISMA (Moher, Liberati, Tetzlaff, & Altman, 2009) diagram summarises the search results, screening and exclusion of studies (Figure 3.1). The systematic search provided 2520 unique records after duplicates had been removed. From the identified publications, a total of 129 instruments were assessed for eligibility and 30 of these instruments were excluded as they were either: designed for use in children/adolescents (4/30); explicitly designed for

use in specific clinical conditions (14/30); designed for specific contexts (6/30); or were deemed by the review team to not be measures of well-being (6/30).

The 99 instruments included in the review are presented in Table 3.1. Many of the instruments have been amended and shortened from their original format; therefore, the instruments included in Table 3.1 are either: (i) the original tools if no revised version was found; or (ii) the latest revised version. A breakdown of when the instruments were first developed and their most recent major revisions can be found in Figure 3.2.

Figure 3.1. PRISMA diagram
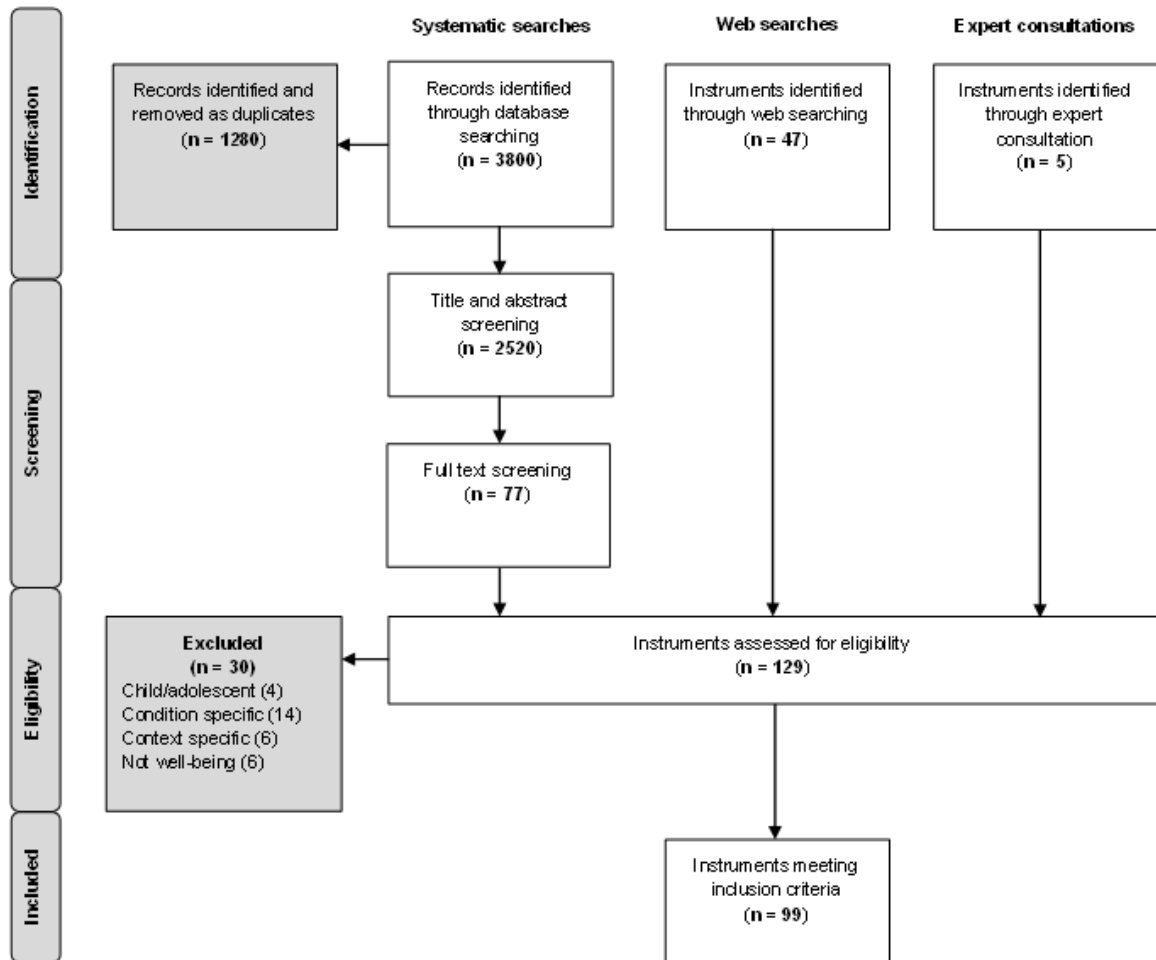
Table 3.1. Description of well-being tools and when they were published and revised (date)

(diagram reference number) Instrument full name	Acronym	First published	Most recent revision	Number of Items
1. 15D (Sintonen & Pekurinen, 1989)	15D	1981	1989	15
2. Affect Balance Scale (Bradburn, 1969)	ABS	1969	1969	10
3. Affectometer 2 (Kammann & Flett, 1983)	A2	1979	1983	20
4. Anamnestic Comparative Self-Assessment (Bernheim et al., 2006)	ACSA	2006	2006	1
5. Arizona Integrative Outcomes Scale (Bell, Cunningham, Caspi, Meek, & Ferro, 2004)	AIOS	2004	2004	1
6. Assessment of Quality Of Life (Hawthorne, Richardson, & Osborne, 1999)	AQOL	1999	1999	15
7. Authentic Happiness Index (Seligman, Steen, Park, & Peterson, 2005)	AHI	2005	2005	20
8. Basic Psychological Needs Scale (Gagné, 2003)	BPNS	2003	2003	21
9. BBC Subjective Well-Being Scale (Pontin, Schwannauer, Tai, & Kinderman, 2013)	BBC-SWB	2011	2013	24
10. Beck Depression Index-2 (Beck, Steer, & Brown, 1996)	BDI-2	1961	1996	21
11. Biopsychosocialspiritual Inventory (Katerndahl & Oyiriaru, 2007)	BIOPSSI	2007	2007	41
12. Cantril Self-Anchoring Striving Scale (Cantril, 1965)	CL	1965	1965	1
13. CASP-19 (Control, Autonomy, Self-realisation and Pleasure) (Hyde, Wiggins, Higgs, & Blane, 2003)	C19	2003	2003	19
14. Centre For Epidemiological Studies Depression Scale-Revised (Van Dam & Earleywine, 2011)	CESD-R	1977	2011	20
15. Chinese Happiness Inventory (Lu & Shih, 1997)	CHI	1997	1997	48
16. Depression-Happiness Scale-Short (Joseph, Linley, Harwood, Lewis, & McCollam, 2004)	DHS-S	1993	2004	25
17. Emotional Well-Being Scale (Şimşek, 2011)	EWBS	2011	2011	13
18. EUROQOL-5D-5L (Herdman et al., 2011)	EQ-5D-5L	1990	2011	5
19. EURO-D (Prince et al., 1999)	EURO-D	1999	1999	12
20. EUROHIS-QOL (Schmidt, Mühlan, & Power, 2006)	E-QOL	1998	2003	8
21. Flourishing Scale (Diener et al., 2010)	FS	2010	2010	8
22. Functional Assessment Of Cancer Therapy-General Population[11] (Brucker, Yost, Cashy, Webster, & Cella, 2005)	FACT-GP	1993	2005	21
23. Functional Well-Being Scale (Evers et al., 2015)	FWBS	2015	2015	10
24. General Health Questionnaire (Goldberg & Williams, 1988)	GHQ12	1978	1988	12
25. Goteborg Quality Of Life Instrument (Tibblin, Tibblin, Peciva, Kullman, & Svärdsudd, 1990)	GQLI	1967	1990	15
26. Happiness Measures (Fordyce, 1988)	HM	1966	1973	2
27. Health and Well-Being Assessment (Mills, 2005)	HWB	2005	2005	20
28. Health Utilities Index-3 (Furlong et al., 1998)	HUI-3	1996	1998	8
29. Herth Hope Index (Herth, 1992)	HHI	1991	1992	12

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[11] This tool was developed for cancer therapy, but this is a generic version

30.	Hospital Anxiety And Depression Scale (Zigmond & Snaith, 1983)	HADS	1983	1983	14
31.	ICECAP-A (Al-Janabi, Flynn, & Coast, 2012)	ICECAP-A	2012	2012	5
32.	ICECAP-O (Coast et al., 2008)	ICECAP-O	2008	2008	5
33.	ICOPPE - Interpersonal, Community, Occupational, Physical, Psychological, and Economic well-being (Prilleltensky et al., 2015)	ICOPPE	2015	2015	21
34.	InCharge Financial Distress/Well-Being Scale (Prawitz et al., 2006)	IFDFWS	2006	2006	8
35.	Inventory of Positive Psychological Attitudes (Kass et al., 1991)	IPPA	1991	1991	32
36.	Jarel Spiritual Well-Being Scale (Hungelmann, Kenkel-Rossi, Klassen, & Stollenwerk, 1996)	JSWBS	1996	1996	21
37.	Kellner's Symptom Questionnaire (Kellner, 1987)	KSQ	1987	1987	92
38.	Life Orientation Test-Revised (Scheier, Carver, & Bridges, 1994)	LOT-R	1985	1994	10
39.	Life Satisfaction Index-A (Neugarten, Havighurst, & Tobin, 1961)	LSI-A	1961	1961	20
40.	Life Satisfaction Questionnaire-9 (Fugl-Meyer, Bränholm, & Fugl-Meyer, 1991)	LISAT9	1991	1991	9
41.	Meaning in Life Questionnaire (Steger, Frazier, Oishi, & Kaler, 2006)	MLQ	2006	2006	10
42.	Measure Yourself Concerns and Wellbeing (Paterson, Thomas, Manasse, Cooke, & Peace, 2007)	MYCAW	1996	2007	3
43.	Memorial University of Newfoundland Scale of Happiness (Kozma & Stones, 1980)	MUNSH	1980	1980	24
44.	Mental Health Continuum-Short Form (Keyes, 2006)	MHC-SF	2002	2005	14
45.	Mental Health Inventory-5 (Stewart, Hays, & Ware, 1988)	MHI5	1983	1988	5
46.	Mental Physical Spiritual Well-Being Scale (Vella-Brodrick & Allen, 1995)	MPS	1995	1995	30
47.	Mood And Anxiety Symptoms Questionnaire-30 (Wardenaar et al., 2010)	MASQ-D30	1991	2010	30
48.	Multicultural Quality of Life Index (Mezzich, Cohen, Ruiperez, Banzato, & Zapata-Vega, 2011)	MQLI	2011	2011	10
49.	Multidimensional Personality Questionnaire-Brief (Patrick, Curtin, & Tellegen, 2002)	MPQ	1982	2002	155
50.	Multiple Affect Adjective Check List-Revised (Zuckerman, Lubin, & Rinck, 1983)	MAACL-R	1965	1983	132
51.	Nottingham Health Profile (Hunt, McEwen, & McKenna, 1985)	NHP	1975	1985	45
52.	Older Adult Health and Mood Questionnaire (Kemp & Adams, 1995)	OAHMQ	1995	1995	22
53.	Ontological Well-Being Scale (Şimşek & Kocayörük, 2013)	OWBS	2013	2013	24
54.	Orientations To Happiness (Peterson, Park, & Seligman, 2005)	OTH	2005	2005	18
55.	Oxford Happiness Questionnaire (Hills & Argyle, 2002)	OHQ	1989	2002	29
56.	Perceived Wellness Survey (Adams, Bezner, & Steinhardt, 1997)	PWS	1997	1997	36
57.	Personal Growth Initiative Scale (Robitschek, 1998)	PGIS	1998	1998	9
58.	Personal Wellbeing Index-Adult (International Wellbeing Group, 2013)	PWI-A	1994	2013	7
59.	Philadelphia Geriatric Centre Morale Scale (Lawton, 1975)	PGCMS	1972	1975	17
60.	Physical, Mental and Social Well-Being Scale (Supranowicz & Paz, 2014)	PMSW-21	2014	2014	21
61.	Positive and Negative Affect Scale (D. Watson, Clark, & Tellegen, 1988)	PANAS	1988	1988	12
62.	Positive Functioning Inventory (Joseph & Maltby, 2014)	PFI-12	2014	2014	12
63.	Positive Mental Health Instrument (Vaingankar et al., 2011)	PMH	2011	2011	47
64.	Profile Of Mood States-Short (Shacham, 1983)	POMS2	1971	1983	37
65.	Psychological General Well-Being Index (Grossi et al., 2006)	PGWB-S	1970	2006	6

66.	Public Health Surveillance Well-Being Scale (Bann, Kobau, Lewis, Zack, & Thompson, 2012)	PHS-WB	2012	2012	10
67.	Purpose in Life Test-Short Form (Schulenberg, Schnetzer, & Buchanan, 2011)	PIL-SF	1964	2011	20
68.	Quality of Life Index-Generic (Ferrans & Powers, 1985)	QOLI-G	1985	1985	66
69.	Quality of Life Inventory (Frisch, Cornell, Villanueva, & Retzlaff, 1992)	QOLI	1988	1988	17
70.	Quality of Well-Being Self-Administered (Kaplan, Sieber, & Ganiats, 1997)	QWB-SA	1970	1997	10
71.	Questionnaire for Eudaimonic Well-being (Waterman et al., 2010)	QEWB	2010	2010	21
72.	Questions on Life Satisfaction (Henrich & Herschbach, 2000)	QOLS	1988	2000	16
73.	Rosenberg Self-Esteem Scale (Rosenberg, 1965)	RSES	1965	1965	10
74.	Ryff's Scales Of Psychological Well-Being (Ryff & Keyes, 1995)	PWB	1989	1995	54
75.	Salutogenic Health Indicator Scale (Bringsén, Andersson, & Ejlertsson, 2009)	SHIS	2009	2009	12
76.	Satisfaction With Life Scale (Diener, Emmons, Larsen, & Griffin, 1985)	SWLS	1985	1985	5
77.	Scale of Positive And Negative Experience (Diener et al., 2010)	SPANE	2010	2010	12
78.	Self-Evaluated Quality Of Life Questionnaire (S. Ventegodt, Merrick, & Andersen, 2003)	SEQOL	2003	2003	317
79.	Serenity Scale-Brief (Kreitzer, Gross, Waleekhachonloet, Reilly-Spong, & Byrd, 2009)	SS-B	1993	2009	22
80.	Short form 36 (Ware, Kosinski, & Dewey, 2000)	SF-36v2	1988	1996	36
81.	Snaith-Hamilton Pleasure Scale (Snaith et al., 1995)	SHAPS	1995	1995	14
82.	Social Production Function-IL (Nieboer, Lindenberg, Boomsma, & Bruggen, 2005)	SPF-IL	2005	2005	58
83.	Social Well-Being Scale (Keyes, 1998)	SWS	1998	1998	50
84.	Spiritual Well-Being Scale (Paloutzian, 1982)	SP-WB-S	1982	1982	20
85.	Spirituality Index of Well Being (Timothy P. Daaleman & Frey, 2004)	SIWB	2004	2004	12
86.	State Anxiety Inventory (Marteau & Bekker, 1992)	SAI	1970	1992	6
87.	State-Trait Cheerfulness Inventory (Ruch, Köhler, & van Thriel, 1997)	STCI	1996	1996	30
88.	Steinhauser Spiritual Concern Probe (Steinhauser et al., 2006)	SSCP	2006	2006	1
89.	Subjective Happiness Scale (Lyubomirsky & Lepper, 1999)	SHS	1999	1999	4
90.	Subjective Vitality Scale (Ryan & Frederick, 1997)	SVS	1997	1997	7
91.	Temporal Satisfaction With Life Scale (Pavot, Diener, & Suh, 1998)	TSWLS	1985	1998	15
92.	The Spiritual Well-Being Questionnaire (Gomez & Fisher, 2003)	SP-WB-Q	2003	2003	20
93.	The Spirituality Scale (C. Delaney, 2005)	SS	2005	2005	23
94.	Valued Living Questionnaire (Wilson, Sandoz, Kitchens, & Roberts, 2011)	VLQ	1999	2010	20
95.	Warwick-Edinburgh Mental Well-Being Scale-Short (Stewart-Brown et al., 2009)	WEMWBS	1983	2009	7
96.	Well-Being Picture Scale (Gueldner et al., 2005)	WPS	1979	2005	10
97.	WHO-5 (World Health Organisation-5) (World Health Organization, 1998)	WHO5	1982	1998	5
98.	World Health Organisation-Brief Spiritual, Religious and Personal Beliefs (Skevington, Gunson, & O'Connell, 2013)	WHO-QBF	1995	2013	34
99.	Zung Self-Rating Depression Scale (Zung, 1965)	ZSDS	1965	1965	20

3.3.2. Instrument characteristics

3.3.2.1. Features of well-being instruments

The majority of the measures contained multiple items (95/99) and the largest tool contained 317 items (Tool 78: SEQOL). Most of the instruments used verbal questions (97/99), however two tools were pictorial (Tool 12: CL and Tool 96: WPS). The fewest response options were found within simple 'yes/no' questionnaires (Tool 37: KSQ), whilst other tools offered up to eleven response options along a bipolar scale (Tool 26: HM and Tool 58: PWI-A). However, the majority of the tools used five-point bipolar Likert scales. Items asked individuals about the frequency, intensity, strength of agreement, or truth of both specific and non-specific thoughts, feelings, experiences and statements. Instruments were named after key authors (11/99) such as the Rosenberg Self-Esteem Scale, academic affiliation (7/99) as with the Oxford Happiness Questionnaire, or organisational affiliation (5/99) as with the WHO-5. In most cases, instruments were named after their key concept or approach.

3.2.1.1. Disciplinary influence

It was difficult to assign each instrument to one single discipline as many of the tools were developed by inter-disciplinary teams. Clinical psychology, medical sociology, public health, epidemiology, psychotherapy, health psychology, nursing, gerontology and primary care were among the disciplines represented. In some cases, such as the Warwick-Edinburgh Mental Well-being Scale (Tool 96), multidisciplinary input spanned colleagues from medical schools, faculties of health and social care and schools of sociology and social policy. Variety in terms of where instruments were published, where they were being used in practice, where academics received their academic training and where they

were employed made it difficult to determine which instruments belonged to which disciplines.

3.3.2.2. Development of instruments over time

Although the systematic searches were limited to 1993 and 2015, almost half of the instruments identified during this time had been first developed in the decades prior to this period (44/99). As shown in Figure 3.2, the oldest instruments identified were developed in 1961 (Tool 39: LSI-A and Tool 10 version 1: BDI) while the newest tools were developed in 2015 (Tool 33: ICOPPE and Tool 23: FWBS). On average, eight tools had been designed every five years since 1960. The 1990s provided the biggest period for the development of new tools (n=27). Since 2010, 14 new tools and eight revisions have already been published.

Figure 3.2. Developmental timeline of well-being measures
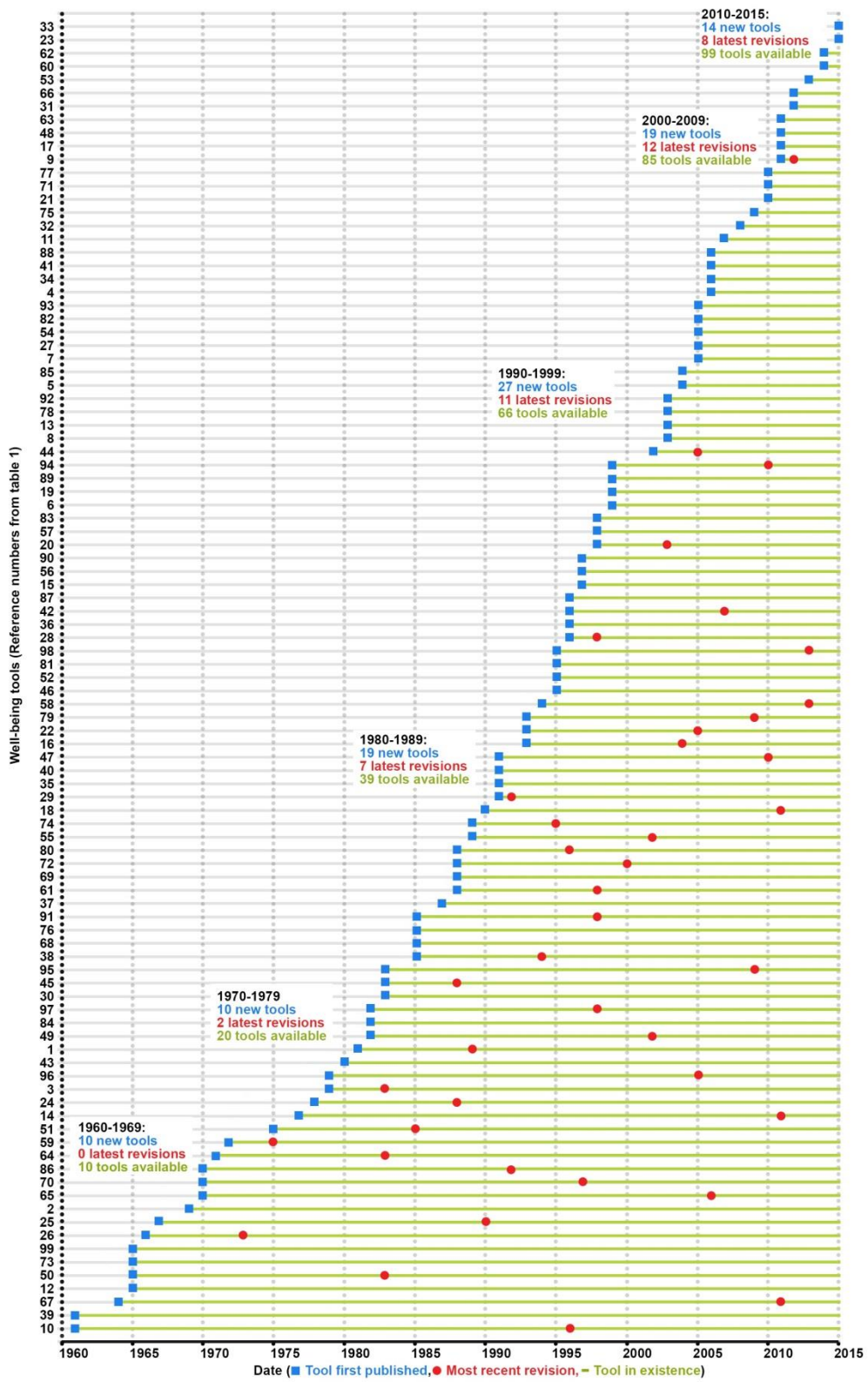
Three trends were observed over time. Firstly, many of the newer measures contained fewer items, or were accompanied by 'short-form' versions. Secondly, since the 1980s, with measures such as the Spiritual Well-being Scale (Tool 84), 'spirituality' has been incorporated into the assessment of well-being. Finally, over the last 15 years there have been significant efforts to contrast the many measures concerned with illbeing, ill-health and unhappiness, with measures of positive functioning and adaptation to negative circumstances. Examples of these instruments included the Salutogenic Health Indicator Scale (Tool 75), Positive Functioning Inventory (Tool 62) and the Flourishing Scale (Tool 21).

3.3.2.3. Synonyms of well-being

The confusing use of synonyms highlighted in Chapter 2 was also observed within articles concerning the measurement of well-being. Subjective well-being was noted as a synonym for happiness (Lyubomirsky & Lepper, 1999), the interchangeable usage of mental well-being and mental health was acknowledged (Tennant et al., 2007) and psychological well-being was used as an alternative phrasing for mental health (Kozma & Stones, 1980). Authors frequently quoted the WHO definition of health (Vaingankar et al., 2011) (Bringsén et al., 2009) which blurred the boundary between health and well-being. Overall, there was little consistency in how terms were used.

3.3.3. Dimensions of well-being

Across the 99 instruments identified, 196 different dimensions were found. In a minority of cases the full text of a paper was unavailable, however information

on the dimensions within tools was available in the abstracts. A glossary is provided in Appendix B which provides a definition of each dimension, informed by the articles in the review. Psychological well-being overall (n=13); physical well-being overall (n=12); social well-being overall (n=9); depression (n=9); positive affect (n=8); and relationships (n=8) appeared multiple times within the instruments examined. Overall, most dimensions appeared in only one of the measures identified (69%, 136/196). This highlights a substantial degree of conceptual heterogeneity among measures.

Over time the variety of dimensions found within measures of well-being had developed. Among the ten oldest measures identified (period 1960 -1965), the most common dimension was 'Depression' (found within 3/10 tools). This reflects the historically negative focus of the literature, which for a long time was more interested in impairment and psychological suffering (Joseph et al., 2004). Over time however instrument authors have embraced notions of flourishing (Diener et al., 2010) and functioning (Evers et al., 2015) among many other attempts to re-balance the topic.

In support of claims that well-being is multidimensional, most instruments were composed of multiple dimensions (67/99). On average, each measure contained five-dimensions (range: 1 to 15). Instrument developers used: pre-set theory, literature searches, factor analytic methods, expert opinion, or a combination of all four to determine which dimensions would be included in their tools. Unidimensional instruments were most frequently measures of 'well-being overall', 'happiness' or 'depression'.

3.3.4. Thematic framework

The dimensions identified clustered around six key themes: Mental well-being, Social well-being, Physical well-being, Spiritual well-being, Activities and functioning, and Personal circumstances (Table 3.2). The seventh theme (Well-being overall) was reflected by dimensions which attempted to measure well-being in a broader global sense. Together, these themes represent some of main ways in which well-being has been conceptualised within the instruments in use.

Table 3.2. Descriptions of the themes identified and the reoccurring dimensions within them

Themes	Theme description
Mental well-being	Dimensions linked to the theme of mental well-being assess the psychological, cognitive and emotional quality of a person's life. This includes the thoughts and feelings that individuals have about the state of their life, and a person's experience of happiness.
Social well-being	Social well-being concerns how well an individual is connected to others in their local and wider social community. This includes social interactions, the depth of key relationships, and the availability of social support.
Activities and functioning	The focus of this theme is the behaviour and activities that characterise daily life. This involves the specific activities we fill our time with, and our ability to undertake these tasks.
Physical well-being	Physical well-being refers to the quality and performance of bodily functioning. This includes having the energy to live well, the capacity to sense the external environment and our experiences of pain and comfort.
Spiritual well-being	Spiritual well-being is concerned with meaning, a connection to something greater than oneself, and in some cases faith in a higher power.
Personal circumstances	These dimensions are related to the conditions and external pressures that individuals are faced with. This involves numerous environmental and socio-economic concerns such as financial security.

The 196 dimensions, seven themes and 99 instruments are compiled within the Thematic Framework of Well-being (TFW), which is presented in Figure 3.3. Each of the dimensions is listed in alphabetical order, alongside the themes which it reflects and the instruments within which the dimensions can be

found. Table 3.3 highlights which themes of well-being are reflected within which instruments. The purpose of the framework is to provide a rich and organised toolkit for the measurement of well-being. The framework is populated by measures which reflect a range of disciplinary influences and perspectives on the topic.

Figure 3.3. Thematic Framework of Well-being (TFW)

Themes | **Dimension** | *Tool reference # (table.1)*

Column 1:
- Absorption - 49
- Acceptance - 79
- Achievement - 31, 49 & 58
- Achievement at work - 15
- Activation - 53
- Affection - 82
- Affective suffering - 19
- Aggression - 49
- Agitation - 59
- Alcohol consumption - 27
- Alienation - 49
- Anhedonic depression - 47
- Anxiety - 30, 37, 50, 64 & 86
- Anxiety/depression - 18
- Anxious arousal - 47
- Attachment - 31 & 32
- Attitude towards aging - 59
- Autonomy - 8, 13, 31 & 74
- Bad mood - 87
- Behavioural confirmation - 82
- Being at peace - 88
- Breathing - 1
- Cheerfulness - 87
- Civic action - 69
- Cognition - 28
- Comfort - 82
- Community - 33, 48 & 69
- Community well-being - 58, 93 & 94
- Competence - 66 & 8
- Confusion-bewilderment - 64
- Contentment - 15 & 37
- Control - 13 & 32
- Creativity - 63
- Depression - 1, 10, 14, 30, 37, 50, 52, 64 & 99
- Depression/happiness - 16
- Dexterity - 28
- Discomfort and symptoms - 1
- Distress - 1 & 47
- Downward social comparisons - 15
- Eating - 1
- Eco-awareness - 92 & 93
- Elimination - 1
- Emotional reaction - 51
- Emotional well-being - 22, 26, 28, 44 & 56
- Energy level - 51
- Enjoyment - 31 & 32
- Environmental mastery - 74
- Environmental quality of life - 20 & 98
- Existential well-being - 84
- Faith/belief - 36
- Family - 22, 40, 68, 69 & 94

Column 2:
- Fatigue-Inertia - 64
- Financial distress/well-being - 34
- Financial situation - 33, 40, 58 & 69
- Fitness - 15
- Friendliness - 37
- Friendships - 40, 69 & 94
- Fulfilment of needs - 78
- Functional well-being - 11, 22 & 23
- Future life satisfaction - 91
- Future security - 32 & 58
- General coping - 63
- General health - 27, 58, 68, 69, 72 & 80
- Global affect - 63
- Goal congruence - 39
- Happiness - 43, 55, 78 & 89
- Harm avoidance - 49
- Hearing - 1 & 28
- Home - 69
- Home life - 51
- Hope - 29 & 53
- Hostility - 37, 50 & 64
- House keeping - 51
- Illness - 6
- Independent living - 6
- Inner balance/biological order - 78
- Inner haven - 79
- Intellectual wellness - 56
- Interactive function - 75
- Interests/hobbies - 51
- Inter-personal functioning - 48 & 63
- Intrapersonal characteristics - 75
- Learning - 69 & 94
- Leisure situation - 40
- Life engagement - 7 & 54
- Life meaning - 7, 41, 54, 66 & 78
- Life purpose and satisfaction - 35
- Life satisfaction - 12, 40, 66, 72, 76, 78 & 91
- Life satisfaction/self-actualisation - 36
- Life/self-responsibility - 36
- Life-scheme - 85
- Lonely dissatisfaction - 59
- Mental alertness - 15
- Mental functions - 1
- Mental health/symptoms - 11, 24, 25, 45, 60 & 80
- Mobility - 1, 18, 28 & 70
- Mood tone - 39
- Motivation - 19
- Need for relatedness - 8
- Negative affect - 2, 3, 17, 61, 66 & 77
- Neighbourhood - 69
- Nothingness - 53

Column 3:
- Nutritional balance - 27
- Objective factors - 78
- Occupational functioning - 48
- Optimism - 15 & 38
- Pain - 18, 27, 28, 51 & 80
- Parenting - 95
- Partner relations - 40, 69 & 94
- Past life satisfaction - 91
- Peace of mind - 15
- Personal fulfilment - 48
- Personal growth - 57 & 74
- Personal growth and autonomy - 63
- Personal safety - 58
- Philosophy of life - 69
- Physical activity - 27 & 70
- Physical and mental well-being - 25
- Physical functioning - 51 & 80
- Physical senses - 6
- Physical well-being (overall) - 9, 20, 22, 33, 37, 46, 48, 56, 60, 66, 94 & 98
- Pleasure - 7, 13, 54 & 81
- Positive affect - 2, 3, 15, 17, 50, 61,66 & 77
- Positive readiness and expectancy - 29
- Praise and respect from others - 15
- Psychological and spiritual well-being - 68
- Psychological well-being (eudaimonic) - 44 & 71
- Psychological well-being (other) - 6
- Psychological well-being (overall) - 9, 20, 33, 46, 48, 49, 56, 62, 65, 92, 95, 97 & 98
- Psycho-social flourishing - 21
- Purpose in life - 67 & 74
- Realizing life potential - 78
- Recreation - 69 & 94
- Regret - 53
- Relationship with children - 69
- Relationships - 6, 9, 15, 31, 33, 58, 74 & 93
- Relaxation - 37
- Religious well-being - 84
- Resolution and fortitude - 39
- Role - 32
- Role-emotional - 80
- Role-physical - 80
- Satisfaction of material needs - 15
- Search for meaning - 41
- Self-confidence during stress - 35
- Self-discovery - 93
- Self-esteem - 73
- Self-regard - 69
- Self-acceptance - 74

Column 4:
- Self-care - 18, 40, 48 & 70
- Self-control - 49
- Self-efficacy - 85
- Self-realisation - 13
- Self-satisfaction - 15
- Sensation seeking - 50
- Seriousness - 87
- Sex life - 1, 40 & 51
- Sleep - 1, 27 & 51
- Social acceptance - 83
- Social actualisation - 83
- Social and economics - 68
- Social closeness - 49
- Social coherence - 83
- Social commitment - 15
- Social contribution - 83
- Social function - 80
- Social integration - 83
- Social isolation - 51
- Social potency - 49
- Social service - 69
- Social/emotional support - 48 & 63
- Social well-being (overall) - 11, 20, 25, 44, 51, 56, 60, 66 & 98
- Somatic symptoms - 11, 25 & 37
- Speech - 1 & 28
- Spiritual fulfilment - 48
- Spiritual symptoms - 11
- Spiritual well-being (overall) - 46, 56 & 98
- Spirituality - 58, 63 & 94
- Stability - 31
- Status - 82
- Stimulation - 82
- Stress reaction - 49
- Symptoms - 70
- Symptoms of stress - 27
- Temporality and future - 29
- Traditionalism - 49
- Transcendental spiritual - 92
- Trust - 79
- Usual activities - 1 & 18
- Vacations - 51
- Vigour-activity - 64
- Vision - 1 & 28
- Vitality - 1, 80 & 90
- Well-being (overall) - 4, 5, 33, 42, 48, 78 & 96
- Work - 27, 33, 40, 51, 69 & 94
- Zest for life - 39

Theme key:
- Global well-being
- Mental well-being
- Physical well-being
- Social well-being
- Spiritual well-being
- Activities/functioning
- Personal circumstances

Table 3.3. Themes reflected by each of the measures of well-being

Reference number	Acronym	Global well-being	Mental well-being	Social Well-being	Physical Well-being	Spiritual Well-being	Activities and functioning	Personal circumstances
1	15D		●	●	●		●	
2	ABS		●					
3	A2		●					
4	ACSA	●						
5	AIOS	●						
6	AQOL		●	●	●		●	
7	AHI		●			●	●	
8	BPNS		●	●			●	
9	BBC-SWB		●	●	●			
10	BDI-2		●	●	●		●	
11	BIOPSSI		●	●	●	●	●	
12	CL	●						
13	C19		●				●	●
14	CESD-R		●	●	●		●	
15	CHI		●	●	●		●	●
16	DHS-S		●					
17	EWBS		●					
18	EQ-5D-5L		●		●		●	
19	EURO-D		●					
20	E-QOL		●	●	●			●
21	FS		●	●		●		
22	FACT-GP		●	●	●		●	●
23	FWBS		●	●	●		●	●
24	GHQ12		●					
25	GQLI		●	●	●			
26	HM		●					
27	HWB		●	●	●		●	
28	HUI-3		●		●		●	
29	HHI		●					

#	Measure							
30	HADS		●	●	●		●	
31	ICECAP-A		●	●			●	●
32	ICECAP-O		●	●			●	●
33	ICOPPE	●	●	●	●		●	●
34	IFDFWS		●					●
35	IPPA		●				●	●
36	JSWBS		●			●		
37	KSQ		●	●	●		●	
38	LOT-R		●					
39	LSI-A		●				●	
40	LISAT9	●	●	●	●		●	●
41	MLQ		●			●		
42	MYCAW	●						
43	MUNSH		●					
44	MHC-SF		●	●		●		
45	MHI5		●					
46	MPS		●		●	●		
47	MASQ-D30		●		●			
48	MQLI	●	●	●	●	●	●	●
49	MPQ		●	●			●	
50	MAACL-R		●	●	●	●		●
51	NHP		●	●	●		●	●
52	OAHMQ		●	●	●		●	
53	OWBS		●					
54	OTH		●			●	●	
55	OHQ		●					
56	PWS		●	●	●	●		
57	PGIS		●					
58	PWI-A		●	●	●	●	●	●
59	PGCMS		●	●				
60	PMSW-21		●	●	●			
61	PANAS		●					
62	PFI-12		●					
63	PMH		●	●		●		
64	POMS2		●	●	●		●	

#	Abbreviation	● (black)	● (red)	● (teal)	● (orange)	● (purple)	● (dark purple)	● (magenta)
65	PGWB-S		●					
66	PHS-WB	●	●	●	●	●	●	
67	PIL-SF		●			●		
68	QOLI-G		●	●	●	●	●	●
69	QOLI		●	●	●	●	●	●
70	QWB-SA		●	●	●	●		
71	QEWB		●			●		
72	QOLS	●	●	●	●		●	
73	RSES		●					
74	PWB		●	●		●	●	●
75	SHIS		●	●	●		●	●
76	SWLS	●						
77	SPANE		●					
78	SEQOL	●	●	●	●	●	●	●
79	SS-B		●			●		
80	SF-36v2		●	●	●		●	
81	SHAPS		●					
82	SPF-IL		●	●	●			●
83	SWS			●				
84	SP-WB-S					●		
85	SIWB		●			●		
86	SAI		●					
87	STCI		●					
88	SSCP		●			●		
89	SHS		●					
90	SVS		●		●			
91	TSWLS	●						
92	SP-WB-Q		●	●		●		●
93	SS		●	●		●		
94	VLQ			●	●	●	●	●
95	WEMWBS		●					
96	WPS	●						
97	WHO5		●					
98	WHO-QBF		●	●	●	●		●
99	ZSDS		●	●	●		●	

The themes should be interpreted as distinct but related conceptualisations. For example, overlap exists between many of the themes outlined. The dimension 'Vitality' in general refers to how active and energetic a person feels, and this is likely to depend on both physical and mental well-being. Similarly, for many people 'meaning' and 'purpose' in life are likely to be a matter of both mental and spiritual well-being. One of the iterations of this analysis did not accommodate this overlap; however, the resulting framework became prescriptive rather than flexible. The colour coding in Figure 3.3 and Table 3.3 indicates which dimensions reflect multiple themes.

3.4.   Discussion

This review has provided a detailed exploration into the variety of instruments available in the literature for the measurement of well-being. Overall, the evidence suggests that there is little consistent agreement on how well-being should be measured or what measures should include. Existing reviews have focused on a small set of tools or psychometrics; however, this review has focused on analysing the dimensions found within instruments and developments in the measurement of well-being over time. The primary practical outcome of the review is the development of a framework which has organised the many dimensions and measures of well-being around a set of key themes.

3.4.1. Main findings

The central finding of the review was the identification of 99 measures of well-being. This finding demonstrates substantial variety in the ways in which well-being has been measured. Previous reviews with related objectives had

highlighted the existence of 60 or fewer relevant measures (Lindert et al., 2015; McDowell, 2010). Two possible reasons for the identification of more instruments within this review have been noted. Firstly, the initially agreed definition of well-being was deliberately broad as a way of accommodating for the many alternative ways of interpreting well-being. As a result, measures of happiness that touched on relevant content were included, even though they have featured less frequently in previous reviews. Secondly, the current review used a wider variety of bibliographic databases and relied on hand searching. This decision was taken to ensure that measures used across disciplines were identified.

A second key finding was the identification of 196 dimensions of well-being. Describing the dimensions within measures of well-being within reviews had been neglected until recently (Lindert et al., 2015). Lindert et al's review noted 25 distinct 'domains' of well-being and stated that life satisfaction and affect domains were amongst the most popular within the instruments. The review in this chapter reported many more dimensions and these findings imply that there is considerable heterogeneity among how measures of well-being have conceptualised the topic.

The third key result was the development of the timeline of measurement, which indicated that there has been consistent and quantifiable growth in the number of well-being measures being produced each decade since the 1960s. These findings support the claim that there has been little unanimous agreement on how well-being should be measured. The continued growth can at least in part be attributed to the increasing levels of multidisciplinary input into the topic. For example, the first tools developed in the 1960s were heavily geared towards psychological and medical assessment;

however, this work highlights a diverse set of tools, many the products of cross-disciplinary collaborations that draw on influences across different schools of thought. The spike in the number of instruments developed in the last twenty years in particular may have been influenced by the growing academic recognition that self-reported data produced by measures of well-being have demonstrable empirical and economic value (Kahneman & Krueger, 2006).

The final main finding and contribution of the chapter is the Thematic Framework of Well-being. This toolkit principally aims to improve the way in which researchers select measures of well-being. By organising the toolkit around the dimensions, researchers are prompted to pay closer attention to the contents of tools. Separately, researchers could examine the dimensions within the framework to determine whether a newly proposed measure is able to provide anything that existing tools do not already cover. In both cases, this framework provides an organised inventory of relevant tools for consideration.

3.4.2. Ongoing issues in the measurement of well-being

In a topic as diverse as well-being there is a need for both highly focused and widely scoped reviews. Narrowly focused reviews can provide more detailed insight on a smaller range of widely used tools, while reviews with a wider focus are able to focus on developments over time and the existence of lesser known tools, which may help researchers address their specific hypotheses. In the course of conducting this widely-scoped review, several challenges in the measurement of well-being were identified.

Regardless of their similarities, difficulty arises when the term well-being is used interchangeably with terms like health and happiness. Concern over the

differences between these terms has been raised elsewhere in the thesis (Chapter 2). For terms like these to be useful, attempts must be made to clarify and acknowledge their differences. The findings from this study further support claims that 'well-being' is a multidimensional construct. This work has highlighted that these dimensions range from A (achievement at work) to Z (zest for life).

One simple way to achieve more clarity with measurement in mind would be for researchers to offer their readers more contextual information. For example, when researchers attempt to measure 'life satisfaction', it would be beneficial for them to highlight whether they are referring to life satisfaction as a form of SWB (Diener, Larsen, Levine, & Emmons, 1985), or whether they are referring to one of the many other alternative conceptualisations. Further, when researchers develop new dimensions such as 'social potency' (Patrick et al., 2002), it would be informative to describe how this relates to the wider theme of social well-being. Broadly focused reviews like the work presented here help to facilitate this process of contextualisation by indicating the themes that numerous measures of well-being can be aligned to.

Several difficulties arose regarding the distinction between measures of well-being and measures of: mental health, mental illness and depression. Measures such as the Beck Depression Inventory-2 and the Mood and Anxiety Symptom Questionnaire feature in existing reviews into the topic, however it would be defensible to argue that these dimensions would fit more comfortably into some idea of 'ill-being' rather than 'well-being'. These measures have often been lumped together as researchers have assumed that low levels of depression and anxiety signal high levels of some conceptualisation of 'well-being'. Within the current review, these measures were retained, to

acknowledge the overlap between the topics. Rather than assuming that the absence of mental illness represents the presence of well-being – a multidimensional approach to the subject should be taken.

A review of well-being measures unsurprisingly prompts the question "what makes a good measure of well-being?". On one hand psychometric properties such as validity and reliability provide the main criteria used to determine the quality of a questionnaire (Cohen, Swerdlik, & Phillips, 1996). Statistical forms of these properties such as concurrent validity perform a vital function; however, there is much about the quality of an instrument that is better captured by non-statistical forms of validity. Content validity and face validity for example concern the extent to which an instrument reflects the concepts it claims to measure, and the extent to which respondents agree with this (Rust, Golombok, Kosinski, & Stillwell, 2014). This review demonstrates that there are clearly a variety of ways in which researchers have attempted to operationalise well-being. Therefore, when researchers employ these measures, they should be mindful of whether these tools reflect their own perspective on well-being, but also whether it is an appropriate reflection of what 'well-being' means for people in the study's target population.

Growth in the number of well-being measures can be interpreted as both a sign of healthy progress and possibly a detrimental development. On one hand, having an excess of instruments provides researchers with a diverse range of measures to select from. On the other hand, this growth indicates that there may be a general sense of dissatisfaction among researchers with the instruments in existence. The next step would be to consider whether there should be less measures of well-being, or some form of 'cap' on the development of new measures. There are no easy answers to whether this

should be the case; however instruments which have demonstrated poor validity or reliability should be used with caution.

The value and use of the tools identified will vary. Short measures of Global well-being, such as the Arizona Integrative Outcomes (AIOS) Scale or the World Health Organisation-5 (WHO5) provide quick overall snapshots on well-being and take up very little time from participants. In comparison, broader-scoped instruments such as the Biopsychosocialspiritual Inventory (BIOPSSI) or the Mental Physical Spiritual Well-Being Scale (MPS) assess well-being separately across themes, and are thus able to provide a more comprehensive assessment. Other instruments assess more specific dimensions such as financial distress/well-being or social acceptance. These instruments are conceptually narrower and, as a result, are better equipped to facilitate more focused assessment.

3.4.3. Limitations

The review's selection criteria limited the scope of the review to generic instruments for use in adult populations. Although this means that some measures for use in condition and context specific instances will have been missed, the decision was justified on pragmatic grounds to keep the review more focused on measures for use across populations. The extensive literature, inconsistent phrasing and disorganisation remain significant challenges for those conducting systematic reviews on the topic of well-being. It is unlikely that any search strategy could collate a definitive list of instruments, however hopefully the broad approach taken in the current work is able to complement the selective reviews already in existence. In contrast to the psychometric focus of previous reviews, the objective of this work was to inform researchers about

the dimensions available and the thematic differences among instruments. Further research should investigate the psychometric properties of this wider set of tools, with a specific focus on the issue of content and construct validity. Merging these strands of work should strengthen the methodological quality and our understanding of the subject.

The systematic search strategy used was both an advantage and a disadvantage. On one hand, because a systematic process was followed, the search could be replicated by another researcher. Further, the presence of inclusion and exclusion criteria helped to anchor the review to its set focus. In other ways, the process at times felt mechanical. As my understanding of the topic developed while I undertook the review, a less structured and more organic format would have been beneficial. For this reason, it is important to supplement insight gained from systematic searches with relevant literature sourced in more natural ways, such as through discussions with colleagues.

Finally, the themes presented in this review could be contested by the original authors of the instruments. Subjectivity is one of the many inherent qualities of the topic; therefore, it is unavoidable that there may be some conflict between the framework presented in this review and the perspectives of other researchers. In defence of the review, this work represents an original reanalysis of existing literature. References for each of the instruments examined have been provided throughout the work to allow readers to explore the original sources.

3.4.4. Further research

A long list of well-being measures has been provided, but ambiguity surrounding the measurement of well-being remains. The current work has

attempted to be inclusive, rather than attempting to consolidate the measurement options, however, additional research should be conducted with the goal of investigating whether so many measures are necessary. For example, some of the measures available may be too similar to other instruments already in use. Other tools developed many years ago may simply no longer be of value due to the ongoing development of newer instruments. Work to clarify which instruments are necessary should ideally tie in with psychometric analyses.

Further research should also focus on better understanding the conceptual similarities and differences between different dimensions of well-being. It remains to be seen whether there are substantial differences between for example 'happiness' and 'emotional well-being', or 'life purpose' and 'life meaning'. Further research should seek to investigate whether these distinctions are defensible. Progress will depend on researchers being more: specific about definitions, selective about which measures are used, and more cautious about how well-being terms are used.

Finally, another way in which measures of well-being differ that has not been examined in this chapter relates to theory. Theories occupy an essential function in the literature, by forming the basis of the empirical studies conducted, but also by informing the development of instruments. Further in-depth investigation into the nature of the relationship between theory and measurement in well-being is required. An examination of this sort would provide rich contextual information and indicate which theories function as dominant influences within the literature.

3.4.5. Conclusion

This review was prompted by ambiguity surrounding how well-being is currently measured. A comprehensive overview of available instruments has been provided, along with a framework that organises these instruments by dimension and theme. The consistent rate at which new instruments have been developed suggests that continued growth can be expected. While significant empirical and policy-related developments have been made in the last ten years, continued progress will depend on equal amounts of effort focused on understanding the methods and measures used to collect well-being data.

CHAPTER 4: AN INVESTIGATION INTO THE THEORIES UNDERLYING MEASURES OF WELL-BEING

4.1. Introduction

Comprehensive investigation into well-being requires an awareness of its theoretical roots. Multiple theories of well-being exist, partly due to the interdisciplinary input of psychologists, sociologists, philosophers and economists amongst others. These theories influence how researchers understand well-being; however, there has been little in-depth investigation into how these ideas have influenced the ways in which well-being is measured. The focus of this chapter will be on the nature and variety of these theories.

4.1.1. Theories of well-being

The term 'theory' is used throughout the literature on well-being, yet its meaning is rarely given much close attention. Across the social sciences however the role of 'theory' has been discussed widely and many definitions have been proposed. Broadly speaking, a theory is a type of proposition (Berger, 2005). Elsewhere theories have been described as a collection of suspected relationships between variables (Gelso, 2006). Numerous other approaches exist and the 'correct' usage of the term can sometimes be unclear (Sutton & Staw, 1995). In line with this uncertainty, theories found in the literature come in numerous varieties.

A multitude of different theories have been used to understand well-being. Some approaches have provided an explanation for why people display stable levels of life satisfaction over time (Brickman & Campbell, 1971), while

others describe the relationship between economic development and national happiness (Easterlin, McVey, Switek, Sawangfa, & Zweig, 2010). Both of these theories present propositions, concern suspected relationships, and attempt to provide clarity to a highly debatable subject. One of the ongoing challenges for well-being researchers has been managing the multiple theories in existence.

4.1.2. Existing reviews into theories of well-being

One of the most cited reviews in the literature compares two of the most widely referenced theoretical approaches (Ryan & Deci, 2001). The 'hedonic[12]' theory of Subjective Well-being (Diener, 1994) is contrasted with the 'eudaimonic[13]' theories of Psychological Well-being (Ryff, 1989) and Self Determination (Ryan & Deci, 2000). The approaches disagree on the nature of well-being and have typically studied the determinants of well-being from their own perspectives. This article briefly highlighted that each approach has been associated with separate measures; however, the topic of measurement was not a central issue for this review.

Reviews have also provided discipline-specific perspectives on the theories underlying well-being. Veenhoven (2008) reviewed the meaning of well-being, its assessment, determinants and consequences, with reference to the sociological literature. Theoretical discussion in this work focused on: social construction theory (Rusconi, 1968), the Easterlin Paradox (Easterlin, 1974), Brickman's set point theory (Brickman & Campbell, 1971), Diener's Subjective well-being theory (Diener & Suh, 1997), Broaden and build theory (Fredrickson,

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[12] Hedonic theories are broadly concerned with happiness and pleasure (Diener, Oishi, & Lucas, 2003).
[13] Eudaimonic theories are principally concerned with growth and purpose (Ryff, 1989).

2004) and Multiple discrepancy theory (Michalos, 1985). Although matters of SWB have not frequently been at the centre of sociological discussion, many of its key theories have demonstrable applicability.

Other review work has concentrated on the defensibility of well-being theories. One of these reviews categorised the available theories into hedonistic theories which had been discussed previously (Ryan & Deci, 2001), desire-fulfilment theories and objective list theories (Bloodworth, 2005). The differences between feelings of satisfaction, obtaining things that are desirable and the presence of specific 'goods' within a person's life are discussed as alternative ways of conceptualising well-being. The advantages and disadvantages of these approaches are described; however, measurement and the empirical study of well-being were outside of the scope of this discussion.

4.1.3. Existing challenges

These reviews further indicate that well-being is continuously conflated with a range of other terms. As an example of this, theories of well-being are described within a review into 'happiness and human potentials' (Ryan & Deci, 2001). Further, one of the first points made by Bloodworth is that well-being and quality of life are related enough to be used interchangeably (Bloodworth, 2005). Finally, SWB, life satisfaction and happiness are explicitly referred to as synonymous with each other (Veenhoven, 2008). These observations echo the central point presented in Chapter 2 and Chapter 3 that not enough care or precision is used when utilising these terms in the literature.

A second unsettled issue is that theoretical reviews have often neglected the relationship between theory and measurement. Many of the reviews in the

literature discuss the differences between theories and will occasionally highlight some of the relevant tools in existence (Ryan & Deci, 2001). On the whole however, it is unclear how influential theories have been in the ongoing development of these tools, if at all. Although explicit theoretical motivation is not a compulsory requirement for measurement, theories can provide an instrument with its conceptual underpinning and guide the selection of dimensions and items that make up an instrument.

4.1.4. The current review

The purpose of this chapter is to explore the theoretical basis of well-being measurement, to illuminate the specific theories which have been influential in the ongoing development of instruments. This chapter will provide further examination into the instruments identified in Chapter 3. The principal difference between this review and existing work is its explicit focus on the interrelationship between theory and measurement. The focus will be on the breadth and variety of theoretical influences, rather than a select few, as has been the case within most of theoretical reviews on the topic. Both approaches are required to advance a more comprehensive understanding of the topic. Given the scope of the work and its purpose, this chapter will focus on the development of understanding and explore ambiguity, rather than seeking to critically appraise which theories are 'better' or 'worst' performing.

4.1.5. Aims

The aims were as follows:

Aim 1: To examine the extent of theoretical variety in existence among measures of well-being;

Aim 2: To examine which specific theories have been the most influential across measures of well-being;

Aim 3: To investigate the ways in which the measures and theories identified are interconnected using a network analysis;

Aim 4: To summarise a selection of the theories which have been influential in the measurement of well-being.

4.2.   Methods

4.2.1. Identification of theories

The theories were identified from the articles cited by the list of measures reported within Chapter 3. A theory was extracted from the publication if: (1) authors explicitly stated that an existing theory influenced the development of a new tool, (2) authors had developed a new theory themselves and constructed a new tool to operationalise its measurement, or (3) authors used a theory in order to determine their instrument's dimensions or items. When a theory met the inclusion criteria for extraction, it was entered into an excel database. An excerpt from this table is presented in Table 4.1.

Given the many forms that theories come in (Berger, 2005; Gelso, 2006; Sutton & Staw, 1995), this review took a broad and inclusive approach. For

example, theories were not excluded from the review if they lacked falsifiability.

While falsifiability is a defensible characteristic for theory, judging whether each

of the theories met this criterion was outside of the scope of this review. For the

purposes of simplicity, the word 'theory' was used as an umbrella term to refer

to the: theories, models, frameworks and definitions that have been influential in

the development of well-being measures.

Table 4.1. Part of the extraction table for theories

Measures	Theories identified		
15D	WHO definition of health		
Affect Balance Scale	Psychological well-being (Bradburn)		
Affectometer 2	None explicitly stated		
Anamnestic Comparative Self-Assessment	Andrews and Whithey's approach to subjective well-being	Subjective well-being (Bernheim)	
Arizona Integrative Outcomes Scale	WHO definition of health		
Assessment of Quality of Life	WHO definition of health	WHO definition of impairment	
Authentic/Steen Happiness Index	None explicitly stated		
Basic Psychological Needs Scale	Self-determination Theory		
BBC Subjective Well-Being Scale	Psychological well-being (Ryff)	WHO definition of quality of life	Beck's Negative Cognitive Triad theory
Beck Depression Index-2	Beck's Negative Cognitive Triad theory		
Biopsychosocialspiritual Inventory	Biopsychosocial-spiritual model		
Cantril Self-Anchoring Striving Scale			
CASP-19	Maslow's hierarchy of needs	Theory of human need (Doyal and Gough)	
Centre For Epidemiological Studies-Depression Scale	None explicitly stated		
Chinese Happiness Inventory	None explicitly stated		

4.2.2. Visualising the relationships between theories and measures

The data were entered into an adjacency matrix table, in order to describe

which measures and theories were connected to one another. An adjacency

matrix is used to describe how some measures are explicitly related to some theories while others are not. Adjacency matrices are used within computer science and graph theory to describe data for subsequent analysis (West, 2001). A segment of this table can be found below in Table 4.2. The 'iGraph' package within the statistical software 'R' was used to convert the adjacency table into a format ready for analysis. Next, the 'bipartite properties'[14] of the network were specified. This allowed R to recognise that the visualisation will have two types of objects (theories and measures). The R package 'ggnet2' was used to specify the visual properties of the network (shapes, colours and labelling used) and to generate the final visualisation of the network diagram.

Table 4.2. Excerpt of the adjacency matrix table describing which theories and which measures were linked

	T66	T67	T68	T69	T70	T71
M74	0	0	0	0	0	0
M75	0	0	0	0	0	1
M76	0	0	0	0	0	1
M77	0	0	0	0	0	1
M78	0	0	0	0	0	0
M79	0	0	0	0	0	0
M82	0	0	0	0	0	0
M83	0	0	0	0	0	0
M85	0	1	0	0	0	0
M87	0	0	1	0	0	0
M89	0	0	0	0	0	1
M90	0	0	0	0	0	0
M91	0	0	0	0	0	1
M92	1	0	0	0	0	0

Note: M = Measure and T = theory, 0 = This measure does not cite this theory as an influence, 1 = This measure does cite this theory as an influence. M74 = Ryff's Scales of Psychological Well-Being, M75 = Salutogenic Health Indicator Scale, M76 = Satisfaction with Life Scale, M77 = Scale of Positive and Negative Experience, M78 = Self-Evaluated Quality of Life Questionnaire, M79 = Serenity Scale (Brief), M82 = Social Production Function-II, M83 = Social Well-Being Scale, M85 = Spirituality Index of Well Being, M87 = State-Trait Cheerfulness Inventory, M89 = Subjective Happiness Scale, M90 = Subjective Vitality Scale, M91 = Temporal Satisfaction with Life Scale, M92 = The Spiritual Well-Being Questionnaire, T66 = Spiritual health (Fisher), T67 = Spirituality and wellbeing (Daaleman), T68 = State-trait model of exhilaratability (Ruch), T69 = Subjective quality of life (Calman), T70 = Subjective well-being (Bernheim) and T71 = Subjective well-being (Diener).

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[14] Bipartite simply refers to data being made of two parts (West, 2001).

4.3. Results

4.3.1. Identification of theories

A flow chart detailing the process undertaken can be found in Figure 4.1. The majority of full text articles were accessible for the measures of well-being in this review (85%, 84/99). In total 74% of these measures (63/84) could be linked explicitly to at least one theoretical influence. Across the instruments a total of 96 theories were explicitly referenced as being influential in the development of the instruments. A complete list of these theories and their corresponding notations can be found in Table 4.3.

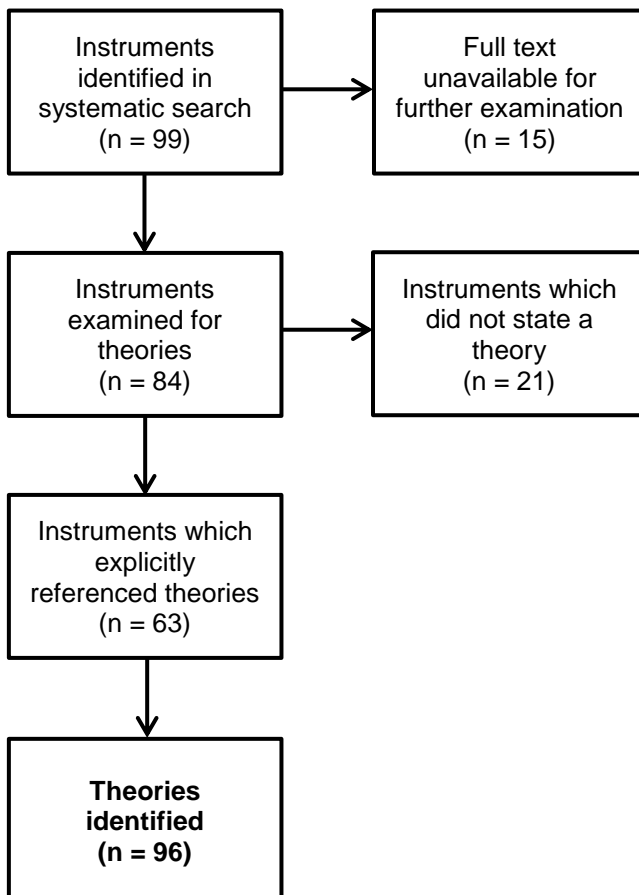**Figure 4.1. Flow chart describing the identification of theories**

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Table 4.3. Theories of well-being identified

Ref[15]	Theory name
T1	Acceptance and Commitment Therapy (Hayes, Strosahl, & Wilson, 1999)
T2	Action-theoretic approach (Nordenfelt, 1995)
T3	Additive model of life satisfaction (M. Frisch, 1989)
T4	Allport's formulation of maturity (Allport, 1961)
T5	Andrews and Whithey's theory of subjective well-being (Andrews & Withey, 1976)
T6	Aristotle's notion of eudemonia (Crisp, 2014)
T7	Authentic happiness (Seligman, 2004)
T8	Basic life tendencies (Bühler, 1935)
T9	Beck's Negative Cognitive Triad theory (Beck, 1967)
T10	Biopsychosocial model of health (Engel, 1968)
T11	Biopsychosocial-spiritual model (Sulmasy, 2002)
T12	Capability theory (Sen, 1987)
T13	Conceptual model of financial well-being (Porter, 1993)
T14	Diagnostic Statistical model 3 (American Psychiatric Association, 1987)
T15	Dufault and Martocchio's model of hope (Dufault & Martocchio, 1985)
T16	Ego identity status (Marcia, 1966)
T17	Ethical hedonism (Epicurus) (Annas, 1987)
T18	Eudaimonic identity theory (Waterman & Kroger, 1993)
T19	Eudaimonic Well-being (Waterman, 1990)
T20	Expected utility theory (Von Neumann & Morgenstern, 2007)
T21	Flow (Mihály, 1990)
T22	Fully functioning person (Rogers, 1974)
T23	General Health Policy Model (Kaplan & Anderson, 1996)
T24	Grinker's conceptualisation of depressive symptomology (Grinker, Werble, & Drye, 1968)
T25	Harmonious interconnectedness (Hungelmann, Kenkel-Rossi, Klassen, & Stollenwerk, 1985)
T26	Health as expanding consciousness (Newman, 1997)
T27	Hedonic psychology (Kahneman, Diener, & Schwarz, 1999)
T28	Hedonism as conceptualised by Aristuppus (Irwin, 1991)
T29	Helicy (Barrett, 1990)
T30	Holism (Kunitz, 2002)
T31	Holistic health related theory (Whitbeck, 1981)
T32	Holistic health related theory (Seedhouse, 2001)
T33	Holistic model of health (Quick & Tetrick, 2003)
T34	Homeodynamic principles (M. E. Rogers, 1992)
T35	Human wellness (Millar & Hull, 1997)
T36	Intentional model of emotional well-being (Şimşek, 2011)
T37	Jung's account of individuation (Jung, 1933)
T38	Jung's theory of psychoanalysis (Jung, 1958)
T39	Locus of control theory (Lefcourt, 1982)
T40	Logotherapy (Frankl, 1962)
T41	Maslow's hierarchy of needs (Maslow, 1943)
T42	Meaning in life (Steger, Kashdan, Sullivan, & Lorentz, 2008)
T43	Model of behavioural self-regulation (Scheier & Carver, 1988)
T44	Modular approach to quality of life (Aaronson, Bullinger, & Ahmedzai, 1988)

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[15] Reference numbers.

T45	Neugarten's personality theory (Neugarten, 1973)
T46	Eudemonism as an ethical theory (Norton, 1976)
T47	Ontological well-being (Şimşek, 2009)
T48	Positive health (Sigerist, 1950)
T49	Positive mental health (Jahoda, 1958)
T50	Positive therapy: a meta-theoretical approach (Joseph & Linley, 2006)
T51	Powerlessness and alienation (Seeman, 1991)
T52	Psychological well-being (Bradburn & Caplovitz, 1965)
T53	Psychological well-being (Ryff, 1989)
T54	Relativistic theory of meaning in life (Battista & Almond, 1973)
T55	Renaissance hedonism (Rummel, 1983)
T56	Salutogenic approach (Fredrickson, 1998)
T57	Self-determination theory (Ryan & Deci, 2000)
T58	Self-efficacy theory (Bandura, 1977)
T59	Sense of coherence (Antonovsky, 1987)
T60	Serenity theory (Roberts & Fitzgerald, 1991)
T61	Social capital theory (Putnam, 2000)
T62	Social cohesion (Durkheim, 1951)
T63	Social Integration (Srole, 1956)
T64	Social production function theory (Ormel, Lindenberg, Steverink, & Vonkorff, 1997)
T65	Social well-being (Keyes, 1998)
T66	Spiritual health (Fisher, 2010)[16]
T67	Spirituality and wellbeing (Timothy P Daaleman, Cobb, & Frey, 2001)
T68	State-trait model of exhilaratability (Ruch, 1993)
T69	Subjective quality of life (Calman, 1984)
T70	Subjective well-being (Bernham, 1999)
T71	Subjective well-being (Diener, 1994)
T72	Subjective Wellbeing Homeostasis (Cummins, Gullone, & Lau, 2002)
T73	Systems theory of perceived wellness (Adams et al., 1997)
T74	Tellegen's model of personality (Tellegen, 1982)
T75	The circumplex model of emotions (Ressel, 1980)
T76	The concept of intentionality (Husserl, 1970)
T77	The ethics (De Spinoza, 1951)
T78	The Gaia hypothesis (Lovelock & Lovelock, 2000)
T79	The human becoming theory (Parse, 1997)
T80	The National Interfaith Coalition on Aging model of spiritual well-being (Moberg, 1984)
T81	The perceived locus of causality (deCharms, 1968)
T82	The psychosocial identity theory (Erikson, 1963)
T83	The quality-of-life philosophy (Ventegodt, 1995)
T84	The tao of physics (Capra, 1975)
T85	The trans theoretical model (Prochaska & DiClemente, 1992)
T86	The utility approach to health-related quality of life (Feeny, 2000)
T87	Theoretical perspective of holistic health (Cmich, 1984)
T88	Theory of human need (Doyal & Gough, 1991)
T89	Tripartite model of anxiety and depression (Clark & Watson, 1991)
T90	Utilitarianism (Bentham, 1879)
T91	Watson's theory of Nursing (Watson, 1985)
T92	WHO definition of functioning (World Health Organization, 2001)
T93	WHO definition of health (World Health Organization, 1948)

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[16] This book takes its name from the corresponding unpublished doctoral dissertation at The University of Melbourne (1998).

T94	WHO definition of health promotion (World Health Organization, 1986)
T95	WHO definition of impairment (World Health Organization, 1980)
T96	WHO definition of quality of life (The WHOQOL Group, 1998)

4.3.2. Highly connected theories and measures of well-being

The majority (80%; 77/96) of the theories identified were cited only once among the tools examined. The most cited theories are displayed in Figure 4.2. Subjective well-being (Diener) 'T71' reoccurred within 11 measures of well-being and was the most popular theory identified. Similarly, Ryff's psychological well-being theory 'T53' and the WHO definition of health 'T93' were cited by seven instruments each. Finally, Maslow's hierarchy of needs and self-determination theory were stated by five instruments. The most recently developed of these approaches was Csíkszentmihályi's theory of Flow 'T21' (1990). A description of each of these theories can be found in Table 4.3.

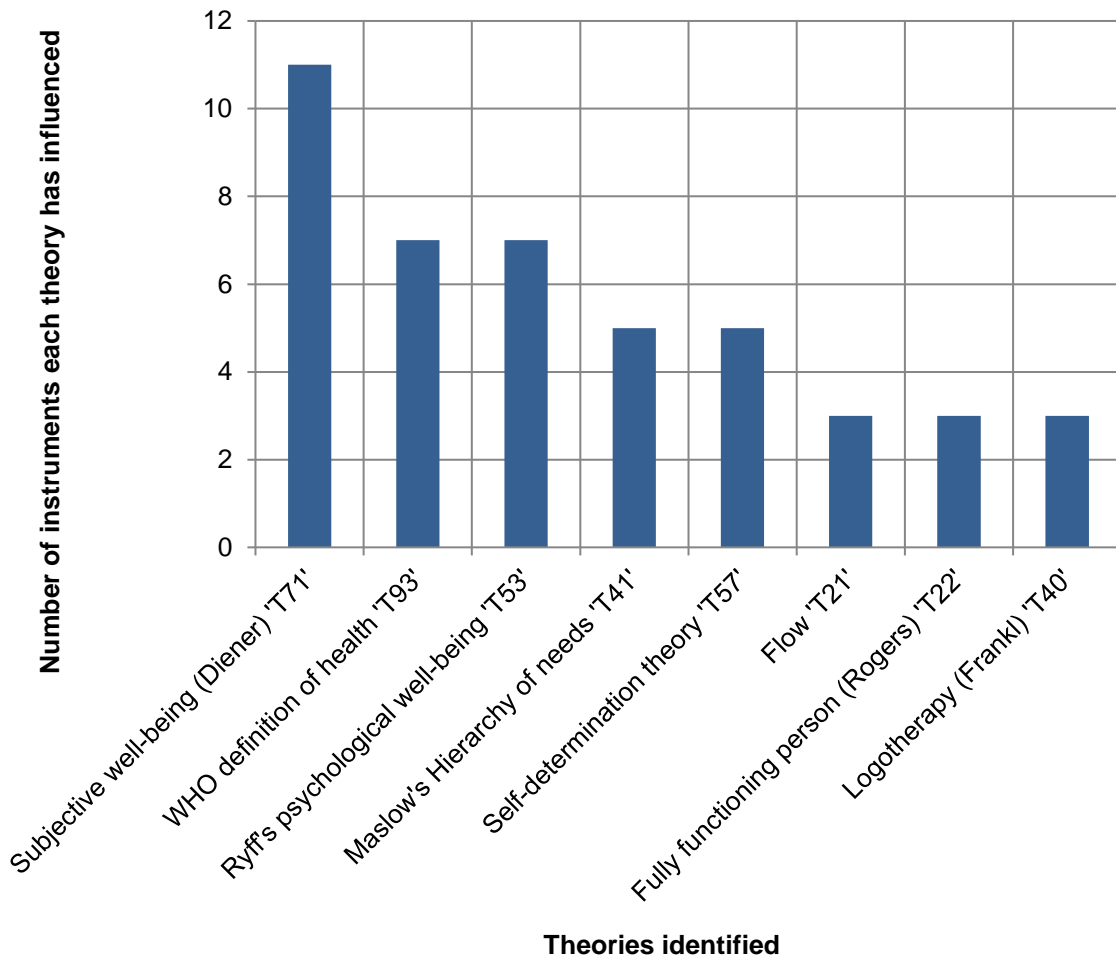**Figure 4.2. The most cited theories within measures of well-being**

Table 4.4. Descriptions of each of the most cited theories within measures of well-being

Theory	Summary
Subjective well-being	Diener proposes that subjective is composed of cognitive and emotional components (Diener, Scollon, et al., 2003). Life satisfaction is the cognitive dimension, and it describes how an individual evaluates the quality of their life overall. Two emotional components – positive affect and negative affect – represent a person's experience of positive emotions like happiness and negative emotions like anxiety.
WHO definition of health	The WHO defines health as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity" (World Health Organization, 1948).
Ryff's psychological well-being	Psychological well-being is comprised of six key dimensions: self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life and personal growth (Ryff, 1989). Positive experiences in these six aspects of psychological well-being are believed to be critical for human flourishing.
Maslow's hierarchy of needs	The satisfaction of several physiological, social and psychological needs is central to well-being (Maslow, 1943). Once basic physical needs such as access to clean water and shelter have been met, individuals are able to focus on the need to feel loved, accepted and confident. After these needs have been met individuals are able to realise their full potential and live life to the fullest.
Self-determination theory	Individuals are assumed to be motivated by three basic psychological needs: relatedness, autonomy and competence (Deci & Ryan, 2008). Relatedness refers to the need to interact with others, autonomy refers to the need to act in accordance with our own values and competence refers to the need to feel that one's environment can be controlled.
Flow	Flow describes occasions where individuals experience heightened levels of happiness in response to engaging activities (Mihály, 1990). Individuals are described as being 'in flow' when an activity is sufficiently stimulating and requires them to employ some degree of skill, ability or talent.
Fully functioning person	Fully functioning individuals are characterised by: unconditional positive regard for oneself, openness to new experiences and an ability to grow in response to the world around them (Rogers, 1974). As such, fully functioning is a dynamic and ongoing process.
Logotherapy	Logotherapy argues that individuals are constantly searching for meaning in life (Frankl, 1962). While it is possible to find a purpose in life, happiness is not guaranteed.

The majority of instruments referred to only one theory (58%; 37/63). The eight measures which cited the most theoretical influences can be found in Figure 4.3. The Orientations to happiness tool 'M54' cited the most theoretical influences (11 theories). The Social well-being scale 'M83' (10 theories), Salutogenic health indicator scale 'M75' (10 theories), Questions for eudaimonic

well-being 'M71' (nine theories) and Ryff's scales of psychological well-being 'M74' (nine theories) also referenced a wide variety of theoretical influences.

Figure 4.3. Measures of well-being with the most theoretical influences
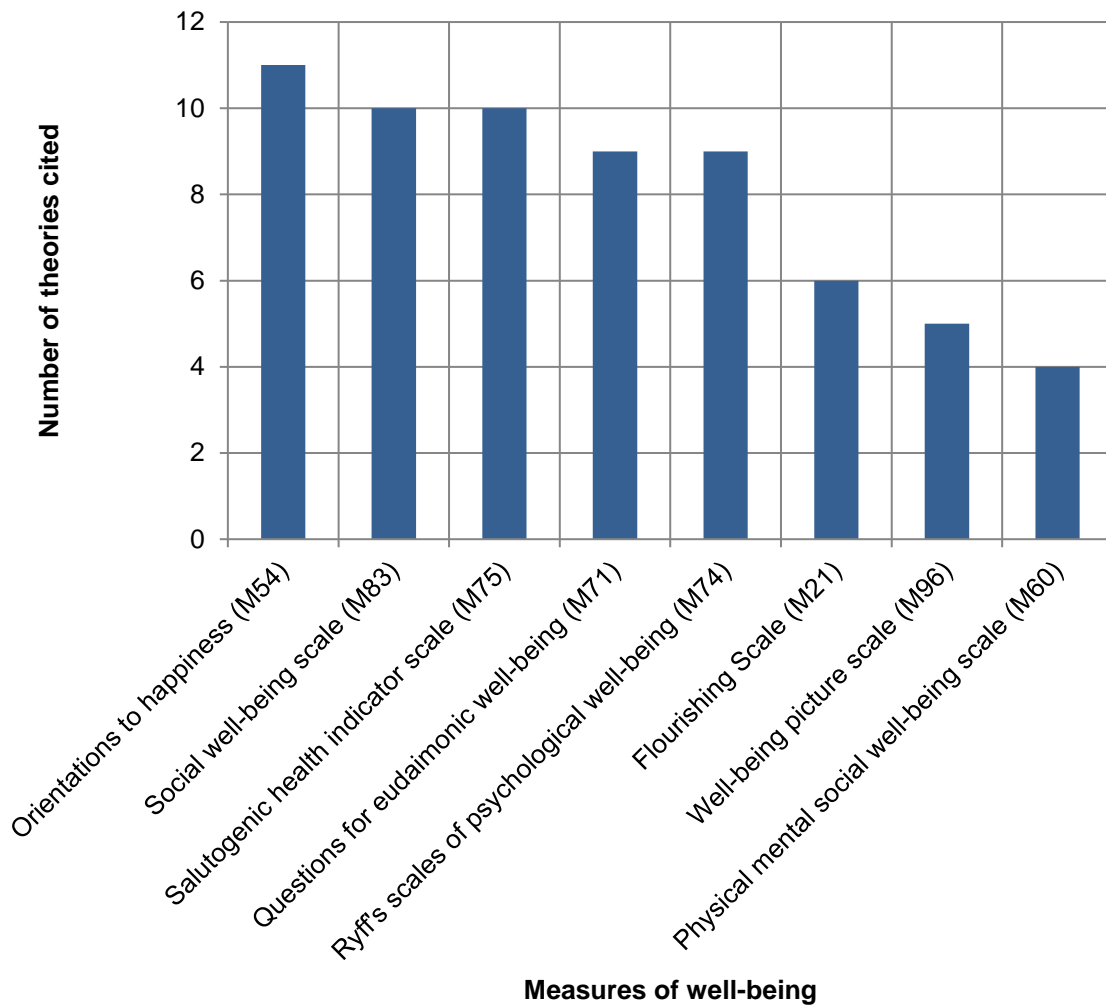
4.3.3. Network diagram – depicting the connection of theories to measures

The connection between theories and measures of well-being has been visually depicted in Figure 4.4. The network diagram demonstrates the extent to which measurement is dependent on theory. The way in which theories guide the

development of measures is noticeably intricate and forms a network that resembles a 'web' of influence. In this respect, many of the theories and measures are indirectly related to each other through several degrees of separation. For example, the Biopsychosocial model of health - 'T10' influenced the development of the Physical, Mental and Social Well-Being Scale - 'M60', which was also influenced by the WHO definition of health - 'T93', which itself was linked to six other measures. In this network diagram, it is possible to observe that M60 has been influenced by several 'health oriented' theories. By tracing these commonalities, the dependence of measurement on theory can be observed.

Figure 4.4. Network diagram illustrating the theories influencing each measure of well-being
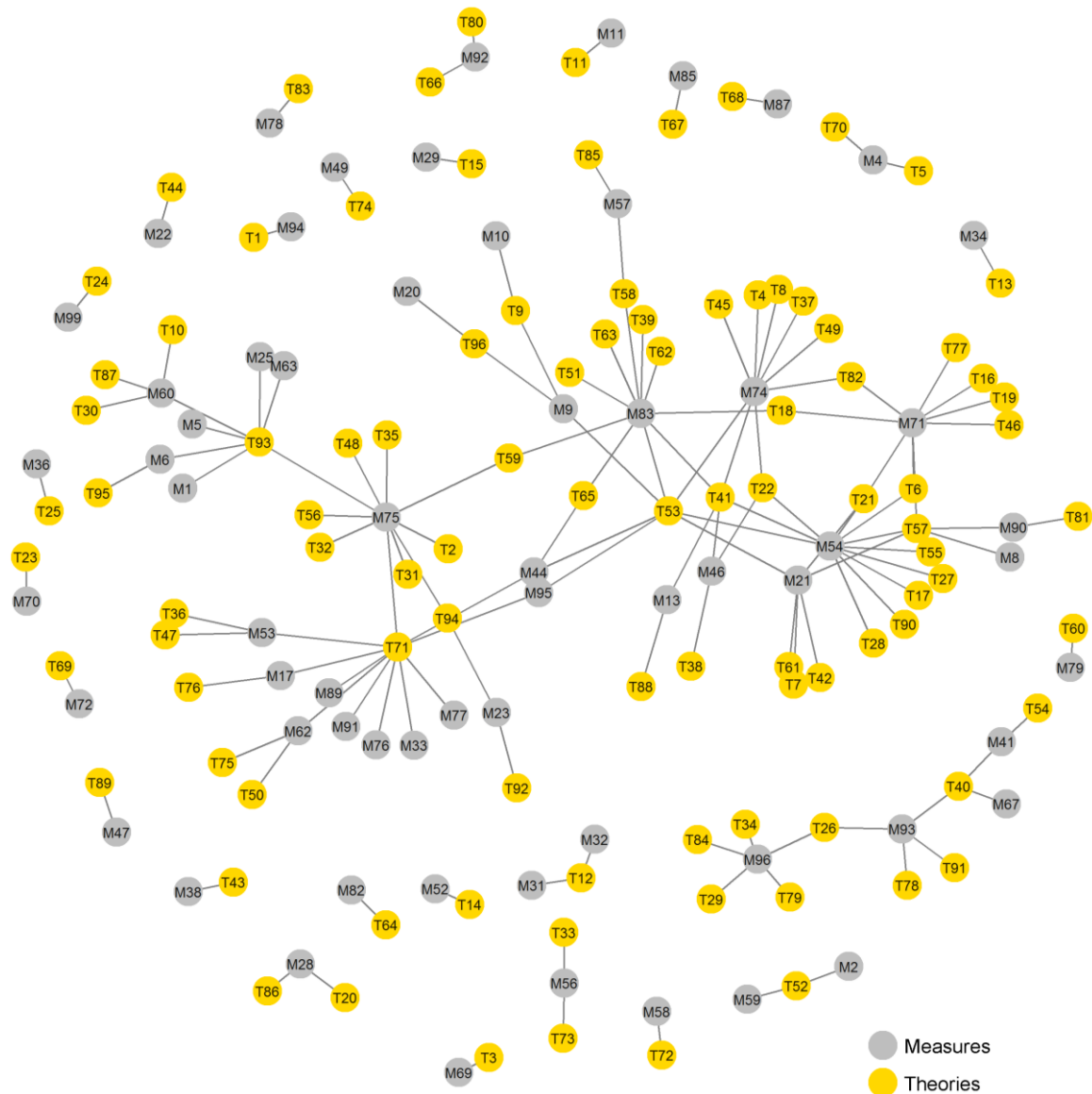
The network diagram also indicates which theories may be of peripheral importance. For example, Social production theory - 'T64', the Model of behavioural self-regulation - 'T43' and Subjective quality of life (Calman) - 'T69' were each linked to only one measure of well-being. It is nevertheless important to highlight these theories, partly because they have been often neglected within previous reviews. Here however, the influence of more niche theories is visible.

Seven of the eight instruments stated in Figure 4.4 were found to be interwoven within a cluster of shared theoretical influences (Cluster 1) which has been highlighted in green within Figure 4.5. This cluster links 49% of the measures (31/65) to 54% of the theories identified (52/96). This common influence indicates the existence of a 'mainstream' collection of tools and theories with a common influence.

Figure 4.5. Network diagram illustrating how theories and measures of well-being form two separate clusters
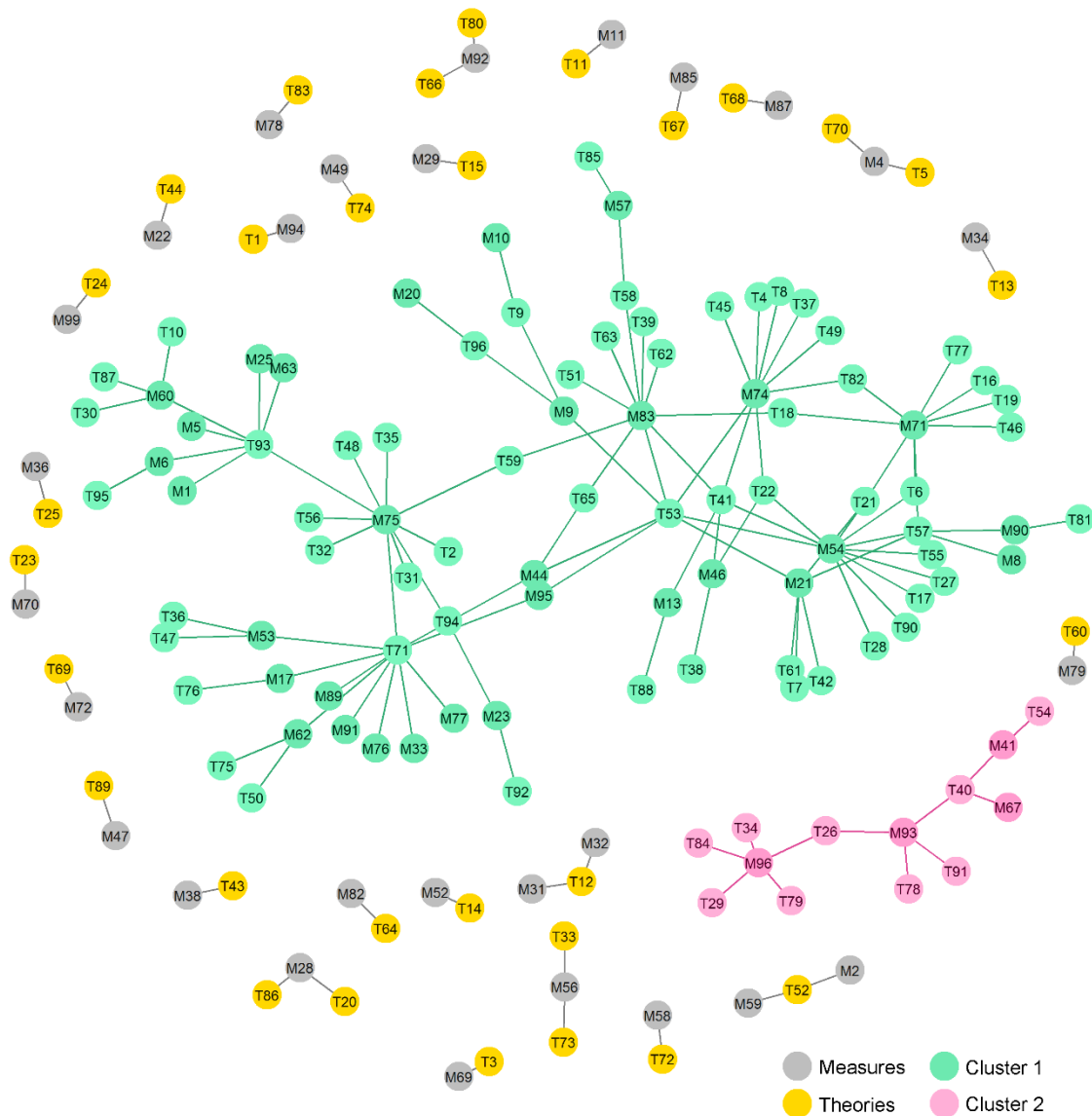
A second much smaller cluster of theories and measures external to the mainstream cluster has been highlighted in pink within Figure 4.5 (Cluster 2). This cluster unites topics such as meaning in life and spirituality with disciplinary influence from the nursing literature. One of the key measures contained within this cluster is the Well-being picture scale - 'M96' which was previously highlighted within Figure 5. As the diagram highlights, it is connected to a distinct collection of measures ('M93', 'M41' and 'M67') and theories external to Cluster 1.

Surrounding this clusters exists a collection of largely unrelated measures of well-being. These instruments have distinct theoretical influences and in some cases may be of peripheral relevance to the topic on the whole. An example of this is the theory of Hamonious interconnectedness - 'T25'. As the diagram displays, this theory was referenced by only one instrument, the JAREL spirirtual well-being scale - 'M36'. Simialrly, The Serenity Scale-Breif - 'M79' was soley influenced by Serenity theory - 'T60'.

4.3.4. Historical context

The term 'well-being' has existed in several forms throughout history, and this history could form an entire chapter in its own right. Although the theories identified within these measures span a period of two millennia, they still paint an incomplete picture of this history. As such, it is necessary to briefly reflect on the succession of key intellectual movements that took place during this time. Outlining this chronology will contextualise the forthcoming summary of theories.

Some of the earliest theories identified date back to ancient Greece. The notable works of philosophers like Aristotle (Höffe, 2010), Epicurus (Annas, 1987) and Aristippus (Irwin, 1991) laid the early scholarly foundation for many theories of well-being to come. Following the middle ages, cultural developments during the European Renaissance helped to usher in a new wave of intellectual and scientific thought that would later be known as the period of enlightenment (Kant, 2013). During this period, key figures like Bentham and Erasmus theorised about utilitarianism and hedonism, respectively (Bentham,

1879). These theories would go on to directly and indirectly shape insights into well-being for centuries.

The 20th century saw the development of the social and behavioural sciences, and the continued expansion of the medical sciences. Several waves of psychology were born, ranging from the psychoanalysis of Jung (Jung, 1933) to the humanistic approach of Maslow (Maslow, 1943). Adjacent to this there were rapid developments in the applications of economics (Von Neumann & Morgenstern, 2007), and the WHO was established to tackle global health challenges (World Health Organization, 1948). Evidently, theories shaped by these developments continue to play an influential role in the measurement of well-being.

4.3.5. Exploring theories of well-being

Substantial theoretical variation has been identified, yet amongst this diversity several commonalities were identified. These commonalities were the basis for deciding which of the many theories identified in this review would be discussed in further detail. In addition to this, the theories selected represent those that have been particularly influential, alongside some which have been neglected by existing reviews of the topic. The following sections will cover theories of: hedonism, eudaimonia, humanism, the World Health Organisation, clinical psychology, and economics.

4.3.5.1. Hedonism

Early hedonic ideas are principally concerned with the pursuit of pleasure. Aristippus - 'T28', for example, rejected the prevailing opinion that happiness

was something to be experienced in the afterlife (Irwin, 1991). Instead, he endorsed the immediate gratification of physical pleasures such as the consumption of food. Later however it was acknowledged that although the pursuit of happiness may drive many human choices, some of these desires are more virtuous than others (Annas, 1987). As such, simple pleasures like inner tranquillity and intellectual stimulation may be more superior to physical pleasures. Although these approaches provide historical context to the ideas underpinning measures of subjective well-being, the ideas themselves predate the issues of measurement that occupy contemporary thought.

Modern discussions of hedonic well-being regularly cite Diener's influential theory of subjective well-being - 'T71' (Diener, 2000). Based on this theory, SWB is composed of three distinct components: life satisfaction, positive affect and negative affect. Life satisfaction describes the cognitive and relatively stable evaluations that people make about their lives overall. Positive and negative affect are the emotional evaluations that fluctuate overtime and encompass experiences like happiness and anxiety. Diener's efforts to highlight the importance of the individual's own perspective on well-being have been highly influential to developments in the measurement of well-being (Diener, 1994).

Several theories of SWB have been developed in response to Diener's work. Subjective well-being homeostasis - 'T72' proposes that a person's level of SWB is regulated around an optimal 'set point', enabling people to adapt to the demands of most environments (Cummins et al., 2002). Kahneman's hedonic psychology - 'T27' claims that researchers are better able to understand whether a person is objectively happy by taking an average of multiple responses to happiness questionnaires over time (Kahneman et al.,

1999). Another approach called the Intentional model of emotional well-being - 'T36' suggests that discussions of SWB should focus primarily on satisfaction about something, as opposed to satisfaction in general (Şimşek, 2011). It has also been proposed that a person's past, present and future SWB can be taken together to represent their 'ontological well-being' - 'T47' (Şimşek, 2009). This whole-life perspective views each person's life as a personal project that may or may not be fulfilled successfully. These theoretical developments around the topic of SWB have stimulated the development of new instruments which may be better equipped to respond to new empirical questions.

4.3.5.2. Eudaimonia

Several eudaimonic approaches were also identified. These approaches overlap in their suggestion that well-being is achieved by following a personally meaningful path. Eudaimonic theories are frequently contrasted with hedonic theories (Deci & Ryan, 2008) (Keyes, Shmotkin, & Ryff, 2002); however, contemporary efforts to integrate the two approaches are widely noted (Keyes et al., 2002; Tennant et al., 2007)

Eudemonism is often attributed to early work undertaken by Aristotle within his book titled the "Nicomachean Ethics" - 'T6' (Höffe, 2010). Aristotle discusses the traits, behaviours and values necessary to 'live well'. Although commonly sought things such as money and the satisfaction of bodily pleasures are highly desirable, Aristotle claimed that they did not reflect his idea of a good life. Instead, 'living well' – understood as an ongoing activity as opposed to an end-state is illustrated by intellectual and character development. Importantly, this work acknowledged that the ability of an individual to live a good life is

partially dependent on them living in circumstances where their well-being is prioritised by those in power. This approach has been highly influential over the course of history.

Several approaches evolved in response to Aristotle's work, two of these approaches were Norton's ethical theory - 'T46' (Norton, 1976) and Eudaimonic identity theory - 'T18' (Waterman, 1993). Norton developed the eudemonic perspective by suggesting that people are able to reach a greater sense of inner well-being through a process of self-discovery, much like how Aristotle had stressed that the development of well-being was an active process (Norton, 1976). Eudaimonic identity theory focused specifically on the way in which this process of self-discovery is able to have an instrumental role in shaping a person's character (Waterman, 1993). In many ways, these theories complement each other by elaborating on the mechanisms and processes which make personal growth possible.

Two contemporary eudaimonic theories that have had a bigger impact on the measurement of well-being are Psychological Well-being (Ryff) - 'T53' (Ryff, 1989) and Self-determination Theory - 'T57' (Ryan & Deci, 2000). Psychological well-being was developed by combining insight from six existing theories with the goal of describing the multidimensional structure of psychological well-being. Ryff's theory describes flourishing as: autonomy, personal growth, self-acceptance, positive relations with others, environmental mastery and purpose in life (Ryff, 1989). Self-determination theory on the other hand is primarily focused on how intrinsic and extrinsic motivations drive human behaviour. Self-determination theory suggests that autonomy, relatedness and competence are basic intrinsic psychological needs, and prerequisites for well-being (Ryan &

Deci, 2000). Both approaches describe a set of explicitly defined dimensions of importance.

4.3.5.3. Humanistic psychology

Five of the theories identified stem from the tradition of humanistic psychology, a holistic approach to understanding how individuals are able to attain fulfilment (Buhler, 1971). In contrast to the psychiatric models of the 20th century which largely focused on dysfunction, humanistic psychology was developed as a way of better understanding human growth (Jahoda, 1958).

Each theory tackles the topic of well-being and growth from a slightly different angle. Logotherapy – 'T40' argues that searching for meaning in life is a universal human drive (Frankl, 1985). Frankl describes the search for meaning as a natural response to existential frustration (Frankl, 1962). Maslow's hierarchy of needs - 'T41' describes how basic physiological and social needs must first be met before a person is able to live life to its fullest potential, a state referred to as 'self-actualisation' (Maslow, 1943). Self-actualisation, however, requires maturity, which Allport - 'T4' had claimed involves a degree of self-insight developed over time (Hogan & Roberts, 2004) (Allport, 1961). Roger's developmental approach - 'T22' describes how well-being may arise once an individual has embraced the principle that 'living well' is a dynamic process, not a state (Rogers, 1974). In addition to this, although experiences of emotional happiness may be reported, 'fully functioning' individuals are better characterised as being enriched and living with purpose. Finally, Jahoda - 'T49' was an early advocate of the claim that the absence of mental illness was a poor indicator of psychological health (Jahoda, 1958).

Humanistic psychology and eudaimonic theories share a focus on meaning and purpose in life. As such, several of the humanistic theories described are cited as influences within instruments that approached the measurement of well-being from a eudaimonic perspective.

4.3.5.4. World Health Organisation definitions

Among many other tasks, the WHO provides various definitions throughout the topic of medicine. Five of these definitions were identified within the current review as they had influenced the development of several instruments used to measure well-being. These definitions are hosted on the WHO website (http://www.who.int/en/), but often also appear throughout WHO reports. Providing definitions enables the WHO to address two of its central goals: shaping the research agenda and setting norms and standards (http://www.who.int/about/what-we-do/en/).

The WHO definition of health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" - 'T91' was the most influential WHO approach identified among measures in this review. The objective of this approach is to encourage people to think of health as a form of 'whole person' well-being, and less as a synonym for disease (World Health Organization, 1948). In addition to this, the WHO definitions of: functioning - 'T92' (World Health Organization, 2001), health promotion - 'T94' (World Health Organization, 1986), impairment - 'T95' (World Health Organization, 1980) and quality of life - 'T96' (The WHOQOL Group, 1998) were also referenced within other measures of well-being. In total, nine instruments were underpinned by WHO definitions.

It is questionable whether these definitions are able to meet the conventions required to be considered falsifiable 'theories'. Nonetheless they influenced measures of well-being in much the same way as a theory would. Although the definitions identified are 'propositions' in the literal sense of the word, they were not designed to substitute the role played by traditional theory. The goal of these definitions was instead to foster shared understanding and clarity. The benefit of deferring to theory, however, is that theories exist to be tested and validated, while definitions are not required to be inherently evidence based.

4.3.5.5.   Clinical psychology

Several clinically-oriented psychology approaches were also identified. As with the WHO definitions, it would be erroneous to suggest that these are theories of well-being. These approaches represent the interplay between medicine and psychology and focus on categorisation, diagnosis and treatment, rather than formal theorising.

The majority of these theories evolved from America's psychiatric movement. Grinker - 'T26' separated experiences of depression into categories of severity, acknowledging the many ways in which depression manifests (Grinker et al., 1968). The tripartite model - 'T89' stated that symptoms of anxiety and depression can be divided into three main categories: negative affect (negative emotions), positive affect (positive emotions) and physiological hyperarousal (physical manifestations of anxiety such as dizziness, trouble breathing and sweating) (Clark & Watson, 1991). The DSM-3 - 'T14' (which has since been updated) takes a particularly systematic approach and is much less

of a theory and more of an instruction manual for understanding the range of psychiatric disorders in existence. Beck's negative cognitive triad - 'T9' characterises depression as the prevalence of negative views about the world, the self and the future, and remains a highly utilised framework (Beck, 1967). Although mental health is a critical aspect of well-being, these identified theories make few explicit claims about the contents or nature of well-being.

4.3.5.6. Economic approaches

Theories such as Maslow's hierarchy of needs (Maslow, 1943) and subjective well-being (Diener, 2000) have been utilised by economists, however, numerous theories identified in the review originated within economics. Two types of economic theory applied to well-being were identified. The first set of theories concerns the economic principle termed 'utility', while the second set of theories concerns the effect that economic conditions have on well-being.

The utility based approach was first described within Bentham's utilitarian perspective - 'T90' (Bentham, 1879). Bentham described how individuals are driven to maximise the amount of pleasure they experience and minimise their exposure to pain. Balancing the two of these experiences is referred to as the hedonic calculus (Bentham, 1879). This focus on the role of pleasure in determining well-being is one reason why Bentham's work is often considered to be a precursor to many hedonic approaches, including Diener's subjective well-being theory (Diener, 1994). As the discipline of economics evolved, this idea of utility was largely abandoned – primarily because it was believed that Bentham's ideas could not be properly measured or tested (Read, 2004).

In contemporary discussions of utility, economists have been more interested in understanding preferences rather than pleasure. Expected utility theory - 'T20' for example argues that the decisions people make reflect their inner preferences (Kahneman, Wakker, & Sarin, 1997). Given the choice between two options, people will select the option that they expect to maximise their satisfaction (utility function) (Von Neumann & Morgenstern, 2007). This approach to utility has been central to the measurement of health related quality of life - 'T86' (Feeny, 2000). Being in good health - like other 'rational' preferences - contributes to the maximisation of utility.

A second set of economic theories seeks to examine the role that circumstances play in determining well-being. Sen's capability approach - 'T12' describes a 'good life' as one in which a person is able to pursue the things that they value (Sen, 1987). In line with this, well-being is partially dependent on the resources that a person has access to, and their ability to transform these resources into satisfying achievements (Saito, 2003). For example, access to a supportive learning environment, in combination with a willingness to learn may provide the conditions necessary to transform these resources into educational attainment. Educational attainment may have a positive impact on a person's objective quality of life and thus improve their SWB. Sen's work prompts us to reflect on the ways in which some people possess the preconditions required to live personally satisfying lives while others do not.

The Porter Conceptual Model of Financial Well-Being - 'T13' is another theory which is concerned with the role of circumstances. Within this framework, a person's financial satisfaction depends on how they perceive and evaluate their objective conditions (Porter, 1993). It is proposed that a person's financial well-being will be shaped by characteristics like their values and goals, and

standards of comparison such as the financial situations of those around them. Similar to Sen's approach, Porter's model suggests that a person's objective circumstances alone do not guarantee satisfaction. Instead, individual differences such as expectations have the potential to facilitate or diminish well-being.

4.4. Discussion

The overall objective of this review was to provide the thesis with theoretical context. Theories relevant to the measurement of well-being have been identified, visualised and the patterns among them have been described.

4.4.1. Main findings

The central finding of the review was the identification of 96 theories which had influenced the development of well-being instruments included in Chapter 3. This illustrates a substantial volume of theoretical variation. Approximately two-thirds of the instruments examined explicitly stated at least one theoretical influence. Previous reviews have been narrower in their focus and none have quantified the extent of theoretical variety highlighted within the current work. These findings imply that there is substantial heterogeneity in how well-being has been understood both over time and also across disciplines.

The most frequently used theories were: subjective well-being (Diener) (Diener, 2000), Ryff's psychological well-being (Ryff, 1989) and the World Health Organisation definition of health (World Health Organization, 2001). Diener and Ryff's work features frequently within existing reviews; however, the

influence of the WHO definition of health has seldom been highlighted. The reoccurrence of these three theories indicates that some consistency among influential theories in the field exists.

4.4.2. Theoretical challenges

4.4.2.1. Which disciplines do theories belong to?

Determining which disciplines the theories belonged to was challenging. In some cases it was possible to pin theories such as Logotherapy (Frankl, 1985) to humanistic psychology and expected utility theory (Von Neumann & Morgenstern, 2007) to economics, however, the majority of theories were difficult to categorise. This is principally because once theories have been developed they are studied by researchers across multiple disciplines. Subjective well-being (Diener, 2000); for example, was developed by psychologists but is frequently used within economics, neuroscience and health services research, among many others.

4.4.2.2. 'Theories of well-being' and 'theories that apply to well-being'

The theories identified also differed in the extent to which they were in fact theories of well-being. Theories such as Flow (Mihály, 1990) highlight how engagement in meaningful activities can produce states of heightened happiness. Similarly, social capital theory (Putnam, 2000) suggests that friends, family and community members are central to fostering well-being. However, other theories were more implicitly associated with well-being. For instance, the Gaia hypothesis is primarily an approach to climate science; however, it

influenced the inclusion of an environmental dimension within the Spirituality scale 'M93'. Similarly, Basic life tendencies theory (Buhler, 1971) is an approach to human motivation and can be employed to understand how fulfilled individuals may be, yet it is not explicitly a theory of well-being. This distinction between theories of well-being and theories that can be applied to well-being has been neglected by existing reviews because they typically have a more narrow focus. It is likely that the application of non-conventional theories to the topic of well-being acts to both enrich and complicate the literature.

4.4.2.3. Several of the theories are not 'theoretical'

Importantly, the list of theories identified contains several references which are better described as models, frameworks, guidelines and in some cases simply influential definitions. These were grouped alongside the conventional theories to build an inclusive review that would complement the more exclusive and focussed reviews already found within the literature. By retaining less conventional theoretical influences within this review the prominence of the WHO definition of within measures of well-being has been revealed.

4.4.2.4. Differences between health and well-being

The influence of several health-related perspectives reflects the increasingly blurred distinction between health and well-being. With dominant approaches

like the WHO definition of health focusing on well-being, there is little to distinguish where one ends and the other begins. This conceptual overlap has also affected the development of new measures of well-being. For example, the WHO definition of health was identified as an influencer of the physical, mental and social well-being scale, while the WHO definition of quality of life was identified as influencing the BBC subjective well-being scale. In summary, health, well-being and frequently quality of life have become unhelpfully synonymous. This challenge prompts researchers to be careful about which measures of well-being they select and how they use these conceptually broad terms. Researchers are thus further encouraged to use the term 'subjective well-being' when they are in-fact talking about how individual's think and feel about their own personal circumstances.

4.4.2.5. Theories of well-being with a negative focus

Several of the theories identified – particularly within the clinical psychology literature – were negative in nature. The identification of these theories reiterates that occasionally experiencing negative feelings such as anxiety, sadness and worry is a natural aspect of a balanced and emotionally healthy life. However, it is simultaneously essential to recognise that the absence of mental illness does not alone signal that a person is happy or flourishing. For these reasons, theories with a strong emphasis on depression such as the Tripartite model (Clark & Watson, 1991) should be used to complement theories which are more positive in their nature, to give a more complete picture.

4.4.2.6. Are all of the instruments measuring the same underlying concept?

The theories influencing each instrument also provide insight into what the instruments are attempting to measure. By looking at the dimensions of each measure in the previous chapter it is possible to comment on the extent of conceptual variation within measures of well-being. In this chapter, it is possible to comment on the degree of theoretical variation within the measures. The clusters reported in the results section indicate that there is a selection of measures which draw on related theoretical influences. Several measures however did not cite any theoretical context, or they cited theories which were not referenced by any other measure. These theoretical observations call into question the extent to which these 96 measures grouped under the umbrella term of 'well-being' represent one homogenous topic.

4.4.3. Limitations

4.4.3.1. Variety in the quality of theories identified

If it is assumed that a 'good theory' must be testable and thus falsifiable, then several theories that were identified may be deemed insufficient. This work, however, sought to offer breadth; therefore the 96 theories were not subjected to assessments of their empirical testability. As a result, it is possible that some of the theories that have been highlighted lack sound empirical grounding. One priority for future theoretical work should be to collate the evidence supporting and disputing the claims made by the theories identified. Such a process of scientific scrutiny would help to sort the evidence based theories from the empirically weaker theories.

4.4.3.2. Other theories of well-being

The principal focus of this PhD is the measurement of well-being; therefore, the scope of this review was limited to theories which had been used to develop new measures of well-being. This was a key difference between the current work and existing reviews. However, by doing so it is possible that numerous theories of well-being which have not been applied to the topic of measurement were missed. For example, Easterlin's theory (Easterlin et al., 2010) concerning the relationship between income and subjective well-being is highly influential within the literature; however, it was not reported as an influential factor in the development of the well-being measures examined.

4.4.3.3. Western-centrism

The theoretical overview presented is dominated by American and European literature. This gives the impression that theorising about well-being has been a largely western phenomenon. There are however two possible explanations for this. Either, theorising about well-being has been limited to western civilisation, or theories that originate outside of the west have been neglected. Given the universal nature of well-being, the first of these possibilities seems to be less plausible. If theories of well-being that originate from the east for example do exist, they are not being explicitly cited as influential in the development of well-being measures. This bias is problematic if measures of well-being are being used cross-culturally to make comparisons between countries. Another avenue for future research may be to test the extent to which western-centric measures

of well-being are truly sensitive to what it means to live a good life, across cultures.

4.4.4. Conclusion

Systematic searches and network analysis were employed to identify, describe and analyse the ways in which theory influences the development of well-being instruments. Substantial theoretical variation was identified; however, Diener's Subjective well-being approach was the most frequently referenced theory among measures of well-being. While previous reviews have been highly focused and discipline specific, this review adds value to the literature by identifying a wider range of theories and by analysing the complex ways in which theory and measurement are interwoven. There is a greater need to differentiate terms like health and well-being and to avoid using these and other terms such as happiness interchangeably. Further, researchers should be mindful that not all measures of well-being are based on theories of well-being or on falsifiable theories of any sort. This work provides the thesis with theoretical context and highlights the pressing need to pay close attention to how terms like 'well-being' are used.

CHAPTER 5: KEY FACTORS ASSOCIATED WITH SUBJECTIVE WELL-BEING (SWB): A FIXED-EFFECTS ANALYSIS OF LONGITUDINAL DATA

5.1. Introduction

Media outlets regularly report that the 'secret' to happiness[17] has been discovered (Fox News, 2017), and that it can be achieved (instantly) by following a set of simple instructions (Huffington Post, 2017). Similar claims about how easy happiness is to understand and achieve have been made in pop-science self-help books (Niven, 2008). These claims stand in direct opposition to academic accounts, in which the complexities of the topic are regularly highlighted (Dolan et al., 2008). Prompted by calls for further research into the topic, this chapter presents an examination into the factors important for SWB in a representative sample of community dwelling adults in the United States.

5.1.1. The need to study factors related to SWB

Studying the factors related to SWB is central to understanding why some people report being happy and satisfied with life while others report the opposite. Data from the OECD Better Life Index shows that on average people in the UK rate their life satisfaction in line with the OECD average of 6.5/10, while people in the United States on average gave their lives a higher rating of 6.9/10 (OECD). Individual differences and life circumstances are believed to

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[17] The term happiness is used throughout this paragraph in keeping with the news articles cited. Following an examination of these articles (and the articles that they occasionally referenced) it is arguable that lay usage of the term 'happiness' highly corresponds to the academic term 'subjective well-being (SWB)'.

affect how individuals rate the quality of their own lives (Biswas-Diener, Vittersø, & Diener, 2005; Diener & Diener, 1996). Accordingly, it is important to identify what these influential factors may be, as a way of illuminating how differences in SWB manifest.

Understanding the factors important for SWB is also critical because it is associated with other favourable outcomes. For example, academic success (Quinn & Duckworth, 2007), creativity (Pannells & Claxton, 2008), job performance (Wright & Cropanzano, 2000) and life expectancy (Diener & Chan, 2011) have all been linked to how individuals think and feel about the life they live. There is still much to be learned about the directionality of these effects, however greater insight into how SWB is promoted may also reveal how other positive life outcomes may be achieved.

Finally, understanding the causes of SWB has become a significant priority for governments. This shift in focus comes partly as a consequence of ongoing scrutiny surrounding the use of economic performance metrics in the assessment of societal progress (Stiglitz, Sen, & Fitoussi, 2010b). Subjective measurements of well-being have been proposed as an alternative metric that may better encapsulate how individuals perceive their own circumstances (Diener, 2006; Kahneman & Krueger, 2006). Earlier studies have demonstrated that subjective measures reveal national differences in well-being unrevealed by the findings yielded from objective country level measures (Diener, Suh, Smith, & Shao, 1995; Helliwell, 2003). As the role that SWB plays in policy continues to grow, it will become increasingly important to understand what factors these measures are sensitive to.

5.1.2. Difficulty selecting important factors associated with SWB

The literature remains conflicted regarding the key factors related to SWB. As a result of this ambiguity, studies attempting to examine factors which are important for SWB rarely investigate the same variables. Commonly studied factors such as marriage (Kim & McKenry, 2002) can be contrasted with lesser studied phenomena such as exposure to major sporting events like the Olympic Games (Kavetsos & Szymanski, 2010). Given the multifaceted nature of the topic, it is likely that SWB has a multitude of influential factors. In the absence of clear insight in the literature on what these influential factors might be, this chapter was informed the OECD framework for measuring well-being.

5.1.3. The OECD framework for measuring well-being

The OECD framework draws together multiple perspectives on the topic of 'factors most important for well-being' (OECD, 2011a). This framework was developed by reviewing key academic articles, working papers and policy reports. These included (but were not limited to): the Stiglitz report on GDP and subjective well-being (Stiglitz et al., 2010b), a highly cited review examining factors associated with happiness (Dolan et al., 2008) and reports from the OECD 'At a glance' series (OECD, 2011b, 2011c). The goal of this framework was to conceptualise the objective and subjective components that characterise well-being. The OECD used this framework in order to develop their Better Life Index, a web-based tool that aims to quantify indicators of well-being and compare the objective and subjective conditions across the 35 OECD countries (Durand, 2015).

The framework is composed of nine indicators of well-being. These indicators are: health status, work life balance, education and skills, social

connections, civic engagement and governance, environmental quality,

personal security, subjective well-being, income and wealth, jobs and earnings

and housing. A description of each indicator is presented in Table 5.1. The

OECD selected these indicators on the basis of their 'conceptual soundness'

and well-established high quality data (OECD, 2011a). 'Conceptual soundness'

referred to the ability of the OECD to agree on a definition for each indicator.

'High quality data' referred to the availability of existing sources of secondary

data that could be used to form an overall score compiled from data on each of

the nine indicators of well-being.

Table 5.1. Indicators from the OECD framework for measuring well-being

OECD indicator	Explanation
Health status	Good health is a highly-valued aspect of life, and includes life expectancy, chronic diseases (non-communicable disease and a person's self-assessed level of health).
Work life balance	Work is an important activity for individuals, however working long hours and limited time for leisure activities can have a detrimental effect on well-being.
Education and skills	Education provides individuals with knowledge however the development of skills also facilitates participation in the labour market.
Social connections	The quantity and quality of social interactions plays a vital role for well-being, partly by providing an individual with a network of people that can be relied upon.
Civic engagement and governance	Civic engagement and governance refers to an individual's participation in society, political freedoms and engagement in community life, each of which is thought to provide people with a sense of belonging.
Environmental quality	Environmental quality concerns the state of the natural environment surrounding an individual. Exposure to airborne pollutants is able to impact the health of a population.
Personal security	Personal security comes in many forms; however, vulnerability due to crime appears to be of specific importance to well-being.
Subjective well-being	Some form of happiness or satisfaction is believed to be central to the idea of living a good life. Understanding how people rate their own lives provides insight into the conditions that foster and impede subjective well-being.
Income and wealth	Income and wealth enable consumption and the acquisition of resources, which in turn has been linked to well-being.
Jobs and earnings	Employment provides earnings; however, it also provides fulfilment, the opportunity to develop skills and fosters self-esteem.
Housing	Adequate housing is a crucial material need and frequently the largest household expenditure.

5.1.4. Existing evidence on the factors important for SWB

A large variety of studies have examined the correlates of SWB and a separate

body of literature exists for each of the indicators presented in Table 5.1.

Further, relevant studies are conducted across the world, in a variety of

population groups and using a range of different methods. Tackling the breadth

and depth of this literature has been the sole focus of previous review work

(Dolan et al., 2008). To contextualise the study presented in this chapter, a systematic literature review on each of the nine indicators presented in Table 5.1 would not have been practical or feasible. Instead, an unstructured review of the literature was undertaken, with the goal of describing some of the evidence surrounding each indicator, rather than trying to produce an exhaustive compilation of studies[18]. An effort was made to examine multiple studies for each indicator, articles which had been published in the last 20 years, and where possible studies which had large sample sizes.

The empirical studies identified during this process are presented in Table 5.2. Having a positive working life and avoiding unemployment are strongly and negatively related to well-being outcomes such as mental strain[19] (Ng & Feldman, 2008). Attainment of a college education appears to influence how favourably people rate their lives (Bjørnskov, Dreher, & Fischer, 2008). Health status was often studied in a general sense (rather than separately for mental and physical components) however high self-ratings were associated with high scores on happiness and life satisfaction scales (Angner, Ray, Saag, & Allison, 2009). External conditions such local crime (Dustmann & Fasani, 2015) and exposure to airborne pollutants (Levinson, 2012) has been shown to have a detrimental impact on the extent to which people across countries appraise the state of their own lives.

Elsewhere however the evidence was mixed. Social support was found to be important; however, this effect may be dependent on exactly 'who' is providing the support (E. N. Gallagher & Vella-Brodrick, 2008). Further, not all aspects of housing have been shown to influence SWB, and it may be

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[18] This plan followed the format of some of the most highly cited reviews on the topic (Diener, Scollon, et al., 2003; Ryan & Deci, 2001; Steptoe et al., 2015).
[19] Mental strain refers to a person's experience of emotional and psychological tension (Ng & Feldman, 2008).

ultimately dependent on whether a person owns or rents the house they are living in (Diaz-Serrano, 2009). These results indicate that the evidence available in the literature is at times inconsistent.

Diversity in where and how studies were conducted also makes it difficult to generalise the findings yielded. For example, it is unclear whether the effects reported in Table 5.2 would remain significant if the variance of other important factors was controlled for. When these variables are examined in isolation, it is difficult to establish how reliable these effects are. Further, the studies examined were conducted in a variety of countries, including the United States, Europe and Latin America, among many others. Because of this heterogeneity, it should not be immediately assumed that these studies describe 'universal' or cross-cultural determinants of SWB. Finally, each of these studies has used distinctly different outcome measures. Overall, there was little appreciation for the way in which the evidence yielded may be sensitive to the methodologies employed.

Table 5.2. Summary of studies that have investigated the links between covariates similar to the OECD indicators and SWB

	Study	Methods	Findings
Health status	(Angner, Ray, Saag, & Allison, 2009)	Cross sectional study, Older adults, United States, N=383	- The lowest levels of happiness were significantly associated with poor self-rated health status - Debilitating pain and urinary insentience were associated with lower levels of happiness. - High cholesterol, asthma/lung disease, menopause, high blood pressure, diabetes, history of cancer, stomach/intestinal problems and overall comorbidity count were unrelated to happiness
	(Gerdtham & Johannesson, 2001)	Cross sectional study (Level of Living Survey - LNU) in 1991, General population, Sweden, N=5106	- Self-rated health status was positively and significantly associated with higher levels of life satisfaction - The health status of parents and siblings was not related to how satisfied participants were with their lives
	(Strine, Chapman, Balluz, Moriarty, & Mokdad, 2008)	Cross sectional study (Behavioural Risk Factor Surveillance System in 2005), General population, United States, N = 340,575	- Controlling for sociodemographic characteristics, dissatisfaction with life was associated with poor mental health, anxiety and physical, mental, or emotional related difficulties. - People who were dissatisfied with life were more likely to suffer from asthma, arthritis, diabetes and heart disease
Work life balance	(Gröpel & Kuhl, 2009)	Cross sectional study, General population, Germany, n = 73 and n = 79	- Work life balance had a significant and positive relationship with positive affect and life satisfaction and a negative relationship with negative affect
	(Shapiro & Keyes, 2008)	Meta-analysis, Various populations, United States[20], N=21,280	- 'Number of hours worked per week' was significantly and positively related to well-being outcomes such as work strain - This positive relationship between hours of work and mental strain was stronger for male participants
	(Wright & Bonett, 2007)	2-year longitudinal field study, Management personnel, United States, N=112	- Turnover was most negative associated with job satisfaction among individuals with the lowest levels of psychological well-being - Job satisfaction (Satisfaction with work, satisfaction with co-workers, and satisfaction with supervision) was significantly and positively correlated with psychological well-being
Education and skills	(Bjørnskov, Dreher, & Fischer, 2008)	Cross sectional study (World Value Survey, 1997-2000), General population, 70 countries, N=87,748	- Life satisfaction was positively associated with the competition of college education (Upper tertiary) - Nonsignificant relationships were observed between primary and secondary education with life satisfaction
	(Cuñado & de Gracia, 2012)	Cross sectional study (European Social Survey in 2008), General population, Spain, N=2,563	- Education had a positive and significant impact on happiness, indirectly though through income and employment status - Controlling for income and employment status, education also had a significant direct positive effect on happiness

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[20] 93% the studies were conducted in the United States

Category	Study	Method/Sample	Findings
	(Gerdtham & Johannesson, 2001)	Cross sectional data (LNU in 1991), General population, Sweden, N=5,106	- Education had a positive direct effect on happiness, even when controlling for health status - The predicted probability of 'being happy most of the time' was higher for university graduates compared to high school graduates
Social connections	(E. N. Gallagher & Vella-Brodrick, 2008)	Cross-sectional study, General population, Australia, N=267	- Social support from friends had a significantly larger correlation with positive affect than support from family - When demographic and psychological variables were controlled for, none of the individual sources of social support (friends, family and significant other) were significantly predictive of life satisfaction or positive affect
	(Golden et al., 2009)	Cross-sectional study, Older adults, Ireland, N=1,299	- Loneliness had a significant negative association with happiness and life satisfaction - Poor integration into a social network was also associated with a significantly lower likelihood of being happy and satisfied with life. Both effects were also observed when controlling for depressed mood.
	(Tay & Diener, 2011)	Cross-sectional study (Gallup Survey years 2005-2010), General population, 123 countries, N= 41,933	- Social support, measured in terms of 'experiencing love' and 'having others you can count on' was a significant positive predictor of positive affect - One explanation for why some less developed countries can attain good levels of SWB is through the attainment of social needs, opposed to the attainment of basic needs such as food and shelter
Civic engagement	(Dorn, Fischer, Kirchgässner, & Sousa-Poza, 2007)	Cross sectional study (International Social Survey Programme in 1998), General population, 28 countries, N = 25,937	- Controlling for income, religion and other country level differences, a significant positive relationship was observed between democracy (political rights and civil liberties) and happiness - The authors suggest that democracy can have this effect as a democratic system will lead to policies in line with the preferences of voters
Environmental quality	(Brereton, Clinch, & Ferreira, 2008)	Cross-sectional study (Urban Institute Ireland National Survey on Quality of Life in 2001), General population, Ireland, N=1500	- Controlling for socioeconomic factors such as age, gender, employment and education, proximity to landfill waste facilities had a significant and negative impact on life satisfaction - Controlling for the same variables, proximity to the coast had a significant and positive effect on life satisfaction
	(Levinson, 2012)	Cross-sectional study (General Social Survey in 1984-1996), General population, United States, N=6035	- On days with the highest levels of PM10 particle pollution[21] participants report significantly lower levels of happiness

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[21] PM10 particle pollution refers to coarse dust particles that are able to cause a visibly haze in the atmosphere

	(Luechinger, 2009)	Cross-sectional study (Eurobarometer in 1979-1997), General population, 137 countries[22], N=137	- Controlling for the influence of numerous macro-economic variables, air pollution (Sulphur Dioxide) has a statistically significant negative effect on self-reported life satisfaction - Air pollution had a significantly more negative effect on older participants and those intending to vote for environmentally conscious parties
Personal security	(Dustmann & Fasani, 2015)	Longitudinal panel survey (British Household Panel Survey and the English Longitudinal Study of Ageing[23]), General population, United Kingdom, n=25,647, n=10,816	- Local crime had a significantly negative effect on subjective well-being and mental health however the effect was larger for female participants than for males - Within the British Household Panel Survey and the English Longitudinal Study of Ageing, property crime had a stronger negative effect on mental well-being than violent crime
	(Office of National Statistics, 2015)	Cross-sectional study (Crime Survey for England and Wales on personal well-being in 2012-2014), General population, United Kingdom, N=10,064	- People directly affected by crime in the last 12 months reported significantly lower levels of life satisfaction, life worth and happiness compared to people who had not been directly affected by crime - People who believed they were very or fairly likely to be a victim of crime in the future reported significantly lower levels of happiness, life satisfaction and life worth and higher levels anxiety
	(Stickley, Koyanagi, Roberts, Goryakin, & McKee, 2015)	Cross-sectional study (Health in Times of Transition survey in 2010-2011), General population, 9 countries[24], N = 18,000	- In formerly Soviet Union countries, direct experiences of physical violence were significantly associated with lower levels of happiness and life satisfaction - Exposure to theft was related to significantly lower levels of life satisfaction but not lower levels of happiness
Income and wealth	(Ball & Chernova, 2008)	Cross-sectional study (World Values Survey in 1995-1998), General population, 18 countries, N = 20,771	- At an individual level, both absolute and relative income had a positive effect on life satisfaction - Changes in relative income had a stronger effect on happiness compared to changes in absolute income
	(Boyce, Brown, & Moore, 2010)	Cross-sectional study (British Household Panel Survey in 1997-2004), General population, United Kingdom, N=86,679	- Life satisfaction was significantly predicted by rank rather than absolute income, suggesting that it is a person's position in society that is important, rather than the amount of income they have

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[22] Data were analysed at the country level, rather than the individual level.

[23] A study of adults over 50 in the general population.

[24] Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia and Ukraine.

	(Oishi, Kesebir, & Diener, 2011)	Longitudinal study (General Social survey in 1972-2008), General population, United states, N=48,318	- People were significantly less happy in periods of study where income inequality was highest - Income inequality in society was also indecently related to happiness through lower levels of general trust and perceived fairness
Jobs	(Boyce, Wood, & Brown, 2010)	Longitudinal study (German socio-economic panel study in 2005-2008), General population, Germany, N=9,570	- Unemployment had a significantly negative effect on life satisfaction in the first, second and third years following unemployed - The negative impact of unemployment on life satisfaction was strongest in participants high in the personality trait conscientiousness
	(Di Tella, MacCulloch, & Oswald, 2001)	Longitudinal study (Eurobarometer in 1975-1991), General population, 12 countries, N=264,710)	- People report significantly higher levels of life satisfaction when national unemployment is lower, controlling for individual differences and other time and country level effects - The effect of unemployment on life satisfaction was stronger than the effect of inflation
	(McKee-Ryan, Song, Wanberg, & Kinicki, 2005)	Meta-analysis, Various populations, Various countries, N=27,862	- Unemployed individuals had significantly lower levels of life satisfaction and mental health compared to employed individuals - Significant positive improvements in mental health and life satisfaction were seen in longitudinal studies of individuals who had been reemployed after a period of unemployment
Housing	(DeLeire & Kalil, 2010)	Cross-sectional survey (Health and Retirement Study in 2006), Older adults, United States, N=1733	- When examining consumption in a number of life domains including food, healthcare and leisure, housing expenditure (mortgages, utilities and other household expenditures) was unrelated to life satisfaction. - Housing consumption was thought to be unrelated to life satisfaction because this type of expenditure may be more about meeting basic material needs such as shelter, electricity and water
	(Diaz-Serrano, 2009)	Longitudinal panel study (European Community Household Panel in 1994-2001), General population, 15 countries[25], N=594,320	- Satisfaction with housing was significantly higher amongst those who owned their own home, compared to those who rented - Renters who become homeowners saw a positive and significant increase in their satisfaction with housing
	(F. Oswald, Wahl, Mollenkopf, & Schilling, 2003)	Cross sectional study (USUMA Berlin Survey in 1999), General population[26], Germany, N=412	- Controlling for a number of variables including household composition, years in residence, and health, within West Germany satisfaction with home environment was a significant and positive predictor of life satisfaction - In contrast, within East Germany controlling for the same factors, quality of housing amenities such as having a garage, balcony or other housing assets was a significant positive predictor of life satisfaction

[25] The EU-15 countries - Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom.
[26] General population of adults over the age of 55.

5.1.5. Current study

At present, there is little agreement on the factors most associated with SWB, however a selection of important factors have been highlighted in the literature. The goal of this study was to provide a theoretically driven empirical contribution to the literature, which addressed some of the methodological shortcomings associated with many of the studies conducted to date (such as the use of cross-sectional datasets and simplistic statistical techniques). In response to the multidimensionality identified in Chapter 3, this study focused on how multiple aspects of well-being influence a set of three SWB outcomes.

5.1.6. Study aim

The overall aim of this study was to investigate the extent to which the OECD indicators of well-being are associated with three separate measures of SWB (life satisfaction, positive affect and negative affect). Factors important to life satisfaction will indicate which factors most impact the overall evaluations individuals make about their lives, while the factors related to positive and negative affect will indicate which factors may most impact the emotional aspects of life.

5.2. Methods

5.2.1. Data

This chapter used data from the Midlife in the United States (MIDUS) study of health and well-being (R. K. Delaney, 2014). MIDUS is a longitudinal and

nationally representative study of community dwelling adults[27]. Data were collected using telephone interviews and questionnaires in 1996-1997 (MIDUS 1), 2006-2007 (MIDUS 2), and most recently in 2014 (MIDUS 3).

This database was selected following a comprehensive process whereby its data and methodological characteristics were compared to several alternative databases (World Values Survey, Eurobarometer and Understanding Society etc.). One of the desirable features of MIDUS, in comparison to other datasets, was its coverage of OECD relevant variables. MIDUS provides a rich and in depth coverage of almost all the indicators of well-being outlined by the OECD framework. Unlike other sources of data which have collected generic data such as self-reported general health, MIDUS contains data on self-rated physical health, mental health, chronic illness and many other factors.

A second related reason for selecting MIDUS was its measurement of several SWB outcome variables. Databases such as the Eurobarometer included data on 'life satisfaction' but ignored other forms of SWB. MIDUS on the other hand contained data on life satisfaction, other forms of SWB (such as negative affect and positive affect) and forms of psychological well-being (for example purpose in life and autonomy).

Finally, the MIDUS project provided access to a wealth of longitudinal data. Longitudinal 'panel' samples are useful because they enable the estimation of more sophisticated models. Also, analyses in longitudinal panel samples are better suited to investigations into the causal relationships between the variables of interest.

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[27] The project website for the study: http://midus.wisc.edu.

5.2.2. Measures

The approach to measurement taken in this study was informed by the OECD framework for measuring well-being. This framework was selected to guide the current study for two key reasons. Firstly, the framework actively acknowledges the existence of both objective and subjective components of well-being, which was in line with the operational definition of well-being used in this thesis. Secondly, the OECD indicators were selected with cross-cultural application in mind. Instead of reflecting the agenda of one country, the framework is designed to be suitable for each of the 35 OECD member states[28]. These reasons make the OCED framework a useful and practical foundation to inform this study.

Although the framework provided useful guidance for this study, it was developed to be 'experimental' and 'evolutionary' (OECD, 2011a), rather than a rigid set of guidelines. Empirical investigation, verification and continued refinement in line with evidence is required to validate the importance of each indicator presented in Table 5.1. For example, it remains unknown whether the influence of these indicators depends on how SWB is measured. It also remains unclear whether changes in these indicators over time would have statistically significant effects on SWB.

A mapping process was undertaken to match the OECD indicators (Table 5.1) to variables available within the MIDUS database. This process was undertaken in five stages:

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[28] Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom and United States.

Stage 1: The OECD indicators were examined separately by ML and AML. This stage was key for familiarising ourselves with the definitions of each indicator.

Stage 2: The variables within the MIDUS database were then examined for their relevance to the indicators of the OECD framework. This process was undertaken by ML and AML separately. The variables within each wave of the MIDUS study were examined independently (MIDUS 1 = 2205 variables, MIDUS 2 = 2444 variables and MIDUS 3 = 2590 variables). Variables were shortlisted if they were relevant to the indicators, had data collected on them at each of the three time points and did not suffer from serious issues of missing data. Sleep related variables for example would have been interesting to analyse however sleep was not highlighted as important by the OECD framework. Also, the number of hours worked per week might have provided an appealing variable for exploration; however respondents infrequently provided responses for these questions within MIDUS.

Stage 3: Once ML and AML had discussed their shortlists together, a draft list of relevant variables was selected. Unfortunately, it was not possible to find a variable related to environmental quality within this dataset.

Stage 4: Next the draft list of MIDUS variables was presented to PD. The objective of this stage was to cut the list down to a manageable set of relevant and informative variables. Following this discussion, a final set of variables was decided upon. A full list of each of the variables selected and the OECD indicators that informed their selection can be found in Table 5.3. Through discussion it was decided that having one MIDUS variable for highly complex OECD indicators such as 'health status' would be an oversimplification. Due to

the richness of the database selected, it was possible to select several variables which covered physical health, mental health and chronic illness separately.

Stage 5: The MIDUS variables selected were examined alongside the themes of well-being identified within Chapter 3. This process was undertaken to assess whether the selected variables provided the thematic coverage necessary to characterise the multifaceted nature of the topic.

Table 5.3. OECD indicators and the MIDUS variables analysed

OECD indicators of well-being	MIDUS variables
Health status	Physical health
	Mental health
	Chronic illness
Work and life balance	Work satisfaction
Education and skills	Educational level
Social connections	Support from friends
	Support from family
Civic engagement/governance	Social integration
Personal security	Neighbourhood security
Jobs and earnings	Household income
Housing	Satisfaction with home
Subjective well-being (SWB)	Life satisfaction
	Positive affect
	Negative affect

5.2.2.1.   Socio-demographics

Data on the age, gender, marital status, educational level and employment status of each participant were collected at each wave of the study. A second age variable was computed by squaring the original age variable; to account for the possibility that age may have a non-linear relationship with subjective well-being. Gender was a binary variable (0 = male, 1 = female). Educational level was recoded into a binary variable for respondents which had or had not completed a full college education (0 = no college education, 1 = college educated). Marital status was similarly coded (0 = not married[29], 1 = married).

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[29] 'Not married' included participants who were single, widowed, separated or divorced.

Working status referred to whether participants were currently in paid employment (0 = not currently working, 1 = currently working). These variables were used to control for the influence of socio-demographic characteristics and to examine their association with SWB.

5.2.2.2.   Health status: Physical health, mental health and chronic illness

Three aspects of health status were measured (physical health, mental health and chronic illness). Physical health was measured using an individual item 'In general, would you say your physical health is - excellent, very good, good, fair, or poor?' and a five-point rating scale. A similar item was used for the measurement of mental health 'In general, would you say your mental health is - excellent, very good, good, fair, or poor?' On both items, higher scores indicate better health. In order to complement the two brief health items, the presence of chronic health conditions within the last 12 months was assessed using dummy coded variables (one chronic condition and multiple chronic conditions/multi-morbidity) where 'no chronic conditions' was the reference group. This variable was created by recoding the responses given to a series of questions concerning the presence of 30 chronic health conditions[30].

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[30] These chronic conditions included: (a) Asthma, bronchitis, or emphysema, (b) Tuberculosis, (c) Other lung problems, (d) Arthritis, rheumatism, or other bone or joint diseases, (e) Sciatica, lumbago, or recurring backache, (f) Persistent skin trouble (e.g. eczema), (g) Thyroid disease, (h) Hay fever (i) Recurring stomach trouble, indigestion, or diarrhoea, (j) Urinary or bladder problems, (k) Being constipated all or most of the time, (l) Gall bladder trouble, (m) Persistent foot trouble (e.g. bunions, ingrown toenails), (n) Trouble with varicose veins requiring medical treatment, (o) AIDS or HIV infection, (p) Lupus or other autoimmune disorders, (q) Persistent trouble with your gums or mouth, (r) Persistent trouble with your teeth, (s) High blood pressure or hypertension, (t) Anxiety, depression, or some other emotional disorder, (u) Alcohol or drug problems, (v) Migraine headaches, (w) Chronic sleeping problems, (x) diabetes or high blood sugar, (y) Multiple sclerosis, epilepsy, or other neurological disorders, (z) Stroke, (aa) Ulcer, (bb) Hernia or rupture, (cc) Piles or haemorrhoids or (d) Swallowing problems.

5.2.2.3. Social connections: Social support from friends and social support from family

Two measures were chosen to reflect 'social connections'. A variable for 'support from friends' was measured using the Friend Support Scale (Walen & Lachman, 2000). Four items were averaged to produce an overall score for this scale and measured the extent to which a person believed their friends: cared about them, understood the way they felt, help when a problem arises and were available for emotional support. Items were scored on a four-point rating scale, ranging from 1 = not at all, to 4 = a lot. The second measure of social connections was 'support from family', measured using the Family Support Scale (Walen & Lachman, 2000). Similarly, four items were averaged to produce an overall score, and assessed the extent to which a person believed their family and/or spouse: cared about them, understood the way they felt, help when a problem arises and available for emotional support.

5.2.2.4. Civic Engagement: Social integration

An exact measure of civic engagement was not found in the database to match the OEDC framework; however, the dimension 'social integration' was selected for its ability to assess an individual's broader connection to society and community. Social integration was measured using three items from the Social Well-being Scale (Keyes, 1998). Each item was measured on a seven point scale and items were averaged, producing an overall score. These items assessed the extent to which a person 'feels like they belong to a community', 'feels close to people in that community' and 'feels that their community is as source of comfort'. Higher scores indicated that a person feels more integrated into society.

5.2.2.5. Income: Household income (log)

The household income variable within the MIDUS database was selected to represent the income indicator within the OECD framework. This variable was constructed by summing the reported income from wages, pensions and social security for participants and other household members. Income was reported in dollars ($) for the previously completed year. These raw values were transformed using the natural logarithm (log) transformation in order to produce a more normally distributed variable. This variable was then adjusted for inflation from 1995-2008 using the Bureau of Labor Statistics US inflation calculator[31].

5.2.2.6. Housing: Satisfaction with home

The OECD indicator 'Housing' was matched to a MIDUS variable measuring 'satisfaction with home'. This single item assessed the extent to which the following statement described their situation 'I live in as nice a home as most people'. Participants rated their agreement to the statement on a four-point scale ranging from 1 = 'not at all' to 4 = 'a lot', where higher scores indicated stronger feelings of satisfaction with.

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[31] Bureau of Labor Statistics. US Inflation Calculator. Consumer Price Index All Urban Consumers CPI-U (1913-2016) (last updated December 15, 2016). http://www.usinflationcalculator.com/inflation/consumer-price-index-and-annual-percent-changes-from-1913-to-2008/ [Accessed 09/01/2017]

5.2.2.7. Personal security: Neighbourhood safety

'Neighbourhood safety' was measured using an item from the Perceived Neighbourhood Quality scale (Keyes, 1998). This covariate was chosen to represent the OECD indicator 'personal safety'. The item required participants to rate how much they 'feel safe being out alone' in their neighbourhood at night. The rating scale ranged from 1 = 'not at all' to 4 = 'a lot', with higher scores indicating better neighbourhood safety.

5.2.2.8. Work life balance: Work satisfaction

This variable was chosen to represent the OECD component 'work-life balance'. Participants were asked the following question: "Using a scale from 0 to 10 where 0 means "the worst possible work situation" and 10 means "the best possible work situation," how would you rate your work situation these days?". On this scale, higher scores indicate greater satisfaction with work.

5.2.2.9. Subjective well-being (SWB): Life satisfaction, positive affect and negative affect

Finally, three MIDUS outcome variables were chosen to reflect the OECD indicator 'SWB'. A description of each of these outcome variables is presented within Figure 5.1. 'Life satisfaction' was measured using the following single item 'Using a scale from 0 to 10 where 0 means "the worst possible life overall" and 10 means "the best possible life overall," how would you rate your life overall these days?'. On this scale, higher scores indicate greater life satisfaction.

Figure 5.1. Diener's model of Subjective well-being

(Diener, 1994; Diener, Scollon, & Lucas, 2003)

Subjective well-being

(1) Life satisfaction	(2) Positive affect	(3) Negative affect
Cognitive evaluations of life overall	Emotional feelings that people experience	Emotional feelings that people experience
Fulfilment and satisfaction with life on the whole	Pleasure, joy, excitement and happiness	Sadness, hopelessness, worthlessness and misery
Overall and relatively enduring judgements	Prone to fluctuations	Prone to fluctuations

Positive affect and Negative affect were measured using the 12 item Midlife Development Inventory (MIDI) Positive and Negative Affect Scale (Mroczek & Kolarz, 1998). Within this tool, six items are averaged to produce a score for positive affect, and an additional six items are averaged to produce a score for negative affect. The positive items focused on how 'cheerful, happy, peaceful and full of life' individuals felt, while the negative items concerned feelings of 'sadness, worthlessness and hopelessness'. Items were selected from previously validated instruments such as the General Well-being Schedule (Fazio, 1977) and the Affect Balance Scale (Bradburn, 1969), and concerned the feelings participants had felt in the previous 30-day period. This period was chosen by the authors of the tool in order capture general mood, rather than the mood of the individuals at the time of the interview. Higher scores for positive affect indicate greater feelings of positive emotions, while higher scores for negative affect indicate greater feelings of negative emotions (Diener, Larsen, et al., 1985).

5.2.3. Statistical analysis

5.2.3.1. Model equations

The main model[32] estimated can be expressed as:

$$SWB_{it} = \alpha + \beta_1 a_{it-1} + \beta_2 a^{\wedge 2}{}_{it-1} + \zeta_1 ma_{it-1} + \lambda_1 col_{it-1} + \tau_1 ws_{it-1} + \gamma_1 sfrn_{it-1}$$

$$+ \sigma_1 sfam_{it-1} + \chi_1 hi_{it-1} + \omega_1 si_{it-1} + \varsigma_1 ci_{it-1} + \varsigma_2 ci_{it-1} + \delta_1 ph_{it-1}$$

$$+ \eta_1 mh_{it-1} + \kappa_1 ns_{it-1} + \Theta_1 sh_{it-1} + \pi_1 wsat_{it-1} + u_{it-1} + \varepsilon_{it-1}$$

Where 'i' denotes individuals from 1 to N, 't' takes the values of 2 or 3, so that the time suffix 3, 2, 1 denote a variable recorded in MIDUS 3 and MIDUS 2, or MIDUS 1 respectively; and the variable 'SWB' is Life satisfaction in Model 1, Positive affect in Model 2, and Negative affect in Model 3. The goal of the analysis was to determine the extent to which these three separate SWB variables are a function of the following independent variables:

Age = a
Age squared = a^2
Marital status (married) = ma
Education level (college) = col
Employment (working) = ws
Social support from friends = sfrn
Social support from family = sfam
Household Income (log) = hi
Social integration = si

Chronic illness = ci
Physical health = ph
Mental health = mh
Neighbourhood safety = ns
Satisfaction with home = sh
Work satisfaction = wsat

The unobserved error term $u_i + \varepsilon_{it-1}$ is composed by a heterogeneity term 'u' that varies across individuals but is fixed across periods for each individual, and an error term 'ε' that varies across time and individuals.

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[32] Within Model 1 SWB = Life satisfaction, within Model 2 SWB = Positive affect, and within Model 3 SWB = Negative affect.

5.2.3.2. Methods of estimation: Ordinary Least Squares (OLS)

Data were analysed using standard OLS regression. The goal of OLS regression is to predict values of some 'dependent variable[33]' from one or multiple 'independent variables[34]'. OLS regression does this by testing the extent to which the dependent variable is a linear function of the independent variables within the model being tested.

The OLS regression produces two statistics specifically related to our objectives: regression coefficients and tests of statistical significance. The regression coefficient for each independent variable indicates how a one unit increase in the independent variable would affect values for the dependent variable. This indicates which of the independent variables has the strongest effect on the dependent variables. The p values associated with each coefficient are used to determine the degree of confidence that the estimated effect is significantly different from zero. By convention, statistically significant coefficients are considered to be those with a $p<0.05$, which represents the probability of incorrectly rejecting the null hypothesis of the coefficient being zero (type I error) of less than 5%.

5.2.3.3. Longitudinal panel data

To strengthen this study's ability to explore causal effects, the data were organised longitudinally. Causality is a particularly important issue in this field as many studies into well-being are 'observational' in nature and lack the

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[33] The term dependent variable is used interchangeably with the terms outcome variable and response variable.
[34] Independent variable is frequently used to refer to covariates, predictor variables and input variables.

experimental manipulation required to facilitate strong causal claims[35]. One form of methodological bias which is mitigated with the use of longitudinal data is reverse causality[36]. For example, in a study of life satisfaction and income, it is conceivable that income 'A' may influence life satisfaction 'B' (Figure 5.2); however, it is also possible that life satisfaction could improve income (Figure 5.3).

Figure 5.2. Depiction of expected causality
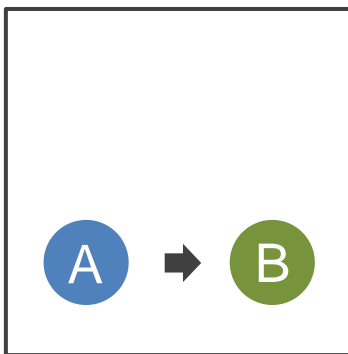
Figure 5.3. Depiction of reverse causality
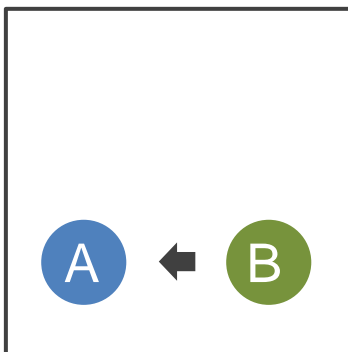
Longitudinal studies provide greater confidence regarding the direction of effects as they can account for the timing of different effects. Reverse causality is a key principle underpinning the common phrase 'correlation does not imply

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[35] By causality, I refer to the direct effect of some predictor on some outcome variable (Schield, 1995).

[36] Reverse causality describes the inability of cross-sectional designs to conclusively detect the direction of statistical effects.

causation' (Schield, 1995). Although no existing statistical methods are able to guarantee estimates with panel data analyses are completely bias free, longitudinal data allows researchers to account for the temporal relationship between variables. Data collected at multiple time points however may not always be available or may be too costly to collect. Helpfully, several large sample longitudinal studies in academic data repositories provide access to such databases.

In this study, three waves of data (MIDUS 1, MIDUS 2 and MIDUS 3) were analysed together in the form of a longitudinal panel, where the same participants provided data for each time point. A model of SWB as a function of lagged values of socio-demographic characteristics and the chosen variables from the OECD framework was estimated. That is, data for the independent variables was taken from MIDUS 1 and MIDUS 2, while data for the dependent variables was taken from MIDUS 2 and MIDUS 3. Predicting the effects of the independent variables at earlier time points on the dependent variables at later time points mitigates the risk of reverse causality. This provides greater (but not complete) confidence that the effects estimated are causal in nature.

5.2.3.4. Fixed effects regression

This study implemented a 'fixed-effects model' (within differences), to mitigate against the possibility of bias arising from unmeasured confounding variables[37] (Allison, 2009). As described in Figure 5.4, common causality originating from some factor not included in the statistical analysis 'C' could be causing both 'A' and 'B'. For example, level of income and level of life satisfaction may be highly

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[37] Unmeasured confounders are factors which influence the independent variable and the dependent variable, which have not been accounted for in a statistical model (Schield, 1995).

affected by personality traits that are stable within individuals but frequently omitted from analyses.

Figure 5.4. Illustration of a confounding variable 'c' influencing the variables 'a' and 'b'
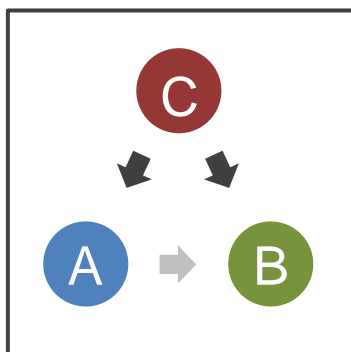
Fixed effect models mitigate this bias by accounting for the impact of unmeasured time-invariant individual factors[38] (Gunasekara et al., 2014). Given the high likelihood that studies will unavoidably omit some (known or unknown) important factors, fixed-effects modelling has become a popular approach to managing the bias that may arise (Bollen & Brand, 2008). Although these effects can also be adjusted for using the random-effects approach, the fixed-effects approach makes no assumptions about heterogeneity being normally distributed across individuals, and is thus a more robust approach (Wooldridge, 2010).

First the mean of the dependent variable for each individual across MIDUS 2 and MIDUS 3 was calculated. Next, a new dependent variable was generated equal to the original value minus the newly created variable. The same steps were followed with the independent variables, using data for MIDUS 1 and MIDUS 2. As such, the focus was on predicting contemporary (MIDUS 3)

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[38] Time-invariant individual factors refer characteristics within individuals that remain largely stable over time (Gunasekara, Richardson, Carter, & Blakely, 2014)

SWB using data on the factors from earlier waves of data collection.   Once the fixed effects models were estimated, the standard errors for each coefficient were corrected for the within transformation by multiplying them by the factor = (N*T – K)/[N(T-1) – K], where 'N' is the number of respondents, 'T' is the number of time periods (= 2) and 'K' is the number of independent variables in the model (Wooldridge, 2010). Finally, the models were re-run without accounting for fixed effects, referred to as a 'pooled OLS'. This step was undertaken to assess whether models that did not account for time-invariant individual characteristics produced upwardly biased coefficients.

5.2.3.5.   Standardisations

In the analyses conducted, numerous variables are scored on ordinal (Likert type) scales. Unlike continuous scales, the distance between scores on ordinal scales cannot be treated as equal (cardinality). For example, the distance between 'disagree' and 'strongly disagree' does not have the same objectivity as the distance between 50 and 60 years of age. To be able to compare the influence of the two types of independent variables (i.e. ordinal and cardinal) on SWB, ordinal scales were standardised. Single item ordinal variables were transformed using ordinal probit regressions, while variables composed of multiple ordinal items were standardised using z-score transformations. Continuous variables such as household income (log), age, and age^2 were also standardised using the z-score method, making their coefficients comparable. Both methods of standardisation transform variables into scales where values represent a person's distance from the mean value for each variable.

5.3. Results

The results section is broken down into five sub-sections. The first section details the sample characteristics (5.3.1). The next three sections detail fixed-effects analyses for the factors associated with life satisfaction (5.3.2), positive affect (5.3.3) and negative affect (5.3.4). The penultimate section presents the fixed-effects analysis split by gender (5.3.5). The last section presents the results of the three pooled OLS models, used to examine the extent to which the bias originating from unmeasured confounders is mitigated by implementing the fixed effect model (5.3.6).

5.3.1. Sample characteristics

Table 5.4 presents the sample characteristics during each wave of the MIDUS study. The average age of participants was: 45.44 (M1), 54.34 (M2) and 63.45 (M3). Female participants accounted for a slight majority of the sample (54%). Across each wave, the most commonly reported marital status was 'married': 73% (M1), 74% (M2) and 69% (M3). Fifty percent or more of the sample had attained a full college education or higher: 50% (M1), 53% (M2) and 54% (M3). The majority of the sample reported that they were currently in paid employment, however this number gradually declined over time: 71% (M1), 60% (M2) and 56% (M3).

Table 5.4. Summary of sample sociodemographic characteristics statistics (N=2,049)

	MIDUS 1 (1995-1996)	MIDUS 2 (2004-6)	MIDUS 3 (2013)
Age (M, SD)	45.44 (10.78)	54.34 (10.74)	63.45 (10.75)
Gender: Female %	54	54	54
Marital status: Married %	73	74	69
Education: College educated %	50	53	54
Working status: Employed %	71	60	56

5.3.2. Factors associated with life satisfaction

The results for the fixed-effect regression assessing the influence of well-being indicators on life satisfaction (Model 1) are presented in Table 5.5. The results provide partial support for the importance of the selected covariates as predictors of life satisfaction. Being married, satisfied with work, having a good home situation, higher levels of mental health and feeling integrated into society were statistically significant and positive predictors of life satisfaction. Each of these effects were in the direction expected. The remaining covariates were individually statistically insignificant, but collectively may help to explain some of the variation in life satisfaction, as evidenced by statistical tests of their joint significance ($F_{(11, 4081)} = 2.80$, p = .001).

Table 5.5. FE regression for indicators of well-being predicting life satisfaction† (Model 1)

	Coef.	Standard error[+]	95% confidence interval
Age	0.509	0.362	-0.201 [to] 1.219
Age^2	-0.446	0.354	-1.141 [to] 0.248
Marital status (married)	0.179*	0.079	0.024 [to] 0.334
Education level (college)	-0.012	0.091	-0.191 [to] 0.166
Employment (working)	-0.035	0.060	-0.151 [to] 0.082
Household income (log)	0.046	0.025	-0.003 [to] 0.094
Work satisfaction	0.206***	0.027	0.153 [to] 0.258
Satisfaction with home	0.072*	0.033	0.007 [to] 0.138
Physical health	0.021	0.035	-0.047 [to] 0.089
Mental health	0.142***	0.035	0.074 [to] 0.210
Chronic conditions (one)	-0.026	0.065	-0.154 [to] 0.101
Chronic conditions (multi)	-0.092	0.067	-0.222 [to] 0.038
Support from friends	0.056	0.032	-0.006 [to] 0.119
Support from family	0.048	0.031	-0.012 [to] 0.108
Social integration	0.065*	0.032	0.002 [to] 0.128
Neighbourhood safety	0.013	0.037	-0.059 [to] 0.086
_cons	-0.030	0.015	-0.059 [to] -0.001
R^2	0.07		

FE: Fixed effects, †: n = 2049 individuals, observations for two time periods each.
Note: *=p<.05, **=p<.005, ***=p<.001, [+]=standard errors adjusted for fixed effects.

Being married, as opposed to other martial statuses was the only demographic variable associated with significant changes in life satisfaction (β =

0.179, 95% CI = 0.024 to 0.334). Changing status from unmarried to married would increase life satisfaction to a level above that experienced by 57% of adults after seven years. Among the selection of indicators informed by the OECD framework, satisfaction with work had the strongest impact on life satisfaction (β = 0.206, 95% CI = 0.153 to 0.258). In this way, an increase of one standard deviation above the mean level of work satisfaction would increase life satisfaction to a level above that currently enjoyed by 58% of adults. Among the indicators for health status, the only significant impact on life satisfaction was found for improvements in mental health (β = 0.142, 95% CI = 0.074 to 0.210). Therefore, an increase of one standard deviation above the mean for mental health would increase life satisfaction to a level above currently enjoyed by 55% of adults after seven years.

5.3.3. Factors associated with positive affect

The results for the fixed effect regression assessing the influence of well-being indicators on positive affect (model 2) are presented in Table 5.6. Similar to the results of Model 1, partial support is provided for the importance of well-being indicators predicting positive affect. Age, age^2, work satisfaction, mental health, support from friends and social integration all have positive and statistically significant effects on positive affect. Each of these effects were in the directions expected. The remaining covariates had statistically insignificant effects on positive affect, but collectively may help to explain some of the variation in positive affect, as evidenced by statistical tests of their joint significance ($F_{(10, 4081)}$ = 2.93, p = .001).

Table 5.6. FE regression for indicators of well-being predicting positive affect† (Model 2)

	Coef.	Standard error[+]	95% confidence interval
Age	1.074*	0.371	0.347 [to] 1.801
Age^2	-1.037*	0.363	-1.749 [to] -0.325
Marital status (married)	0.023	0.081	-0.136 [to] 0.181
Education level (college)	0.065	0.093	-0.118 [to] 0.249
Employment (working)	0.116	0.061	-0.004 [to] 0.236
Household income (log)	-0.028	0.025	-0.078 [to] 0.022
Work satisfaction	0.128***	0.028	0.074 [to] 0.182
Satisfaction with home	0.040	0.034	-0.027 [to] 0.107
Physical health	0.019	0.036	-0.051 [to] 0.089
Mental health	0.229***	0.036	0.159 [to] 0.298
Chronic conditions (one)	-0.057	0.067	-0.188 [to] 0.074
Chronic conditions (multi)	-0.133	0.068	-0.267 [to] 0.000
Support from friends	0.102**	0.033	0.038 [to] 0.166
Support from family	0.056	0.031	-0.006 [to] 0.117
Social integration	0.089*	0.033	0.024 [to] 0.153
Neighbourhood safety	-0.037	0.038	-0.111 [to] 0.037
_cons	-0.012	0.015	-0.042 [to] 0.017
R2	0.07		

FE: Fixed effects, †: n = 2049 individuals, observations for two time periods each.
Note: *=p<.05, **=p<.005, ***=p<.001, [+]=standard errors adjusted for fixed effects.

Within Model 2, the only demographic factor that had a significant impact on positive affect was Age (and Age^2). As with Model 1, increases in mental health, work satisfaction and social integration had a significantly positive influence on in positive affect. Unlike in Model 1, improvements in social support from friends had a significantly positive influence on positive affect ($\beta = 0.102$, 95% CI = 0.038 to 0.166). As such, an increase of one standard deviation above the mean level of social support from friends would increase positive affect to a level above that currently experienced by 54% of the participants after seven years. In comparison, increases in social support from family members had a statistically insignificant impact on positive affect.

5.3.4. Factors associated with negative affect

Results of the analysis into the influence of well-being indicators on negative affect (Model 3) are presented in Table 5.7. Similar to the results of Model 1 and Model 2, only a selection of the covariates examined had an impact on negative affect. Lower levels of satisfaction with work, being mentally unhealthy and poorer levels of social integration were significantly related to higher levels of negative affect. Further, unlike with the previous SWB outcome variables, multimorbidity (experiencing more than one chronic health condition) was significantly related to higher levels of negative affect. The remaining covariates were individually statistically insignificant, but collectively may help to explain some of the variation in negative affect, as evidenced by statistical tests of their joint significance ($F_{(12, 4081)} = 2.24$, $p = .008$).

Table 5.7. FE regression for indicators of well-being predicting negative affect† (Model 3)

	Coef.	Standard error[+]	95% confidence interval
Age	-0.202	0.381	-0.949 [to] 0.545
Age^2	0.139	0.373	-0.592 [to] 0.870
Marital status (married)	0.044	0.083	-0.119 [to] 0.207
Education level (college)	-0.136	0.096	-0.324 [to] 0.052
Employment (working)	-0.039	0.063	-0.162 [to] 0.084
Household income (log)	-0.016	0.026	-0.067 [to] 0.035
Work satisfaction	-0.129***	0.028	-0.184[to] -0.074
Satisfaction with home	-0.034	0.035	-0.103 [to] 0.035
Physical health	0.018	0.037	-0.054 [to] 0.090
Mental health	-0.214***	0.037	-0.286 [to] -0.142
Chronic conditions (one)	0.124	0.068	-0.010 [to] 0.258
Chronic conditions (multi)	0.235**	0.070	0.098 [to] 0.372
Support from friends	-0.061	0.034	-0.127 [to] 0.005
Support from family	-0.016	0.032	-0.079 [to] 0.047
Social integration	-0.103**	0.034	-0.169 [to] -0.037
Neighbourhood safety	0.017	0.039	-0.059 [to] 0.093
_cons	0.042	0.016	0.011 [to] 0.073
R^2	0.05		

FE: Fixed effects, †: n = 2049 individuals, observations for two time periods each.
Note: *=p<.05, **=p<.005, ***=p<.001, [+]=standard errors adjusted for fixed effects.

These results indicate that as a person's overall mental health improves, they are likely to experience less emotions related to negative affect such as feelings of worthlessness and hopelessness. Specifically, an increase in overall mental health of one standard deviation above the mean level of in the sample would decrease negative affect to a level below that experienced by 42% of the sample. Further, changing from a state of 'no chronic conditions' to 'multimorbidity' was associated with an increase in feelings of negative affect, to a level above that experienced by 59% of the sample.

For clarity, the results of these three analyses are summarised within Table 5.8. Work satisfaction, mental health and social integration were the only variables that predicted changes in life satisfaction, positive affect and negative affect.

Table 5.8. Summary table of significant predictors of SWB

	Life satisfaction	Positive affect	Negative affect
Age	ns	+	ns
Age^2	ns	+	ns
Marital status (married)	+	ns	ns
Education level (college)	ns	ns	ns
Employment (working)	ns	ns	ns
Household income (log)	ns	ns	ns
Work satisfaction	+	+	-
Satisfaction with home	+	ns	ns
Physical health	ns	ns	ns
Mental health	+	+	-
Chronic conditions (one)	ns	ns	ns
Chronic conditions (multi)	ns	ns	+
Support from friends	ns	+	ns
Support from family	ns	ns	ns
Social integration	+	+	-
Neighbourhood safety	ns	ns	ns

Key: + = significant positive effect, - = significant negative effect and ns =non-significant effect

5.3.5. Gender differences: subgroup analysis

The data were also analysed to test whether there were significant differences between the factors associated with SWB between men and women. Gender differences were first examined for life satisfaction (Table 5.9). The results showed that household income had a positive and statistically meaningful contribution to the life satisfaction of women (β = 0.073, 95% CI = 0.009 to 0.138), while this relationship was non-significant in men. Not experiencing mental health problems had a positive and significant contribution to life satisfaction for both men and women (Men: β = 0.140, 95% CI = 0.046 to 0.233, Women: β = 0.140, 95% CI = 0.041 to 0.239). Being satisfied with work also had a positive and significant impact on life satisfaction in both groups of participants (Men: β = 0.265, 95% CI = 0.190 to 0.341, Women: β = 0.160, 95% CI = 0.086 to 0.234). However, these estimates and confidence intervals also demonstrate that being satisfied with work had a larger meaningfully effect for men.

Table 5.9. FE regression for indicators of well-being predicting life satisfaction split by gender

	Male†		Female‡	
	Coef.	95% confidence intervals	Coef.	95% confidence intervals
Age	1.001	-0.006 [to] 2.008	0.115	-0.888 [to] 1.118
Age^2	-0.981	-1.969 [to] 0.008	-0.022	-1.000 [to] 0.956
Marital status (married)	0.156	-0.071 [to] 0.383	0.188	-0.025 [to] 0.401
Education level (college)	0.089	-0.171 [to] 0.349	-0.068	-0.316 [to] 0.180
Employment (working)	-0.049	-0.216 [to] 0.118	-0.024	-0.188 [to] 0.140
Household income (log)	-0.002	-0.078 [to] 0.074	0.073*	0.009 [to] 0.138
Work satisfaction	0.265***	0.190 [to] 0.341	0.160***	0.086 [to] 0.234
Satisfaction with home	0.063	-0.025 [to] 0.151	0.085	-0.011 [to] 0.181
Physical health	0.008	-0.080 [to] 0.097	0.026	-0.078 [to] 0.129
Mental health	0.140*	0.046 [to] 0.233	0.140*	0.041 [to] 0.239
Chronic conditions (one)	-0.033	-0.197 [to] 0.131	-0.006	-0.203 [to] 0.190
Chronic conditions (multi)	-0.061	-0.237 [to] 0.116	-0.117	-0.309 [to] 0.075
Support from friends	0.018	-0.068 [to] 0.104	0.092	0.001 [to] 0.183
Support from family	0.021	-0.058 [to] 0.100	0.073	-0.017 [to] 0.163
Social integration	0.074	-0.019 [to] 0.167	0.058	-0.029 [to] 0.145
Neighbourhood safety	0.008	-0.110 [to] 0.125	0.023	-0.071 [to] 0.116
_cons	-0.020	-0.061 [to] 0.020	-0.038	-0.080 [to] 0.004
R^2	0.09		0.06	

Note: FE: Fixed effects, †: n = 938 individuals - observations for two time points each, ‡: n = 1111 individuals - observations for two time points each, coef. = coefficients

*=p<.05, **=p<.005, ***=p<.001, +=standard errors adjusted for fixed effects.

Gender differences between the factors related to positive affect were also examined (Table 5.10). Work satisfaction (Men: β = 0.145, 95% CI = 0.060 to 0.231, Women: β = 0.118, 95% CI = 0.044 to 0.192) and mental health (Men: β = 0.189, 95% CI = 0.086 to 0.292, Women: β = 0.264, 95% CI = 0.165 to 0.364) remain significant positive predictors of positive affect for both genders. The age demographic control variables were significant for males but not, and

support from friends was significant for females but not males (Men: β = 0.097, 95% CI = 0.003 to 0.192, Women: β = 0.107, 95% CI = 0.016 to 0.198). An examination of the confidence intervals yielded for male and female coefficients indicated that these differences were not significantly different from each other.

Table 5.10. FE regression for indicators of well-being predicting positive affect split by gender

	Male†		Female‡	
	Coef.	95% confidence intervals	Coef.	95% confidence intervals
Age	1.234*	0.133 [to] 2.335	0.982	-0.023 [to] 1.987
Age^2	-1.220*	-2.310 [to] -0.131	-0.923	-1.904 [to] 0.057
Marital status (married)	-0.104	-0.358 [to] 0.149	0.106	-0.108 [to] 0.319
Education level (college)	0.164	-0.113 [to] 0.441	0.003	-0.245 [to] 0.252
Employment (working)	0.076	-0.101 [to] 0.254	0.147	-0.018 [to] 0.311
Household income (log)	-0.045	-0.148 [to] 0.059	-0.022	-0.086 [to] 0.043
Work satisfaction	0.145**	0.060 [to] 0.231	0.118**	0.044 [to] 0.192
Satisfaction with home	0.042	-0.054 [to] 0.139	0.041	-0.056 [to] 0.137
Physical health	0.028	-0.070 [to] 0.127	0.007	-0.097 [to] 0.111
Mental health	0.189**	0.086 [to] 0.292	0.264***	0.165 [to] 0.364
Chronic conditions (one)	-0.103	-0.265 [to] 0.059	-0.004	-0.201 [to] 0.193
Chronic conditions (multi)	-0.143	-0.327 [to] 0.041	-0.118	-0.310 [to] 0.074
Support from friends	0.097	0.003 [to] 0.192	0.107*	0.016 [to] 0.198
Support from family	0.057	-0.047 [to] 0.161	0.053	-0.037 [to] 0.144
Social integration	0.092	-0.019 [to] 0.202	0.083	-0.004 [to] 0.170
Neighbourhood safety	0.007	-0.117 [to] 0.132	-0.052	-0.146 [to] 0.041
_cons	0.010	-0.032 [to] 0.052	-0.031	-0.073 [to] 0.010
R^2	0.07		0.07	

Note: FE: Fixed effects, †: n = 938 individuals - observations for two time points each, ‡: n = 1111 individuals - observations for two time points each, coef. = coefficients
*=p<.05, **=p<.005, ***=p<.001, +=standard errors adjusted for fixed effects.

The final gender sub-sample analysis was for negative affect (Table 5.11). Across both gender sub-samples, mental health (Men: β = -0.187, 95%

CI = -0.288 to -0.087, Women: β = -0.238, 95% CI = -0.347 to -0.130) and

multimorbidity (Men: β = 0.284, 95% CI = 0.098 to 0.471, Women: β = 0.188,

95% CI = 0.027 to 0.350) were statistically significant predictors of negative

affect. Two key gender were noted. The experience of one chronic health

condition (compared to experiencing no chronic health conditions) had a

significantly larger adverse effect on males compared to females (Men: β = 0.

191, 95% CI = 0.027 to 0.355, Women: β = 0.056, 95% CI = -0.100 to 0.212).

Similarly, the impact of work satisfaction on reducing negative affect was

meaningfully larger for males compared to females (Men: β = -0.182, 95% CI = -

0.276 to -0.088, Women: β = -0.088, 95% CI = -0.173 to -0.002).

Table 5.11. FE regression for indicators of well-being predicting negative affect split by gender

	Male†		Female‡	
	Coef.	95% confidence intervals	Coef.	95% confidence intervals
Age	-0.031	-1.137 [to] 1.075	-0.313	-1.544 [to] 0.919
Age^2	-0.032	-1.134 [to] 1.070	0.251	-0.952 [to] 1.455
Marital status (married)	0.054	-0.181 [to] 0.290	0.039	-0.200 [to] 0.278
Education level (college)	-0.240	-0.529 [to] 0.048	-0.065	-0.340 [to] 0.211
Employment (working)	-0.046	-0.211 [to] 0.118	-0.030	-0.218 [to] 0.158
Household income (log)	0.003	-0.077 [to] 0.084	-0.025	-0.115 [to] 0.065
Work satisfaction	-0.182**	-0.276 [to] -0.088	-0.088	-0.173 [to] -0.002
Satisfaction with home	-0.043	-0.144 [to] 0.059	-0.027	-0.133 [to] 0.080
Physical Health	0.003	-0.098 [to] 0.103	0.034	-0.079 [to] 0.146
Mental Health	-0.187**	-0.288 [to] -0.087	-0.238**	-0.347 [to] -0.130
Chronic conditions (one)	0.191*	0.027 [to] 0.355	0.056	-0.100 [to] 0.212
Chronic conditions (multi)	0.284*	0.098 [to] 0.471	0.188*	0.027 [to] 0.350
Support from friends	-0.072	-0.184 [to] 0.039	-0.048	-0.156 [to] 0.060
Support from family	-0.014	-0.115 [to] 0.088	-0.019	-0.130 [to] 0.092
Social integration	-0.132*	-0.244 [to] -0.019	-0.084	-0.188 [to] 0.019
Neighbourhood safety	0.039	-0.089 [to] 0.166	0.000	-0.117 [to] 0.118
_cons	0.032	-0.010 [to] 0.074	0.051	0.007 [to] 0.094
R^2	0.08		0.04	

Note: FE: Fixed effects, †: n = 938 individuals - observations for two time points each, ‡: n = 1111 individuals - observations for two time points each, coef. = coefficients
*=p<.05, **=p<.005, ***=p<.001, +=standard errors adjusted for fixed effects.

5.3.6. Pooled OLS results

In the final analysis the data were pooled, thus no longer accounting for unobserved heterogeneity. This analysis was undertaken to determine whether there would have been differences in the results yielded had time invariants confounders not been accounted for (the fixed-effects analyses presented above). The results for the pooled OLS regression models estimating the effect

of well-being indicators on life satisfaction, positive affect and negative affect are displayed in Table 5.12. Almost all of the coefficients across each of the SWB outcome variables are larger and more statistically significant than the fixed effects coefficients presented in earlier models. The pooled OLS results also have noticeably larger R^2 than the models presented in the fixed effects analyses. These results indicate that had a fixed effects analysis not been conducted, the estimated effects would have been upwardly biased. As such, the results in 5.12 should be interpreted with caution.

Table 5.12. Pooled OLS regressions for indicators of well-being predicting life satisfaction, positive affect and negative affect†

	Life satisfaction		Positive affect		Negative affect	
	Coef.	Standard error	Coef.	Standard error	Coef.	Standard error
Age	0.413*	0.165	0.955***	0.177	-0.110	0.183
Age^2	-0.348*	0.165	-0.894***	0.176	-0.007	0.182
Marital status (married)	0.264***	0.028	0.046	0.030	-0.057	0.031
Education level (college)	-0.096***	0.024	-0.132***	0.026	-0.019	0.027
Employment (working)	0.028	0.027	0.104***	0.029	-0.158***	0.030
Household income (log)	-0.008	0.013	-0.038**	0.013	-0.016	0.014
Work Satisfaction	0.272***	0.013	0.158***	0.014	-0.134***	0.015
Satisfaction with home	0.159***	0.015	0.078***	0.016	-0.025	0.017
Physical Health	0.025	0.015	0.007	0.017	0.014	0.017
Mental Health	0.206***	0.016	0.352***	0.017	-0.331***	0.018
Chronic conditions (one)	-0.003	0.035	-0.065	0.037	0.099*	0.039
Chronic conditions (multi)	-0.065*	0.031	-0.230***	0.033	0.352***	0.034
Support from friends	0.063***	0.013	0.081***	0.014	-0.024	0.015
Support from family	0.097***	0.013	0.089***	0.014	-0.104***	0.015
Social integration	0.098***	0.014	0.143***	0.014	-0.119***	0.015
Neighbourhood safety	-0.005	0.015	0.026	0.016	-0.038*	0.017
_cons	-0.143	0.040	0.093	0.043	-0.026	0.044
R^2	0.37		0.34		0.29	

† n = 2049 individuals, observations for two time periods each.
Note: *=p<.05, **=p<.005, ***=p<.001, Coef. = Coefficient, SE = Standard Error

5.4. Discussion

5.4.1. Key findings

Work satisfaction, mental health and social integration were all significant

associated with life satisfaction, positive affect and negative affect. Differences

in the key factors for these SWB outcomes were also noted. Being married and

having a good home situation were only statistically important for life

satisfaction, age and social support from friends were only influential on positive affect and finally multi-morbidity was only statistically related to negative affect. The majority of effects were statistically indifferent across the genders, however work satisfaction had a significantly larger effect on life satisfaction and negative affect among males.

5.4.2. Interpretation

These findings suggest that the three dimensions of SWB examined here are associated with some common factors while also having identifiable unique influencers. This suggests that when studying factors related to SWB, researchers should investigate its dimensions separately, rather than assuming that what is impactful for life satisfaction would also be impactful for SWB's two emotional dimensions (positive affect and negative affect).

Both the PhD's definition of well-being and the OECD framework explicitly acknowledge the importance of subjective and objective forms of well-being. Given this similarity, the OECD framework served as a useful structure for the analysis in this chapter. However, many of the variables selected in line with this framework did not make statistically meaningful contributions to SWB (for example: neighbourhood safety, support from family, physical health, employment status and educational level). These finding highlights that the importance of these indicators of well-being may depend on the population in question and how the indicators of this framework are measured.

5.4.3. Reflection on existing evidence

Within this study the impact of social support from friends on positive affect was stronger than the effect of social support from family. This result was previously observed in a cross-sectional study of the general population in Australia (E. N. Gallagher & Vella-Brodrick, 2008). This highlights the importance of 'who' is providing social support. Further, there may be something 'happiness-inducing' about receiving social-emotional support from people who do so regardless of having no obligation to do so. This also implies that friends may be better equipped to lift each other's mood. Further, activities such as peer support networks and buddy schemes may be particularly well suited to cultivating positive emotional experiences.

In this study, household income was unrelated to all three measures of SWB. The evidence on the topic remains mixed; however, it is possible this non-significance could be attributed to the way in which income was measured. For example, data collected from 18 countries in as part of the World Values Survey found that changes in relative income were more impactful than changes in absolute income on SWB (Ball & Chernova, 2008). Further consideration into the nature of income, and the many forms in which it can take would beneficial to those interested in the way in which material resources are able to improve peoples' lives over time.

The differential impact of chronic illnesses on SWB provides support for previously undertaken studies. In a similar sample of community dwelling older adults in the US, chronic illness morbidity was found to be unrelated to happiness (Angner et al., 2009). This study supports this claim, but also develops this insight further by indicating that the presence of multiple chronic

health conditions is influential for other forms of SWB, namely negative affect. This finding further supports the need to assess measures of SWB separately.

5.4.4. Strengths

The use of OECD indicators in the choice of covariates for this study provided a framework driven variable selection process. This was beneficial because using the framework limited experimenter bias in the selection of MIDUS variables. The selection of MIDUS variables required a degree of interpretation, however the process was anchored to a set framework rather than the preferences of the researchers involved in the project.

This study benefited from its use of longitudinal data. Rather than taking a cross-sectional snapshot of data at one time point, data on contemporary levels of SWB (MIDUS data from 2013) is compared to independent variables measured in the past. Consequently, the results reflect how changes in these variables influence SWB in the future. Although further study is required to make stronger claims about causality, the findings provide robust evidence for some of the factors that may impact changes in how people think and feel about their lives.

Another key strength of the work was the implementation of fixed-effects models. The benefit of this approach is demonstrated by the finding that the results produced without accounting for fixed-effects were upwardly biased. Previous studies have identified that the choice of model for estimating key factors for SWB (pooled OLS or fixed-effect) has an impact on the effects yielded (Powdthavee, 2010) and this chapter confirms this finding.

Finally, influenced by the findings from Chapter 3, this study used multiple outcome variables, to acknowledge that there are numerous ways in which life can be favourable. The differences in patterns of influence between the three SWB outcomes selected demonstrates that relying on a singular outcome measures is likely to provide an incomplete description of the important factors associated with SWB. Access to a rich set of possible outcome variables was a key advantage arising from use of the MIDUS database.

5.4.5. Limitations

An expected limitation of this work is that the sample of American middle-aged and older adults represents only a subset of society as a whole. For example, it should not be assumed that the pattern of results produced in this study could be generalised to younger adults, or other countries. To test the universality of these findings, further studies with analogous models would need to be estimated in separate populations.

Further, it was not possible to match the OECD indicator 'Environmental quality' to a MIDUS variable. The OECD framework highlights the important role played by environmental characteristics such as the presence of airborne pollutants. Unfortunately, information on exposure to pollutants was not available in the data provided. This is a limitation of secondary data analyses in general, as there is often very little control over the data that is collected by the original experimenters.

Ideally, some form of systematic literature search or meta-analysis would have been conducted to inform this study. Instead a summary of 23 studies

within the literature was provided. A systematic review of each factor associated with SWB included in this study's analysis would have been a PhD in itself and resources that were required for empirical work. The primary goal of this chapter was to conduct a study into the key factors related to SWB, rather than appraise the surplus of existing studies.

5.4.6. Future research

These findings indicate several avenues for future research. One of these would be testing the universal importance of work satisfaction, mental health and social integration. It would be interesting to identify what aspects of these predictors make them so persistently important, and also whether they predict eudaimonic forms of self-perceived well-being such as personal growth and purpose in life.

In terms of the effect of gender on SWB, it would be fruitful to identify what makes work satisfaction more important for men compared to women. It may be for example that the men in this sample simply spent more time in employment, or it could be that work was a larger part of their identity. Previous meta-analytic evidence has already demonstrated that the effect of working longer hours has a stronger impact on work-strain among men in comparison to women (Shapiro & Keyes, 2008). Further research is required to investigate these issues and their causes more directly.

This work highlights the detrimental role of chronic illness. In this study, multimorbidity did not make participants any less positive or satisfied, but it did make them considerably more miserable (lower levels of negative affect). This finding indicates that it may be more important to alleviate misery among those

with multiple morbidities, rather than attempting to foster happiness (higher levels of positive affect). Further work is required to investigate why morbidity affected men in this sample more than women. It would also be beneficial to build up an understanding of which particular morbidities (or combination of morbidities) are the most detrimental to SWB.

5.4.7. Conclusion

Work satisfaction, mental health and social integration were significantly associated with SWB in each of the main models tested. The OECD framework was able to highlight the importance of some factors impacting SWB, however not all of the components chosen in line with this framework were individually significant. Methodologically, these results further demonstrate the importance of controlling for fixed-effects when modelling SWB outcomes. One clinical implication of these findings is that greater care may need to be taken to foster lower levels of negative affect among those suffering from multiple chronic conditions. This chapter has shed light on some of the key factors related to SWB, however it is also important for empirical studies to explore what people think would be important for their own SWB, therefore this will be the subject of subsequent chapters.

CHAPTER 6: DISCRETE CHOICE EXPERIMENTS (DCEs): BACKGROUND, THEORY AND APPLICATIONS TO WELL-BEING

6.1. Introduction

The scope of economics has been a topic of continued deliberation in the literature (Hausman & McPherson, 2006), however in 1932 an influential contribution to the debate claimed that the discipline is applicable to all matters of human behaviour and choice (Robbins, 2007). Economics relies on the choices that people make as an important source of insight into the preferences that those people hold. This section of the thesis (Chapter 6 and 7) is concerned with the extent to which preferences for life in the future may be sensitive to the well-being characteristics of the available options. This chapter will cover: the theory underpinning the study of preferences, some of the ways in which preferences are obtained, and existing applications of these methods to the topic of well-being.

6.1.1. A background to understanding preference

Preference studies are concerned with revealed preference (RP) and stated preference (SP). RP studies involve modelling choices that have been made in the real world (J. J. Louviere, Hensher, & Swait, 2000). For example, researchers have studied the purchases that customers make in a Canadian coffee shop (Arnot, Boxall, & Cash, 2006) studied. This study demonstrated that purchases of Fairtrade coffee beverages were far less sensitive to changes in price when compared to purchases of conventional coffees.

Conversely, SP studies involve the analysis of hypothetical choices made in experimental settings. Johnson et al studied the treatment selections made by bipolar disorder patients within a series of scenarios proposed to them in a choice experiment (Johnson et al., 2007). This study found that the prospect of cognitive symptoms and the possibility of weight gain had a significantly negative impact on whether or not patients reported that they would adhere to the treatments offered to them.

SP and RP methods provide valuable insight; however there are clear differences and drawbacks associated with both approaches. The SP data yielded from controlled and relatively simple experimental scenarios is by definition 'cleaner' than RP data yielded from complex real world settings (Swait, Louviere, & Williams, 1994). In addition to this, the development and process of undertaking SP studies is often less costly compared to RP studies (Adamowicz, 2004). RP data are also not always readily accessible, and may need to be recalled retrospectively, with questionable reliability (Broach, Dill, & Gliebe, 2012). Where RP data does exist, it may be confidential and thus inaccessible for the purposes of academic research (Jiang, Johnson, & Calzada, 1999). Finally, it can be difficult to interpret RP data without rich contextual information describing the conditions under which the decisions were made, and which other options were available to individuals (J. Louviere & Timmermans, 1990).

On the other hand, one of the drawbacks of SP is that these methods are subject to 'hypothetical biases'. This bias arises because participants respond to experimental scenarios with an awareness that their decisions are unlikely to have long lasting consequences (Telser & Zweifel, 2007). As a result, it can be unclear whether the responses given to these scenarios reflect how individuals

would decide to act outside of the experimental context (Liu, Recker, & Chen, 2004). This difficulty is part of a wider argument regarding the 'realism' of experimental study settings and the validity of the data that they yield.

Both methods can often be used to study the same general topics however the appropriateness of SP or RP methods is largely context and question specific. Where existing datasets are relevant, rich and readily available a researcher may opt to analyse RP data. However, when researchers are interested in non-market goods, or goods which do not exist yet, SP methods may prove to be superior.

6.1.2. DCEs

As mentioned before, DCEs require participants to choose between alternative options within hypothetical scenarios (J. J. Louviere et al., 2000). Each option within a scenario is described by its characteristics, termed 'attributes'. Attributes are described in terms of their 'levels'. Within DCEs participants are required to respond to multiple scenarios with systematically varied options. The responses participants give to these scenarios indicate how they trade-off between different attribute levels to maximise their utility.

The DCE approach is underpinned by several economic theories. One of these theories is Lancaster's theory of consumption, which proposes that individuals have preferences for the 'characteristics' possessed by goods, rather than the actual goods themselves (Lancaster, 1966). For example, when a person chooses to consume a particular ice cream they do so based on the ice cream's characteristics (attribute levels), such as its flavour or cost.

Importantly, it is assumed that people derive utility by consuming goods with preferential characteristics.

The second theoretical underpinning that DCEs rely on is Random Utility Theory (RUT) (Hanemann, 1987; McFadden, 1973). Within this approach, utility is understood as a latent construct that is not measured directly, but is instead observed through the choices individuals make. The central assumption made is that the utility that an individual (i) derives from a choice (j) is the product of some explainable systematic component (V_{ij}) and some non-explainable or random component (ϵ_{ij}). This is displayed in equation 1 below:

$$U_{ij} = V_{ij} + \epsilon_{ij}, j = 1, \dots, J$$

The systematic component (V_{ij}) that influences choices includes the attributes of the options on offer, in addition to characteristics of the individual chooser. Individual characteristics include the chooser's personality and tastes. The unexplainable component (ϵ_{ij}) represents the random and varied nature of human preference, and variations in response to attributes that have not been accounted for. Due to the presence of this random unexplainable component, a perfect understanding of individual preferences is not possible. Nonetheless, RUT assumes that individuals select options that they believe will provide a higher utility than the other alternatives available.

6.1.3. Developing a DCE

The literature contains guidance on how DCEs should be undertaken. Broadly speaking there are three key stages: conceptualising the choice process, designing and conducting the experiment, and undertaking the econometric analysis on the data (Viney, Lancsar, & Louviere, 2002). Guidance has also

been focused on individual sections of the development process, such as the selection of attributes (Coast & Horrocks, 2007) and the experimental design of DCEs (Johnson et al., 2013). It should be emphasised however that these resources are useful sources of guidance rather than definitive guidelines.

A useful framework for the development of SP experiments is provided by the ISPOR Good Research Practices for Conjoint Analysis Task Force. These guidelines outline nine key steps (Table 6.2) that can guide good practice in the creation of a DCE (Bridges et al., 2011). Frameworks like this serve as a form of critical appraisal and also prompt a discussion on the difficulties encountered when conducting DCEs.

Table 6.1. Steps in the creation of DCEs (Bridges et al., 2011)

Steps	Description	Further details
Step 1	Research question	Was a well-defined research question stated and is conjoint analysis an appropriate method for answering it?
Step 2	Attributes and levels	Was the choice of attributes and levels supported by evidence?
Step 3	Construction of tasks	Was the construction of tasks appropriate?
Step 4	Experimental design	Was the choice of experimental design justified and evaluated?
Step 5	Preference elicitation	Were preferences elicited appropriately, given the research question?
Step 6	Instrument design	Was the data collection instrument designed appropriately?
Step 7	Data collection	Was the data-collection plan appropriate?
Step 8	Statistical analyses	Were statistical analyses and model estimations appropriate?
Step 9	Results and conclusions	Were the results and conclusions valid?

One of the key challenges concerning the use of DCEs is the case of cognitive burden. Choice experiments in general tend to be complicated

activities that require individuals to juggle numerous pieces of information simultaneously; and it is well established that task complexity can have a negative effect on the behaviour of respondents (M. Ryan, Gerard, & Amaya-Amaya, 2007). One experiment that sought to investigate the impact of subjecting participants to numerous choice scenarios found little effect on response rate, choice certainty or perceived difficulty, however experiments with more scenarios did produce greater choice variance (Bech, Kjaer, & Lauridsen, 2011). Finally, expert guidance has suggested that researchers should limit the number of attributes used to describe scenarios, to avoid overwhelming participants (Bridges et al., 2011). Cognitive demand remains an unresolved topic; therefore the ongoing development of DCEs must be sensitive to the risk of overburdening respondents.

Another ongoing challenge is the lack of consistent guidance concerning the development and choice of study attributes. This is an early hurdle in the development of a DCE, and there is a need to utilise both qualitative and quantitative methods in order to develop and ensure the appropriateness of attributes (Lancsar & Louviere, 2008). In some instances, there will be a limited number of potential attributes that are relevant to the study question, however within the context of health and well-being there are many that could be relevant to the problem at hand. Pilot studies are essential to testing whether or not the attributes chosen are able to yield informative and meaningful results (Lancsar & Louviere, 2008).

6.1.4. Existing DCEs: Reviews of the literature

Existing reviews provide an initial overview of DCE studies that have been conducted to date. An awareness of these studies is vital for ensuring that new studies provide a valuable and original contribution to the literature. Reviews have been conducted within the disciplines of marketing, transport and human resources, however systematic reviews conducted on the topic of health and healthcare are the most relevant to this thesis (M. D. Clark, Determann, Petrou, Moro, & de Bekker-Grob, 2014; de Bekker-Grob, Ryan, & Gerard, 2012).

Both of these reviews demonstrate that since the 1990s there has been gradual and consistent growth in the number of health-related articles that have applied DCE methods. For example, between 1990 and 2000 there were 32 DCE studies published, compared to 179 between 2009 and 2012 alone (M. D. Clark et al., 2014). Part of this growth can be attributed to the extension of DCE methods beyond the valuation of patient experiences towards the trade-offs between health outcomes and many other uses. This growth has also coincided with an increased acknowledgement of the policy applications for DCEs.

There were also several interesting developments in the types of experiments being conducted. In earlier studies (1990-2000) qualitative methods were largely reserved for pretesting questionnaire methods, however in more recent studies (2001-2008) qualitative methods have mainly been used for the purposes of attribute selection (de Bekker-Grob et al., 2012). Further, although the use of computerised methods has increased substantially since the 1990s, survey based administration remains the most prevalent procedure for the delivery of DCEs (M. D. Clark et al., 2014).

Neither of these reviews featured any explicit references to the topic of well-being. There are numerous possibilities for this finding. For example, it is possible that well-being as a topic was of little important to the goals of these reviews. It is also possible that some of the studies these reviews identified are relevant to the topic of well-being; however this content was not featured in these reviews. Finally, it may be that DCE methods have not been used to answer questions related to the topic of well-being. To determine the status of existing DCE study into well-being, the literature was systematically searched.

6.2. Systematic search for existing well-being DCEs

A systematic search was conducted to scope the literature for existing studies into well-being that had used DCE methods. Chapter 3 in this thesis highlighted the multidimensional nature of well-being, and the need for further empirical studies into these dimensions. The objective of this systematic search was to identify whether existing DCEs had investigated stated preferences for life characterised by dimensions of well-being, among people in the general population[39].

A systematic search was used for identifying DCEs from 2000 to June 2016 using the search terms documented in a previous review of the topic area (de Bekker-Grob et al., 2012). This included searches in the following bibliographic databases: EconLit, Embase, Health Management Information Consortium (HMIC), NHS EED, Medline, PsycINFO and Web of Science

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[39] Importantly, the goal was to identify studies which were not solely interested in health related quality of life (HRQoL), but reflected the scope of the topic described in the definition of well-being used in this thesis - "Well-being is the multidimensional quality of a person's life, which can be broadly broken down into 'subjective' and 'objective' forms. This includes, but is not limited to a person's: happiness, health and income" – Chapter 2.

(search terms can be found in Appendix C). Full-text of potential relevant articles were obtained and downloaded to EndNote and Microsoft Excel 2010 software for further assessment and handling. The strategy for this systematic search was informed by searches which had been successful at identifying DCE studies in a previously published article.

Once duplicates were removed (n=2,685) a total of 9,701 unique hits were obtained. Within these hits results, searches were run for the following terms: well-being/wellbeing (n =225), subjective well-being (n =12), life satisfaction (n =94) and happiness (n =25)[40].

However, once the abstracts were read and in some instances the full papers downloaded and checked, no DCE studies principally focusing on well-being, subjective well-being, life satisfaction or happiness were found. Many of the articles were conference abstracts or had simply mentioned well-being/ wellbeing/ subjective well-being/life satisfaction/happiness', rather than including dimensions of well-being as the attributes in the DCE design. In other instances (Hofman et al., 2015; Jager, 2004; Pouliakas & Theodossiou, 2010), the articles were reviews and stated preference studies that were not DCEs (such as conjoint analysis studies[41]). Although none of the studies identified were closely related to the definition of well-being used in this thesis, several of the DCE studies were of partial relevance.

Some of these studies focused on the development and psychometric performance of instruments which referenced the topic of well-being. For example, one paper described the development of a social care questionnaire

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[40] These terms were selected because throughout the literature they are used interchangeably.
[41] Conjoint analysis is an alternative SP method used to determine how people value different attributes (Louviere, Hensher, & Swait, 2000).

instrument (Adult Social Care Outcome Toolkit), which the authors claimed should be sensitive to changes in 'health, healthcare and well-being' (Burge, Netten, & Gallo, 2010). Similarly, another study focused on the phenomena of 'response shift', using an instrument which was developed with the capability theory of well-being in mind (Flynn, Peters, & Coast, 2013). Both of these studies are clearly of partial relevance; however they are more focused on the methodological characteristics of the instruments than the preferences of the people in both studies.

There were also studies which detailed alternative ways of obtaining health state utility values from the EQ-5D (Bansback, Brazier, Tsuchiya, & Anis, 2012; Bansback, Hole, Mulhern, & Tsuchiya, 2014; Gu et al., 2013; Viney et al., 2014; Whitehurst, Norman, Brazier, & Viney, 2014). These studies utilise DCE methods as an alternative to time trade-off (TTO), standard gamble (SG) and vignettes. The EQ-5D was an identified instrument within Chapter 3 that had been used to measure well-being.

6.3.   Discussion

6.3.1. Summary of the chapter

Preferences are important for understanding how individuals think and may behave in the future. The appropriateness of RP and SP methods is context dependent and will depend on the research question and availability of data. DCEs are an increasingly popular method for investigating SP and guidance exists on how to conduct them effectively. These methods have been applied in a growing number of contexts and to a growing number of challenges, however thus far there has been little explicit focus on the topic of well-being.

6.3.2. Challenges

This chapter highlights that at several stages during the construction of a DCE, thoughtful planning and execution is required. Safeguarding the quality of a DCE remains imperative, as a poorly designed study is unlikely to yield reliable or informative results (Bridges et al., 2011). Pilot studies provide an invaluable and consistently recommended opportunity to assess the appropriateness, acceptability and performance of DCE methods (Lancsar & Louviere, 2008).

Cognitive burden remains a challenge for those conducting and responding to DCEs (Bech et al., 2011). Studies suggest that task complexity has a negative impact on respondents, however the way in which this effects behaviour remains unclear. For example, further research is required to either support or refute the finding that the when participants are faced with more scenarios there is an increase in choice variance. These findings have implications for the 'user-friendliness' of DCE studies.

In the absence of comprehensive guidance on the selection of attributes, creative methods must be trialled. This process should ideally involve both quantitative and qualitative methods, to ensure the selection process is one of breadth and depth.

6.3.3. Conclusion

In conclusion, DCEs provide a fruitful method for investigating preferences for different goods and services. DCEs have been used to develop new instruments and obtain health state utility values; however the topic of SWB has

not been thoroughly investigated. Given the growing importance of SWB it would be beneficial to understand the characteristics of life that are necessary for attaining this outcome in different populations.

CHAPTER 7: STATED PREFERENCES FOR LIFE IN THE FUTURE AMONG 'EMERGING ADULTS'

7.1. Introduction

It is difficult to imagine a world in which everyone always got exactly what they wanted. This is the essence of the 'central economic problem': the existence of infinite 'wants' coupled with finite resources (Myint, 1946). Instead, people are typically required to choose from a range of options, each of which involves a trade-off between things that may be important. This problem introduces the final focus of the thesis, an investigation into what people want out of their lives. This chapter presents an empirical study into the stated preferences of young 'emerging' adults for their life in the future.

7.1.1. Understanding utility in relation to well-being

One of the two main forms of 'utility' which have been used by economists to understand well-being is 'decision utility'. As mentioned in Chapter 4, this interpretation of utility is principally concerned with understanding the 'preferences' that people have, and has been the dominant approach in economics for the past century (Kahneman, Kahneman, & Tversky, 2000). The decision utility approach assumes that the choices that a person makes are a reflection of that individual's personal preferences (Stutzer & Frey, 2010). Consequently, empirical attention has focused on observing and analysing the actual and hypothetical choices that individuals make (J. J. Louviere et al., 2000).

In contrast to 'decision utility', others interpret 'utility' in terms of 'experienced utility'. This approach is 'hedonic' in nature; therefore it is directly interested in the amount of pleasure that people experience (Kahneman & Sugden, 2005). The early roots of this interpretation can be traced back to Bentham's utilitarian theory (Bentham, 1879). Within this theory, Bentham suggests that people possess a constantly active 'hedonic calculus' which processes the pain and pleasure that people experience. This theory was largely abandoned during the 20th century when it was claimed that this form of utility could not be compared between individuals and could thus not be accurately measured (Carter & McBride, 2013). However, following the experienced utility approach, recent collaborations between psychologists and economists have highlighted the usefulness of directly asking people how satisfied they are (Kahneman & Krueger, 2006), particularly when these data are collected in real time for a set period (Kahneman et al., 2000). At present, both decision utility and experienced utility remain in use.

Both approaches are associated with theories identified in Chapter 3 which have influenced the measurement of well-being. Expected utility theory (Von Neumann & Morgenstern, 2007) corresponds to decision utility, while Bentham's previously noted utilitarian approach corresponds to experienced utility (Bentham, 1879). Modern economics has acknowledged that experienced utility has many uses (Kahneman et al., 2000), however when the objective is to understand why people choose the way they do the decision utility approach remains an appropriate perspective (Easterlin, 2001). Choice modelling is thus a useful tool when researchers are interested in what people expect or want within their own lives.

7.1.2. Dimensions of well-being and preferences for life in the future

The presence/absence or level of different dimensions of well-being is one useful way of understanding the type of life people may want to live. Chapter 3 of this thesis presented a framework of 196 dimensions of well-being, which together describe the many ways in which life may be preferential or unfavourable. It was beyond the scope of this review to investigate which of these dimensions would be more or less important for different target populations; however it remains an important outstanding empirical concern.

These preferences for life can be about the past (hindsight), the present, or the future (prospective). Preferences for the future, along with a person's goals, expectations and worries are all forms of 'future-oriented thinking' (Aspinwall, 2005). These thoughts can be abstract or specific, near or far into the future and positive or negative in nature (D'Argembeau, Renaud, & Van der Linden, 2011). For most people, these thoughts are a persistent and naturally occurring aspect of daily life.

7.1.3. Emerging adulthood

The favourability of life in the future has implications for many groups, one of which is young people. 'Emerging adulthood' takes place between the ages of 18 and 29 and is characterised by: identity exploration, feelings of instability, self-focus and flourishing possibilities (Jeffrey Jensen Arnett, 2000, 2014). This period of life is thought to be the time in which individuals begin their attempts to establish some form of social, emotional and occupational stability in the world. In western societies it has become typical for people progressing through this period to defer marriage and childrearing until the future (Douglass, 2007).

Emerging adulthood was initially a subject of interest for developmental psychologists; however the implications of this life stage are now studied across a range of disciplines. A review of the topic in Lancet Psychiatry focused particularly on its implications for mental health (Jeffrey J Arnett, Žukauskienė, & Sugimura, 2014). Arnett et al claim that mental health services have developed an understanding of the challenges faced by people during adolescence and adulthood; however there has been less focus on the distinct concerns of people transitioning between these stages. It would be beneficial to respond to this knowledge gap with ongoing empirical study into the nature of this transition and the 'wants' and expectations of individuals undergoing this transition.

The choices people make during this period are central to this transition. It is assumed that young people have more choice than ever before (Jeffrey Jensen Arnett, 2000). Given the many real (or perceived) options available to them, emerging adults may be averse to making decisions which have the potential for lasting consequences. Individuals use this period of life to explore their options and to experiment, however attempting to comprehend their own preferences and make choices can be a confusing and difficult process (Jeffrey Jensen Arnett, 2014).

Understanding the way in which well-being effects life as people age has been a persistent academic priority. Several studies report that aspects of well-being like happiness and life satisfaction decline with age, reaching their lowest points in middle adulthood (Blanchflower & Oswald, 2008; Stone, Schwartz, Broderick, & Deaton, 2010). In some cases there may be ways to prevent this decline. For example, a longitudinal study of undergraduates in the US found that having a 'pro-social' rather than a 'financial' orientation to life was

associated with higher levels of personal growth and life purpose thirteen years after graduation (Hill, Burrow, Brandenberger, Lapsley, & Quaranto, 2010). Together these studies suggest that some forms of well-being may decline with age; however there may be identifiable factors which inhibit this decline. Further research is required to better understand the characteristics necessary for a good life in the future among this target population.

7.1.4. The current study

It is important to consider what is important for a good life in the present moment as well as in the future. Given empirical findings that suggest well-being declines in middle adulthood (Blanchflower & Oswald, 2008), the future is a particularly significant topic for young people transitioning into adulthood. Although it has been suggested that the experienced utility approach is a better way of understanding well-being, the decision utility approach remains a crucial way of studying wants and preferences. DCE methods are used to elicit stated preferences for life in the future among emerging adults. This study will highlight which aspects of well-being individuals are willing to trade off on, and which they expect will be most valuable for their lives in the future.

7.1.5. Aims

The overarching aim of this study was to investigate which attributes of well-being influence the preferences that young emerging adults have for their life in the future. Within this aim there were a collection of sub aims:

Aim 1: To use the thematic framework presented in Chapter 3 to inform the development of a discrete choice experiment (DCE).

Aim 2: To examine whether the importance of the different attributes of well-being are dependent on the level of annual salary that a person would have in the future (interaction effects).

Aim 3: To examine whether the level of cognitive demand in a DCE (length of the experiment) has an impact on the results yielded.

Aim 4: To explore why some respondents opt out of DCE scenarios.

7.2. Methods

The development of the experiment comprised several stages. The first stage involved the selection and assessment of attributes of well-being for use in the experiment (7.2.1). Following this a pilot DCE was designed to test how well these attributes performed with participants in the target population of emerging adults (7.2.2). Based on the findings of the pilot study, a finalised DCE was designed (7.2.3) and implemented (7.2.4). How the data were collected (7.2.5), validated (7.2.6) and analysed (7.2.7) is also described.
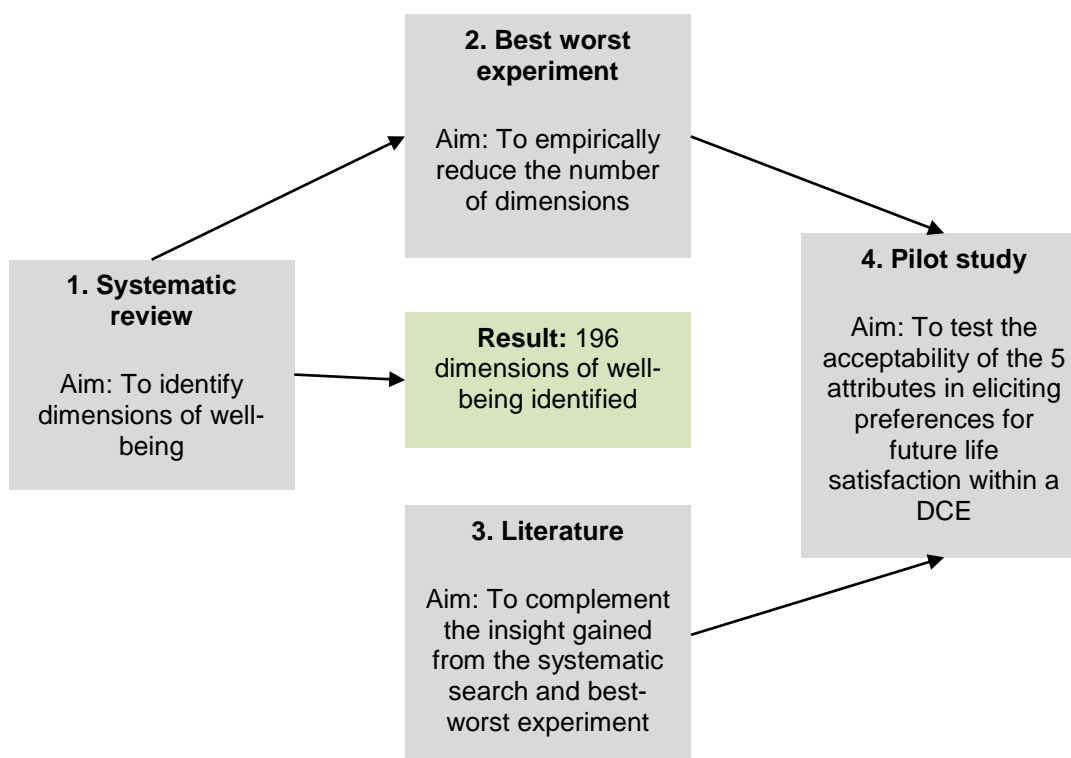
7.2.1. Attributes

Within this DCE, attributes were used to describe the key aspects of a person's life in 10 years' time. The final selection of attributes can be found within Table 7.1. The development of these attributes is described in terms of four key design phases (see Figure 7.1). A step by step explanation of each phase is described below:

Table 7.1 Attributes and levels for life in 10 years' time

Attributes	Levels
Social support from family	*Unsupportive* relationship with immediate family
	Supportive relationship with immediate family
Mental illness	*The absence* of a mental health condition
	The presence of a mental health condition
Control	Feeling that you are *not in control* of your life
	Feeling that you are *in control* of your life
Meaningful activities	*Not engaged* in personally meaningful work and/or non-work activities
	Engaged in personally meaningful work and/or non-work activities
Annual salary	Annual salary *£14,000*
	Annual salary *£28,000*
	Annual salary *£56,000*
	Annual salary *£84,000*

Figure 7.1. Design phases for attribute development

Phase 1 (systematic search): The 196 dimensions identified within the systematic search (Chapter 3) provided an initial set of possible dimensions for use within the DCE. Following this, ML and AML examined this list of potential

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attributes (with their definitions) in order to remove any that were either: (1) conceptually redundant, (2) linguistically complex, or (3) inappropriate for 'emerging adults'. Both lists were reviewed and any discrepancies were resolved through discussion. For example, potential attributes such as 'social potency', 'objective factors' and 'affective suffering' were excluded because they had ambiguous definitions. 'Life scheme' was excluded because its definition was too similar to the already included 'life purpose'. Finally, a selection of other attributes like 'mental functions' were removed because it was deemed unlikely that much age-related decline in cognitive functions would take effect until much later on in life. A final list was compiled of 64 potential attributes.

Phase 2 (experimental selection): A best worst experiment (J. J. Louviere et al., 2000) was designed in order to empirically reduce this set of 64 attributes further. The 64 attributes were randomly allocated to one of 8 'blocks', which each contained 9 scenarios (Appendix D). A sample of undergraduate students (n=40) were presented with one block at a time, and asked to state which of the attributes per scenario was most and least important to their life. A set of the best-worst scenarios are presented in Appendix E. The results of this experiment are presented in Appendix F. The experimental team (ML, AML and RM) discussed these findings and selected: Social support from family, control in life, mental illness, and meaningful activities from the attributes that were most important to the sample of participants from the target population. Each of these attributes were empirically important, deemed to be clearly definable and within discussions did not appear to overlap.

Phase 3 (additional literature): In addition to selecting attributes with direct input from participants, the inclusion of an attribute for 'annual salary' was driven by its importance within the literature (Kahneman, Krueger, Schkade,

Schwarz, & Stone, 2006). Given the findings of existing studies, it is likely that forms of income will play some role in how satisfied individuals expect to be in the future. However, it remains to be seen how individuals will trade-off between their annual salary and the other attributes that they have selected as being important.

Phase 4 (pilot study): The final phase of selection involved the five attributes chosen being piloted within a DCE with members of the target population (n=40). The number of attributes and their levels are in line with recommendations of good practice to avoid making the task too cognitively burdensome (Bridges et al., 2011). The attribute levels were presented in a written description format as opposed to using images or graphics.

7.2.2. Piloting

A pilot study was designed following the suggestions made within good practice guidelines (Lancsar & Louviere, 2008). The pilot study was conducted with undergraduates (n = 40) drawn from the FEELE and contained an 8 scenario DCE (Appendix G). Participants were asked to select between hypothetical scenarios that "reflect what your life could be like in 10 years' time". This pilot was designed to test whether the experiment would be able to yield statistically informative results. The data that were collected were analysed using a mixed logit model (main effects) of discrete choices for life in the future as a function of well-being attributes.

The coefficients yielded for each attribute were in the directions expected and statistically significant. The full results of this analysis are presented in Appendix H. The strongest effect was for the presence of a mental health condition, which had a significantly negative influence on preferences for life in

the future (β = -2.14, 95% CI -3.132 to -1.148). This pilot provided: preliminary results, estimates for the effects of each attribute on stated preferences that could be used to improve the experimental design and data that can be used to estimate the sample size required for the final study.

The pilot also provided the opportunity to ask participants whether they noticed any issues with the experiment. One-on-one semi-structured exit interviews were conducted with a randomly selected pool of participants (n=8). The questions used in these brief interviews are presented in Appendix I. Nonetheless, all of the students interviewed suggested that they: found the experiment agreeable, stated that they did not struggle at any stage and indicated that completing the experiment was not too cognitively tasking. These interviews were conducted to check whether the participants struggled at any stage of the experiment, rather than as a piece of qualitative research.

One notable lesson learned from the pilot study was that it would be practically feasible and informative to add interaction effects to the statistical model. The pilot study analysis was a main effects model; however DCEs can also be used to investigate the interaction between attributes. This would highlight whether the effects of any of the attributes were dependent on each other.

7.2.3. Experimental design

The options within the experiment were unlabelled (a, b and c) and thus were described only by the levels of the generic attributes within them (Figure 7.2). An 'opt out' option was also provided within each scenario. Debate continues throughout the literature concerning whether or not DCEs should include an option to opt out (Kontoleon & Yabe, 2003; Lancsar & Louviere, 2008), as it

leads to losses in data. An option to opt out was retained within this experiment, because it is possible that respondents may be faced with two lives, neither of which they would like to experience in 10 years.

Figure 7.2. Screenshot of one of the unlabelled experimental scenarios

<div style="text-align:center; color:#b03a2e;">Generic 'unlabelled' options</div>

Choice A	Choice B	Choice C
Supportive relationship with immediate family	*Unsupportive* relationship with immediate family	
The absence of a mental health condition	*The presence* of a mental health condition	**I do not want either** A or B choices
Feeling that you are *in control* of your life	Feeling that you are *not in control* of your life	
Not engaged in personally meaningful work and/or non-work activities	*Engaged* in personally meaningful work and/or non-work activities	
Annual salary *£56,000*	Annual salary *£56,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	Choice B ☐	Choice C ☐

<div style="text-align:right; color:#6b8e23;">Option to opt out</div>

The experiment used a fractional factorial design able to accommodate the analysis of main effects and interactions between annual salary and each of the other attributes. An examination of these interactions would help to indicate whether or not the significance of support from family, mental illness, control or meaningful activities to expectations was dependent on the annual salary of individuals in the future. A more complex experimental design could have been developed in order to test the interaction effects between all of the attributes; however this experiment limited this exploration to annual salary. The driving

motivation behind this decision was that of all of the attributes selected, income-related concerns remain the most policy relevant (Diener, 2009; Frey, 2008; Kahneman & Deaton, 2010).

The scenarios within the experiment were block designed (Block A and B with 16 scenarios each). Each scenario was examined (by ML and AML) for logically implausible options, which are attribute-level combinations that are unlikely to occur in reality[42]. None of the options were found to violate the assumption of logical plausibility.

An optimal fractional-factorial[43] main effect plus interaction design was sought. The experiment can be described as a 4^1 x 2^4 level experimental design[44]. SAS was used to obtain a 4^1 x 2^4, 2-block, 32 choice (16 choice per block) main effect plus interaction[45] design. The experimental design is presented in Appendix J. This design had a 57% D efficiency[46], the efficiency gap being caused by the addition of the interactions to the experimental design. The attribute-by-option correlation (ρ) matrix had off-diagonal values less than 0.33 in all instances except for 5 attribute pairs: annual salary-supportive family attributes within options (ρ=0.43), annual salary-supportive family between options (ρ=0.35), annual salary (ρ=0.56), control (ρ=0.37), engaged (ρ=0.37). This set of choice questions was designed with the restriction that no duplicates occur.

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[42] For example, it may be logically implausible to: 'regularly experience severely interrupted sleep' and 'often wake up feeling refreshed'. DCE options like this would be described as 'logically implausible' because they are highly unlikely to occur in reality, and may instead confuse the respondents.

[43] 'Fractional factorial designs' aid in the development of statistically and economically effective experiments. This is the process by which experimenters select a sub-set scenarios for use in an experiment from the often large pool of all possible scenario (the full-factorial design) (Gunst & Mason, 2009).

[44] 4^1 (four levels for annual salary) x 2^4 (two levels for the remaining four attributes).

[45] This was to test for the possible interaction effects between annual salary and each of the remaining four attributes.

[46] D-efficiency is a commonly used metric in DCEs for the statistical efficiency of an experimental designs (Johnson et al., 2013).

The experimental design was developed using the following three stages. First, a fractional factorial design of 32 linear D-efficient option profiles was generated, under the restriction that interactions between the annual salary and other attributes would be estimable. Next, the most efficient 32 choice-set for a multinomial logit model with main effect coefficient values set equal to 1/8 of estimates from the pilot model (and assuming zero values for interactions) was selected from the 32 D-efficient profiles found under the restriction that no duplicate choice sets are generated. The 1/8 is a conservative assumption for estimating sample size. Finally, the most efficient 32 choice sets were divided into two blocks with the highest possible balance in attribute levels within blocks. In experiments of this kind, designed with the objective to have the lowest possible variance (minimise the D-error), orthogonality and level balance are generally not achieved (Zwerina, Huber, & Kuhfeld, 2005).

7.2.4. Implementation (experimental procedure)

Two versions of the experiment were run. In Experiment 1(E1), participants were randomly allocated to either Block A or Block B, each containing 16 scenarios to respond to. In Experiment 2 (E2), participants responded to all 32 scenarios. The goal of E2 was to test whether the more cognitive demanding experiment (with twice as many scenarios) would yield divergent results to E1. A full version of the questionnaire (with all 32 scenarios) used is presented in Appendix K.

Before responding to the DCE scenarios concerning life in the future, participants completed two 'warming up DCE exercises'. This exercise involved hypothetical choices regarding transport taken when visiting a friend. These scenarios were deliberately unrelated to the topic of the main experiment. The

warming up exercise allowed participants to: familiarise themselves with the task ahead, query whether they had correctly comprehended the nature of the experiment choice task and to ask general questions.

The sample size of the definitive study was determined based on the parameter estimates obtained from the pilot study, which involved estimating a main effects model of the same five attributes and levels, and assuming the interactions had zero values. A sample size of 67 was sufficient to estimate all main effect parameter values with $p<0.05$, in a two blocked 32 scenario design. Given the possibility of smaller parameter estimates and sample drop outs (approximately 10%) in the definitive study, a target sample of 120 participants was sought.

7.2.5. Data collection

Undergraduate students were recruited through the Finance and Economics Experimental Laboratory at Exeter University (FEELE). Students were invited to participate in the experiment if they were born in the UK and English was their first native language. The experiments were conducted with groups of 20-40 students at a time. Participants were given a consent form to read and sign; they were also briefed on the anonymity of their data and their right to withdraw from the study at any point. The experiment was explained verbally and it was emphasised that the choices presented to them were all hypothetical. Participants were rewarded with £10 for their participation in the experiment. Ethical approval was obtained from the Economics Department at the University of Exeter.

In addition to the collection of demographic details and the completion of the DCE, respondents also received a survey questionnaire on their 'Attitudes,

circumstances and perceptions'. Participants were required to self-report on their: physical health, mental health, personal financial situation, family financial situation, graduate prospects, social life and romantic life. To capture these perceptions, single item Likert scales required participants to rate these domains of life on a five-point scale ranging from Poor to Excellent. Several of these items were reversed, requiring participants to read each item and its scale carefully. These data were collected to construct a richer characterisation of the study sample, above and beyond basic demographic data, and to contextualise the findings yielded by the experiment.

7.2.6. Validity of responses

The validity of the data collected was assessed by examining how participants responded to scenarios with clearly more favourable options. These options are called 'dominant alternatives' because their attribute levels are equal or more advantageous in comparison to the alternative option available (Johnson et al., 2013). An example of a dominant alternative is presented in Figure 7.3 (Choice A). When a dominant alternative is present within a scenario and it is selected, it suggests that people are: reading the options carefully, understand the nature of the task and are engaged in the exercise. A total of nine dominated scenarios were generated by the experimental design and placed at random throughout the 32 scenarios.

Figure 7.3. Example of a scenario with a dominant alternative option (Choice A)

SCENARIO 11

Choice A	Choice B	Choice C
Supportive relationship with immediate family	*Unsupportive* relationship with immediate family	
The absence of a mental health condition	*The presence* of a mental health condition	**I do not want either** A or B choices
Feeling that you are *in control* of your life	Feeling that you are *not in control* of your life	
Engaged in personally meaningful work and/or non-work activities	*Not engaged* in personally meaningful work and/or non-work activities	
Annual salary *£84,000*	Annual salary *£84,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	Choice B ☐	Choice C ☐

7.2.7. Statistical analysis

Mixed logit models were used to analyse the data from each of the experiments. The estimated models describe a random utility model of choice between two life options, whose utility was determined by the five attributes, and the interaction of annual salary with the other four attributes. To illustrate, the model equation without interactions is:

$$V_{choice\ Ai} = \beta_{\text{Family}}\text{Family}_A + \beta_{\text{MIllness}}\text{MIllness}_A + \beta_{\text{Control}}\text{Control}_A$$
$$+ \beta_{\text{MeaningfulAct}}\text{MeaningfulAct}_A + \beta_{\text{AnnualSalary}}\text{AnnualSalary}_A + \varepsilon_{Ai}$$

$$V_{choice\ Bi} = \beta_{\text{Family}}\text{Family}_B + \beta_{\text{MIllness}}\text{MIllness}_B + \beta_{\text{Control}}\text{Control}_B$$
$$+ \beta_{\text{MeaningfulAct}}\text{MeaningfulAct}_B + \beta_{\text{AnnualSalary}}\text{AnnualSalary}_B + \varepsilon_{Ai}$$

where V is the utility function of option 'A' or 'B', and the βs represent coefficients to be estimated for the five attributes, which may differ across

options in a choice scenario, as indicated by their '*A*' or '*B*' subscripts. Conditional on any given set of attributes faced by a participant in a choice scenario, the individual's utility would vary randomly across individuals according to the error terms 'ε_{A}' and 'ε_{B}', as described by the 'i' sub-index. The probability of a person choosing option A is given by the likelihood that $V_{choiceA} > V_{choiceB}$, which is determined in turn by the assumed distribution of the 'ε', terms. The mixed logit model adopted is obtained by assuming that the 'ε' follows a Type 1 extreme value distribution (Train, 2001).

The results yielded by this analysis are presented in two forms. First, the data are presented as the linear logit index, where the main effects and interactions for each attribute are observed separately. Following this, the results as presented in the form of marginal effects, to more clearly identify how changes in the attributes affect the choices made[47]. In the case of attributes other than annual salary, the marginal effect is the step change from 'absence' to 'presence' of the attribute (e.g. a shift from 'feeling not in control of one's life' to 'feeling in control of one's life').

7.3. Results

The results section is split into four main sections. In the first section the sample characteristics for both experiments are described (7.3.1). In the second section, the estimated main effects, interactions and results of the gender analysis for experiment 1 (E1) is described (7.3.3). Next, the results for the 32 scenario version of the experiment (E2) are presented (7.3.4). Finally, the data

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[47] The marginal effect is useful to the interpretation of the data because the results include the effects of the main effect and interactions together in the same coefficient.

are reanalysed to explore: when, how much and why participants chose to opt-out of the scenarios presented to them (7.3.5).

7.3.1. Sample characteristics

7.3.1.1. Demographics

Table 7.2 provides descriptive statistics for the samples in E1 and E2. The mean age of participants in both experiments was comparable (19.79 vs 19.28, respectively). Further, both samples included a relatively even gender split of (52.9% male in E1 and 47.2% male in E2). Over 50% of participants across both experiments reported that they were in a relationship or currently dating somebody; however the proportion of single people in E1 was noticeably higher (49.5% vs 38.9%). Most of the participants were 'White/White British/White other' (88.8% in E1 and 97.2% in E2). Within E1, most of the participants lived in rented accommodation (65.4%), whereas the majority of participants in E2 lived in university accommodation (63.9%).

Table 7.2. Sample characteristics

	E1 (n = 104)	E2 (n = 36)
Age - Mean [range]	19.79 [18 - 29]	19.28 [18 - 22]
Gender, male - %	52.9	47.2
Relationship - %		
Single	49.5	38.9
In a relationship	50.5	61.1
Ethnicity - %		
White[a]	88.8	97.2
Mixed ethnic background[b]	4.7	2.8
Asian[c]	3.7	0
Black[d]	2.8	0
Housing - %		
University accommodation	32.7	63.9
Rented accommodation	65.4	36.1
Living with parents	0.9	0
Other	0.9	0

Key: E1 = Experiment 1, E2 = Experiment 2, [a]= White/White British/ White other; [b]= Black/Black British/Black other; [c]= Asian/Asian British/Asian other and; [d]= Mixed/Multiple ethnic groups.

7.3.1.2. Attitudes, circumstances and perceptions

In both experiments, participants provided 'very good' ratings for their physical and mental health (Figure 7.4 and Figure 7.5). Higher ratings were provided for physical health compared to mental health, and none of the participants rated their physical health at the lowest possible level (poor). An optimistic picture is depicted by the results concerning perceptions of financial and occupational prospects (Figure 7.6 and Figure 7.7). Respondents believed they had modest personal financial conditions, more favourable familial financial circumstances, and brilliant graduate prospects. Finally, respondents rated the state of their social lives as being better than the state of their romantic lives (Figure 7.8 and Figure 7.9).

The majority of participants either agreed or strongly agreed that their family currently provide them with the emotional support that they need (E1 = 83/104, 79.8% and E2 = 29/36, 80.6%). Most participants also agreed or strongly agreed that there is social stigma attached to having a mental health condition (E1 = 88/104, 84.6% and E2 = 33/36, 91.6%). Finally, almost all of the respondents were in receipt of a student loan (E1 = 92.3%, 96/104 and E2 = 86.1%, 31/36).

Figure 7.4. Self-rated health status in E1 (Left)

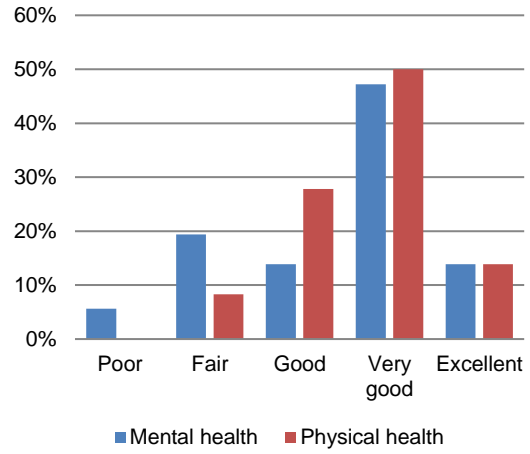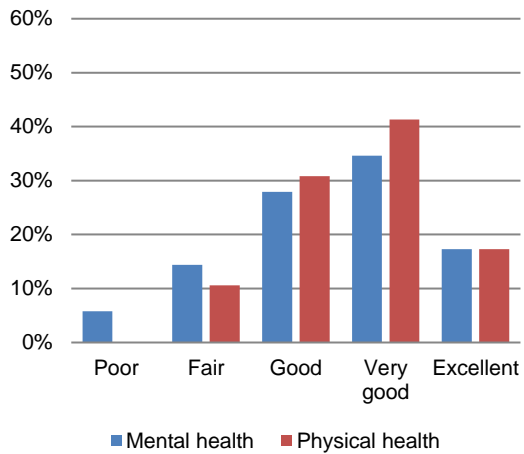**Figure 7.5. Self-rated health status in E2 (Right)**

Figure 7.6. Self-reported characteristics of life in e1 (Left)

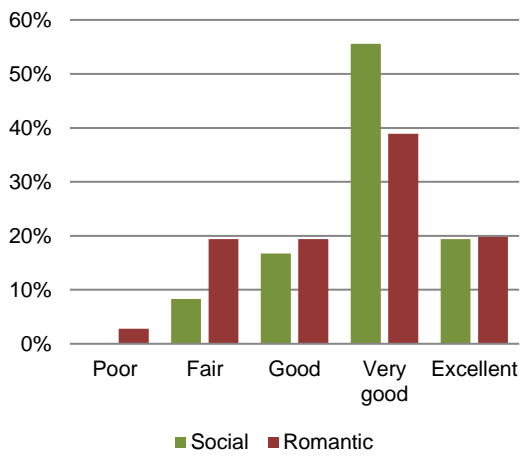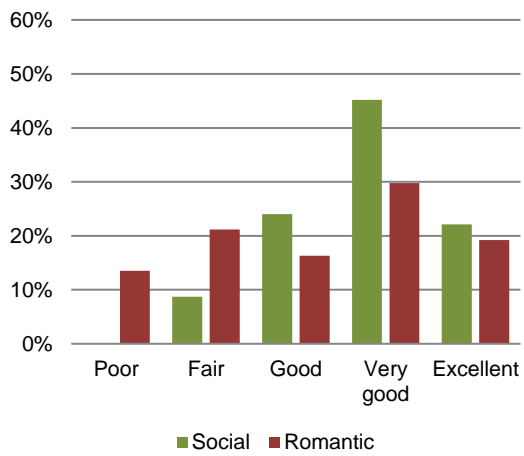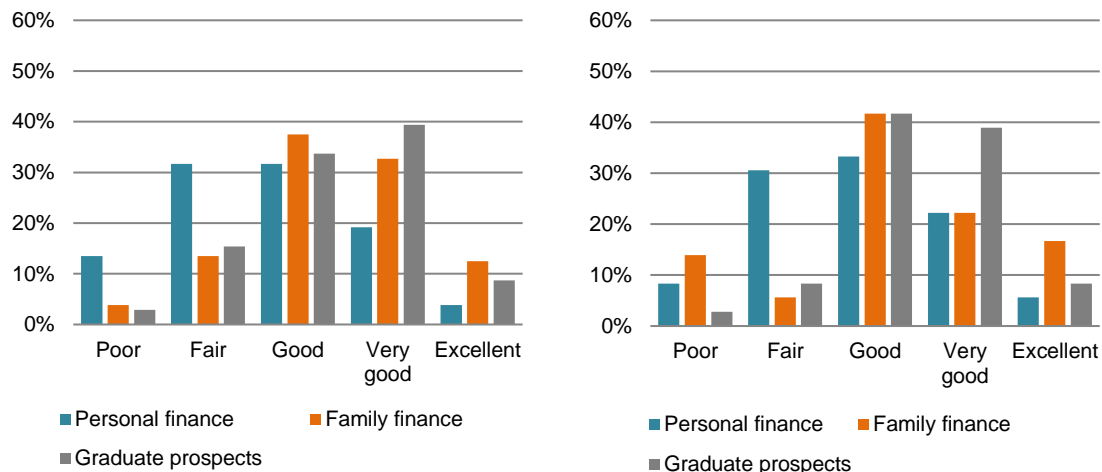**Figure 7.7. Self-reported characteristics of life in E2 (Right)**

Figure 7.8. Self-reported financial and occupational characteristics in E1 (Left)

Figure 7.9. Self-reported financial and occupational characteristics in E2 (Right)

7.3.1.3. Warming up exercise

Before completing the DCE section regarding life in the future, participants in both E1 and E2 completed a two-scenario practise DCE exercise. The slight majority of participants selected Option B in Scenario 1 (82/140, 58.6%) and Option A in Scenario 2 (74/140, 52.9%). Both of these options provided a guaranteed seat on a non-scenic route, while their price and journey duration varied. The frequency of opting out across the two scenarios was relatively low (7.9% in Scenario 1 and 3.6% in Scenario 2). Participants were given an opportunity after the warming up exercise to state whether they understood the nature of the experiment, none of the respondents indicated that they had any difficulty understanding the task. One participant however did ask 'what am I meant to be thinking about when I make my choice'. It was clarified that in the subsequent scenarios there would be guidance text to frame the experiment[48].

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[48] The following instruction was provided to participants:
"The following hypothetical scenarios reflect what your life could be like in 10 years' time. Please put a '✓' in the box to indicate the life that you would be most satisfied with. Please take your time and think about your answers."

7.3.2. Experiment 1 (E1)

For this experiment there were no missing data and a total of 1664 choices were reported (n = 104 participants x 16 scenarios). Across E1, the majority of scenario responses were participants selecting one of the main options provided to them (60.1%, 1003/1664). Nevertheless, the rate of participants opting out of the scenarios was higher than expected (selecting Option C). Participants selected the dominant alternative options in 99.2% of cases (485/489), demonstrating the validity of the responses given by participants. The most popular choice was within Scenario 2A (Appendix J), a dominated scenario where 100% of participants selected Option B.

7.3.2.1. Logistic regression (linear logit index)

The coefficients for all of the main effects were in the directions anticipated (Table 7.3). Control was the only main effect which had a non-significant impact on the choices made (β=0.270, 95% CI = -0.375 to 0.915), however this attribute had a positive (borderline significant) interaction with annual salary. The only interaction with a statistically significant effect was annual salary and support from family (β=0.021, 95% CI= 0.003 to 0.039), indicating that their effects on stated preferences were dependent on each other. For example, preferences for an option with a higher annual salary were dependent on whether or not the option also included social support from family, and vice versa. Together the main effects with interactions model explained 59% of the variance in choices made, demonstrated by the R^2. These findings provide partial justification for the investigation of interactions between annual salary and the remaining categorical attributes.

Table 7.3. Linear logit index for E1

	Coef.	Std. error	95% confidence interval
Main effects			
Support from family	2.540***	0.470	1.619 [to] 3.460
Mental illness	-2.388***	0.407	-3.186 [to] -1.591
Control	0.270	0.329	-0.375 [to] 0.915
Meaningful activities	0.779**	0.250	0.288 [to] 1.270
Annual salary (in 000's of £s)	0.055***	0.011	0.034 [to] 0.076
Interactions			
Annual salary x support from family	0.021*	0.009	0.003 [to] 0.039
Annual salary x mental illness	0.001	0.007	-0.012 [to] 0.013
Annual salary x control	0.012	0.008	-0.003 [to] 0.027
Annual salary x meaningful activities	0.008	0.005	-0.003 [to] 0.019
Pseudo R^2	0.59		
Individuals	104		
Observations	2006		

Notes: Coef. = coefficient, Std. error = standard error, *=p<.05, **=p<.005 & ***=p<.001

7.3.2.2. Marginal effects

In the marginal effects output (Table 7.4), which combines the main effects with the interactions, all of the coefficients are in the directions expected and each of the attributes is statistically significant. This reveals a significant stated preference for: support from family, feelings of control, engagement in meaningful activities, higher annual salary, and an aversion to mental illness in reference to life in 10 years' time. These findings provide a basis for rejecting the null hypothesis in favour of the alternative hypothesis that each of the attributes selected play an important role in preferences for life in the future among emerging adults.

Table 7.4. Marginal effects for E1

	Coef.	Std. error	95% confidence interval
Support from family	0.157***	0.029	0.100 [to] 0.214
Mental illness	-0.117***	0.026	-0.168 [to] -0.067
Control	0.037**	0.012	0.013 [to] 0.060
Meaningful activities	0.051***	0.014	0.023 [to] 0.079
Annual salary (in 000's of £s)	0.003***	0.001	0.002 [to] 0.005
Individuals	104		
Observations	2006		

Notes: Coef. = Marginal effect for each attribute (including the main effect and interaction), Std. error = standard error , CI = confidence interval, *=p<.05, **=p<.005 & ***=p<.001

The effect of 'Support from family' was the strongest among the four categorical attributes (all attributes apart from annual salary). Participants who were offered a 'supportive' relationship rather than 'unsupportive' relationship with immediate family expected life in 10 years' time to be 16 percentage points more preferable (marginal effect = 0.157; 95% = CI 0.100 to 0.214). Conversely, the 'presence' of mental illness was associated with 12 percentage point decrement in how preferable life would be (marginal effect = -0.117; 95% CI = -0.168 to -0.067). Although a significant effect was observed, an increase in annual salary of £10,000 equates to a relatively low 3 percentage point increase in the preferability of life (marginal effect = 0.003; 95% CI = 0.002 to 0.005).

7.3.3. Experiment 2 (E2)

For this experiment there were also no missing data, and a total of 1152 choices were reported (n = 36 participants x 32 scenarios). Across the experiment, the majority of scenario responses were participants selecting one of the main options provided to them (65.2%, 751/1152), however similar to the results from E1, opting-out was higher than expected. In almost all of the scenarios where a dominant alternative option was available, the 'optimal choice' was selected (98.5%, 319/324), which demonstrates that it is likely participants were engaging with the exercise in order to avoid selecting less favourable options. The most popular choice was within scenario 11a where 100% of participants selected Option A (Appendix J).

7.3.3.1. Logistic regression (linear logit index)

The coefficients for all of the main effects were in the directions anticipated (Table 7.5). As with E1, control was the only main effect which had a non-

significant impact on preferences (β=0.274, 95% CI = -0.345 to 0.893). Unlike in E1, there were no statistically significant interaction effects in E2 for the annual salary attribute. Together the main effects with interactions model explained 47% of the variance in choices made, which is notably lower than the explained variance in E1. Overall, these results suggest that the interactions offer little extra statistical value to the model.

Table 7.5. Linear logit index for E2

	Coef.	Std. error	95% confidence interval
Main effects			
Support from family	**2.401*****	0.430	1.557 [to] 3.244
Mental illness	**-1.944*****	0.382	-2.691 [to] -1.196
Control	0.274	0.316	-0.345 [to] 0.893
Meaningful activities	**0.589***	0.257	0.085 [to] 1.093
Annual salary (in 000's of £s)	**0.050*****	0.010	0.030 [to] 0.070
Interactions			
Annual salary x support from family	0.005	0.008	-0.011 [to] 0.021
Annual salary x mental illness	0.001	0.006	-0.011 [to] 0.014
Annual salary x control	-0.001	0.007	-0.015 [to] 0.013
Annual salary x meaningful activities	0.002	0.006	-0.009 [to] 0.014
Pseudo R^2	0.47		
Individuals	36		
Observations	1506		

Notes: Coef. = coefficient, Std. error = standard error, *=p<.05, **=p<.005 & ***=p<.001

7.3.3.2. Marginal effects

In the form of marginal effects all of the coefficients are in the directions expected (Table 7.6). Each of the attributes apart from 'control' had a statistically significant marginal effect on the choices made. This reaffirms the importance of support from family, engagement in meaningful activities, higher annual salary, and an aversion to mental illness in reference to life in 10 years' time, as revealed in E1. The findings from this experiment contradict the importance of control for emerging adults.

Table 7.6. Marginal effects for E2

	Coef.	Std. error	95% confidence interval
Support from family	0.181***	0.034	0.114 [to] 0.248
Mental illness	-0.134***	0.031	-0.195 [to] -0.074
Control	0.017	0.012	-0.007 [to] 0.041
Meaningful activities	0.048**	0.014	0.020 [to] 0.075
Annual salary (in 000's of £s)	0.004***	0.000	0.003 [to] 0.005
Individuals	36		
Observations	1502		

Notes: Coef. = Marginal effect for each attribute (including the main effect and interaction), Std. error = standard error , CI = confidence interval, *=p<.05, **=p<.005 & ***=p<.001

Similar to the results of E1, in E2 the effect of 'Support from family' was the strongest among the four categorical attributes. Participants demonstrated an 18 percentage point preference for 'supportive' relationships with immediate family members compared to 'unsupportive' relationships (marginal effect = 0.181; 95% CI = 0.114 to 0.248). Conversely, the 'presence' of mental illness was associated with a 13 percentage point reduction in the preferability of life in the future (marginal effect = -0.134; 95% = CI -0.195 to -0.074). Similar to the results from E1, meaningful activities and higher annual salary had a statistically significant impact on preferences however they accounted for comparatively small effects.

7.3.4. Opting-out

The previous sections highlight that on numerous occasions participants chose to opt-out of scenarios by choosing Option 3. The rate of opting out among participants is presented in Appendix L. In E1, the majority of participants selected the opt-out option at least once (87%, 90/104), and the results in E2 were similar (83%, 30/36). Although none of the participants in E1 or E2 opted out for all of the scenarios, more participants than expected were choosing 'not to choose' between the main options presented to them. This section includes a breakdown of opting out for each scenario, a descriptive analysis of opting out

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among males and females separately and finally an analysis (logistic regression) into how some of the attributes in the experiments may have been driving participants to opt-out.

The level of opting out for each scenario is presented separately for each experiment in Appendix M. Within E1, the highest rate of participants opting out was for Scenario 11B where 77.8% of participants opted out. The lowest levels of opting out for this experiment were in Scenarios 2A and 8B, where none of the participants chose to opt-out. The highest level of opting out in E2 was for Scenario 14B where 66.7% of respondents stated that they did not want to choose between the options provided to them. The lowest levels of opting out were observed for the same scenarios as in E1 (2A and 8B) with the addition of 11A, where none of the participants chose to opt-out.

The extent of opting-out split by gender for E1 is displayed in Figure 7.10. An independent-samples t-test was conducted to compare the rate of opting out among male and female participants. On average male respondents (Mean =6.54, SD=4.32) opted out more often than female respondents (Mean =6.15, SD=4.63), however this difference was not statistically significant $(t^{102}=0.44, p=0.33)$. The same analysis is presented for E2 in Figure 7.11, where on average male respondents (Mean =11.25, SD=8.81) opted out more often than female respondents (Mean =11.05, SD=8.25), however this difference was also not statistically significant $(t^{34}=0.06, p=0.47)$.

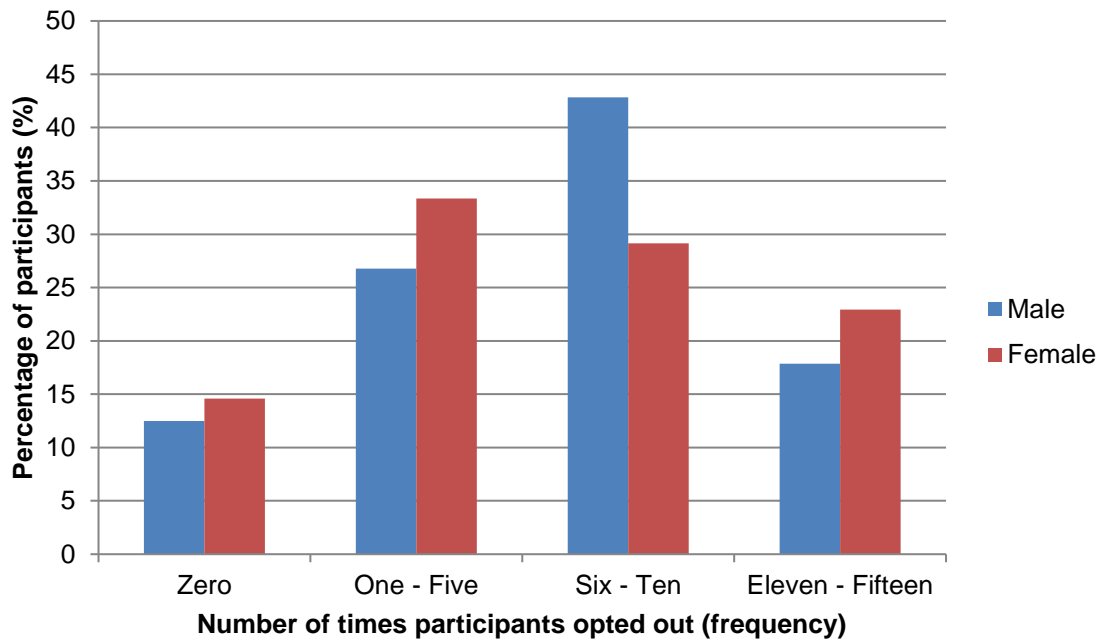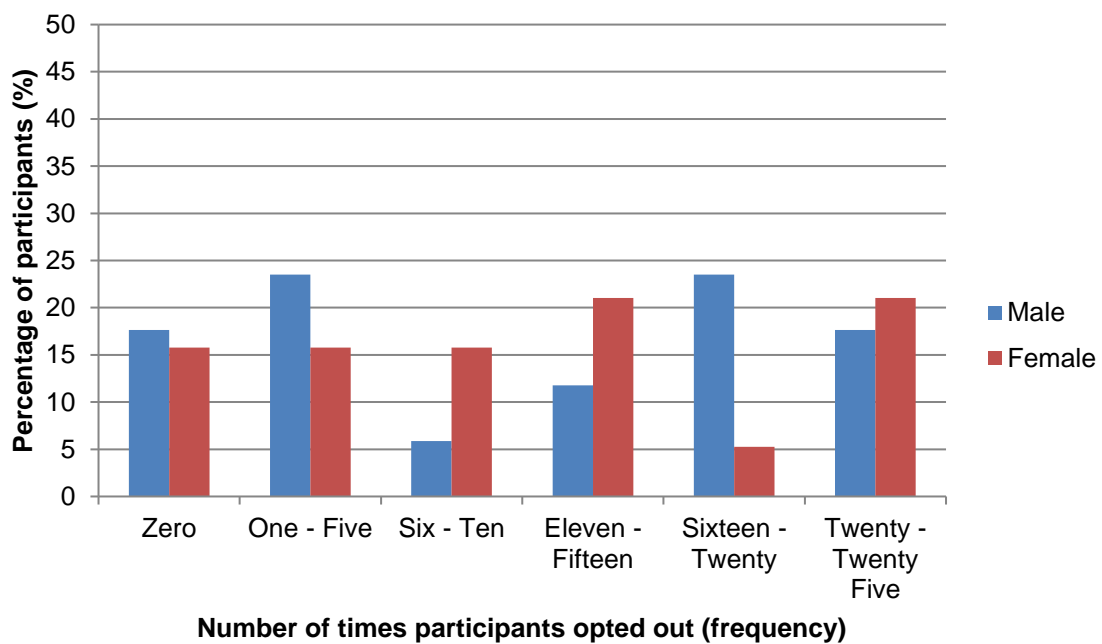**Figure 7.10. Percentage of participants opting out (E1)**

Figure 7.11. Percentage of participants opting out (E2)

Finally, the data were analysed with a logistic regression model to investigate whether the rate of opting-out within the experiments was driven by any of the attributes in the scenarios. The results of this analysis are presented in Table 7.7. All of the attributes apart from support from family (within E1) had

a statistically significant effect on whether or not participants opted-out. The strongest and most meaningfully sized effects were for the mental illness attribute. This indicates that when both options within a scenario included the presence of a mental health condition participants were 0.48 (E1: OR=1.48, 95% CI = 1.13-1.94) and 0.61 (E2: OR=1.61, 95% CI = 1.16-2.22) times more likely to opt-out than if they had at least one option when mental health conditions were absent. Inversely, having at least one option where there was an absence of mental illness reduced the likelihood of opting out by 33% (E1) and 38% (E2).

Table 7.7. Logistic regression model analysing how, when the 'best' possible attribute level was negative

	E1		E2	
	OR	Standard error	OR	Standard error
Support from family	**0.630****	0.100	0.884	0.174
Mental illness	**1.479****	0.203	**1.609****	0.263
Control	**0.509*****	0.068	**0.546*****	0.091
Meaningful activities	**0.492*****	0.087	**0.386*****	0.088
Annual salary (in 000's of £s)	**0.984*****	0.002	**0.987*****	0.003
_constant	1.612	0.192	1.065	0.153
Individuals	103		36	
Pseudo R^2	0.08		0.08	

Notes: OR = Odds Ratio, * = p <.05; ** = p<.01 and *** = p<.001

7.4.   Discussion

7.4.1. Main findings and interpretations

The current study sought to investigate the extent to which attributes of well-being influence the stated preferences of young emerging adults for their life in the future. This study found that there was a statistically significant preference for: a supportive relationship with immediate family members, the absence of mental illness, engagement in meaningful activities, and a higher annual salary. These results were replicated across both experiments, and indicate how young people would expect to fare in the future, given a range of life circumstances.

7.4.1.1. The importance of social support from family

Social support from immediate family had the strongest impact on stated preferences. This finding makes logical sense, given that the sample reported that they currently experienced high levels of emotional support from family members. These results indicate that emerging adults may expect this form of support to continue to play an important role in their future. This also provides further empirical support for existing studies which have highlighted the value of family networks as a source of support in the lives of young people (Holland, Reynolds, & Weller, 2007; Patel, Flisher, Hetrick, & McGorry, 2007).

7.4.1.2. Aversion to mental illness

Another key finding was that the prospect of living with a mental health condition had a strong and significantly negative effect on the choices made. In addition to respondents selecting options where mental health concerns were absent, participants were likely to opt-out of scenarios that did not include this as an option. Further, the participants studied largely believed that there was still considerable stigma surrounding the topic of mental health difficulties. These findings imply that it would be beneficial to invest in programmes able to safeguard the mental health of young people as they enter the labour market and approach the well-being challenges characteristic of middle adulthood (Blanchflower & Oswald, 2008; Stone et al., 2010).

7.4.1.3. Mixed findings concerning feelings of control

Control was a valued attribute of well-being in the pilot study and in E1, however the results yielded from E2 contradicted this finding. One interpretation of this finding is that the remaining four attributes of well-being are more important than control among people in this target population. Alternatively, it could also be possible that if a person is able to satisfy their requirement for family support, mental health, meaningful activities and annual salary, 'control' may cease to be important for them. In statistical terms, if 'control' does have any effect on preferences, it may be operating through the other attributes. With the right support system in place and the absence of a mental illness, the unpredictability of life may be easier to accept.

7.4.1.4. Interactions with annual salary

Within E1, there was a significant interdependence between annual salary and social support from family. Outside of this experiment, this may translate to people expecting a more 'complete' life, to be one in which income is achieved without sacrificing the quality of familial relationships. The practicality of this aspiration is a matter requiring empirical attention. It is notable however that stated preferences for annual salary did not depend on whether a person was able to undertake meaningful activities. The interaction between annual salary and support from family was not observed in E2; however this is possibly due to power differences between the studies.

7.4.1.5. Attitudes, circumstances and perceptions

The findings related to attitudes, circumstances and perceptions provide a description of the respondents above and beyond their demographic characteristics. On the whole, the study sample reported: high levels of both mental and physical health, financially comfortable families, flourishing social/romantic lives, and optimism regarding future employment. This profile of 'prosperity' suggests that the participants were generally positive about what life might look like in 10 years' time. It is important to recognise that this profile may not be characteristic of emerging adults outside of the 'University bubble', even if they are similar in age. It is also possible that in a sample of emerging adults outside of university, a different collection of attributes would have been selected during the study design process.

7.4.1.6. Opting out

The high level of opting-out observed provides empirical support for the theoretical claim that making life choices can be difficult among emerging adults (Jeffrey Jensen Arnett, 2014), even when these choices are within hypothetical scenarios. Opting-out was notably higher in the life scenarios compared to the warming up scenarios. To better understand the magnitude of this effect, it would be beneficial to repeat the experiment with participants of different ages, to compare how much higher opting out is among emerging adults compared to other groups.

When the opt-out responses were analysed, it was the content of the scenarios presented to participants (rather than a gender effect) that was found to be influential. Participants who were faced with unfavourable attribute-levels

in both of the options presented to them[49] were more likely to opt-out of the scenario. The strongest of these effects was for mental illness; however the majority of attributes[50] in both studies were significantly influential. By modelling these responses separately from the main analysis, data which may have been lost has been used to provide insight into some of the drivers behind this decision within DCEs.

7.4.1.7.   The effect of DCE length on results

The results of E1 and E2 were divergent in a number of respects[51]; however it was particularly interesting to observe that (controlling for the attribute-levels within scenarios) the level of opting out was lower in the more cognitively demanding and longer experiment (E2). One explanation is that in the longer experiment participants developed a greater level of familiarity with the experiment and were more acquainted with the process of making trade-offs between the options provided to them. This finding underscores that although DCEs are cognitively demanding, participants appear to cope better than expected with the exercise.

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[49] An example of this would be where both Option A and Option B state that a person will not be engaged in meaningful activities, or both options include the lowest possible Annual Salary level.

[50] Other than 'Support from family' in E2, all of the attributes had a statistically significant effect on the level of opting out in scenarios.

[51] In E2: control over life was not a significant attribute, the R^2 fit index was lower than in E1 and the significant interaction effect for social support from family and annual salary found in E1 was not replicated.

7.4.2. Strengths

The systematic process undertaken to develop the attributes studied in this experiment is a key strength of the work. The systematic review documented in Chapter 3 provided a thorough and organised foundation to begin the process of identifying a set of key attributes for further study in a DCE. The goal of this review was to equip researchers with a toolkit of dimensions that they can use to select more conceptually appropriate measures of well-being, or to develop their own experiments. Within this chapter, the latter approach was followed, and has been highly beneficial.

In addition to this, the best-worst study provided an empirical means of reducing this set of dimensions down to a more manageable number of attributes. Given the breadth provided by the review of measures, it would not have been feasible (or practical) to develop a DCE that reflected all of those dimensions. Instead, ratings within the best-worst study were used together with experimenter insight in order to decide on a final set of DCE attributes. The direct involvement of participants in the design phases adds to the face validity of the experiments. As well-being remains a contentious and subjective topic, this process aimed to limit the possibility of bias in the design of the study.

The pilot study provided several empirical benefits. In addition to providing the main study with a set of beta priors for each attribute, and giving participants an opportunity to report on the acceptability of the methods, the pilot study also provided preliminary results that could be tested in the main study with a larger sample size. As has been reported, the results from the main effects model in the pilot study were largely replicated in the main effects model for the main study.

The responses to scenarios containing dominant alternative options demonstrate that the experiments yielded highly valid responses. In order to select these options, participants were required to correctly understand the nature of the task, and carefully attend to the levels of the attributes contained within each scenario. The results indicate that respondents were actively engaged in the exercise within the 16 scenario version of the experiment (E1) and also the more burdensome 32 scenario version of the experiment (E2). This provides positive evidence for the ability of respondents to comprehend DCEs.

Finally, the administration of two similar experiments provided an opportunity to test the reliability of the findings yielded. The two experiments provide reinforced support for the strong role of mental illness and social support from family in stated preferences, and call into question the significance of feelings of control. E2 cannot be described as a complete replication of E1, because participants in E2 responded to more scenarios. The length of the experiment however was the only technical difference between the experiments and they were otherwise procedurally analogous.

7.4.3. Limitations

One limitation of DCEs in general is the use of attributes with ordinal levels. In this study for example, the 'social support from family' attribute included a level for '*supportive* relationship with immediate family' and a level for '*unsupportive* relationship with immediate family'. These qualitatively labelled levels may or may not be interpreted in the same way by participants, as what is defined as a supportive relationship may vary between people.

Separately, almost a third of the choices made in the experiment were instances where participants opted out of choosing one of the two options

provided. One reason participants may have opted out could be that the attributes selected were not a sufficient reflection of the essential characteristics of life satisfaction. External to this experiment, a person's life may vary in ways that cannot be perfectly represented by any five attributes. It is possible that for some participants, social support provided by friends or the absence of physical health difficulties may be more valuable. For these individuals the attributes used in the experiments may have simply been a lower priority for their future.

Another possibility is that several of participants studied were unwilling to compromise on their 'ideal future life'. If participants were faced with two options that were both sub-optimal for them, they could either choose to compromise by trading off one attribute for another, or they could opt out. 'Inelastic' individuals with rigid criteria for what would constitute life satisfaction in the future for them may decide to opt-out, instead of compromising.

In this study responses to opt-out were analysed separately to the main logistic regression models that were estimated, which represents a loss of data. Elsewhere, researchers have suggested that both types of decision provide insight on individual preferences and attempted to model all of the responses to DCE scenarios, including responses where participants had opted out (M. Ryan & Skåtun, 2004). Further study into the topic should explore the utility of this approach, particularly when respondents in a sample frequently decide to opt-out of the scenarios presented to them.

Another limitation of the current study is that the annual salary attribute could be perceived as ambiguous. In its current phrasing, it is unclear whether 'annual salary' refers to gross income or net income. As a result it is possible that respondents interpreted the attribute in alternative ways. Coefficients related to this attribute therefore must be interpreted with caution. In future,

greater care should be taken with the phrasing of attributes and levels to ensure ambiguity is avoided. Further, the current study focused on personal income; however it would be beneficial to extend our understanding to collective forms of income also. For example, a follow up study could be designed to test whether individuals expect personal sources of income to be more or less satisfying than shared material resources such as household income.

Within this work there are other attributes of well-being in the future that participants may value highly. For example, the current study included no attributes concerning the housing arrangements that respondents may have in the future. It is likely that whether a person is: renting, owns their own home, or is living with their parents may influence their preferences for the future. This attribute and several others (driven by the literature) could be examined in future studies, however the goal of the existing work was to select participant derived rather than purely experimenter-imposed attributes.

7.4.4. Future research

Three potential explanations for the rate of opting out in the current study have been provided above. Further study would be required to determine which of these explanations is accurate. One option to follow up this work would be to investigate the mind-set of individuals completing the experiment. A qualitative study using a 'think aloud' design could explore the thought process and strategies employed by participants. Think aloud methods would be particularly well equipped to address this unresolved issue, as they could pinpoint exactly what people are thinking about during the moments where they are deciding

whether to opt out. The rationale for this choice could also be immediately probed by researchers.

These results call into question whether it is beneficial to provide an option to opt out in the case of well-being DCEs. Further thought should be given to whether it is reasonable to ask respondents to select from the available options without providing them with an option to not choose. In this study opting out was allowed, however in further research it would be informative to test whether the results from 'forced choice' DCEs yield similar results.

This study was conducted with undergraduates as a convenience sample; however the use of DCE methods in the study of well-being could be applied to many populations. Growing interest in well-being within health services research suggests that clinical populations would be a strong candidate for such research. Given the alleged conceptual differences between health-related quality of life and well-being, it would be interesting to investigate whether there are variations in preferences for both outcomes. This represents an interesting and clinically meaningful empirical question as in some contexts there may be a disjoint between what would improve a person's health and what would improve how much they enjoy their life.

7.4.5. Conclusion

It appears feasible to use DCE methods to investigate empirical questions concerning SWB. The results of this study suggest that emerging adults have a significant preference for supportive relationships with family members, the absence of mental illness, engagement in meaningful activities and a higher annual salary in ten years' time. The generalisability of these results should be limited to University educated individuals, until further study in more diverse

populations is conducted. There was a high tendency to opt-out of the scenarios, which was partly driven by the prospect of having to live with mental health difficulties. Although emerging adulthood is characterised by feelings of uncertainty and instability, the importance of 'feelings of control' were minimal if not questionable.

A logical next step for this body of work would be to use longitudinal methods to examine the impact that these attributes have on the lives of emerging adults in the future. Such a study would either support the importance of the domains of life that people valued in this study, or demonstrate that people are often wrong about the things that they expect will improve their lives. This would continue to progress our understanding of the validity or naivety of the preferences reported in DCEs.

CHAPTER 8: GENERAL DISCUSSION

8.1. Chapter outline

The aim of thesis was to examine measurement, theory, associated factors and preferences related to experiences of well-being. This thesis explored these issues using systematic review methods, thematic analysis, network analysis, fixed-effect models and discrete choice experiments, among other techniques. The range of methods utilised reflects the interdisciplinary approach taken. This chapter presents an overview of the work conducted, with a focus on: key findings and implications (8.2), original contributions of the thesis and their implications (8.3), the limitations of the work conducted (8.4), future research priorities (8.5) and concluding remarks (8.6).

8.2. Key findings and implications

8.2.1. The meaning of well-being

Chapter 2 explored the ways in which well-being has been defined. Following this exploration, it is arguable that despite the topic's ongoing study, the meaning of well-being remains a highly contested topic. Academics differ widely in their definitions of well-being, and in many cases avoid offering a definition altogether. This difficulty in defining well-being has been highlighted within the literature (Dodge et al., 2012). This thesis builds on the existing literature by highlighting the confusion caused by the interchangeable usage of similar terms like happiness, health and quality of life with well-being. In doing so, it is suggested that the meaning of well-being, is dependent on the way in which the term is used throughout the literature.

In practice, greater clarity would be achieved if researchers were more careful in how they use their terminology. Where authors in the literature do not provide a clear and explicit definition of what they mean by well-being, readers are forced to either guess what the authors mean, or defer to their own (possibly ill-suited) definition. Researchers in the field could avoid this mismatch if they explicitly spelled out what they mean by the term in the context in which it is being used. Failing this, authors could potentially move the discussion forward if they offered an examination into some of the barriers which prevented them from stating a definition. As an example, one difficulty researchers may face when attempting to define well-being is the volume of literature that may have to be examined before they could be confident 'their' definition was representative enough.

8.2.2. The measurement of well-being

Chapter 3 presented a systematic exploration of the literature focusing on how well-being is measured using self-report questionnaires. With an explicitly interdisciplinary approach and an operational definition of well-being in mind, 99 measures of well-being were identified, which was considerably more than comparable reviews found within the literature (Lindert et al., 2015). Within these measures there was considerable variety in how many items were presented to respondents, the written or pictorial format they were presented in and the ways in which they were scored. The number and varying nature of the available tools suggests that there is no consensus within the academic community as to how well-being should be measured.

Data were also extracted on the dates that the tools were developed, enabling the construction of a timeline of development over time. This was the first time the creation of measures had been mapped, visualised and described, and clearly indicates consistent interest in the measurement of well-being, particularly around the 1990s. Importantly, this spike in interest pre-dates several key milestones in the incorporation of self-reported well-being data in policy matters. The current rate of development however suggests that growth in the development of new and re-designed measures has yet to subside.

Equally astonishing was my finding that within these 99 assessment tools, there were as many as 196 different dimensions that researchers were attempting to measure. This indicated that there is little consistency in the contents of well-being measures. Figure 3.3 (Chapter 3) displays this variation in a way designed to help researchers explore the options available to them. As Figure 8.1 below indicates, measures of well-being typically approach the topic from alternate perspectives and thus are not guaranteed to include many (if any) overlapping dimensions. In harmony with the operational definition used in this thesis, well-being is best understood as a multidimensional construct. However, these original findings indicate that there is a need to better understand the structure of well-being.

Figure 8.1. Measures of well-being with no common dimensions

BBC Subjective Well-being Scale	Ontological Well-being Scale	Quality of Well-being Scale	Emotional Well-being Scale
Psychological well-being	Activation	Mobility	Positive affect
	Hope	Physical activity	Negative affect
Physical well-being	Nothingness	Self-care	
Relationships	Regret	Symptoms	

8.2.3. Theories that influence the measurement of well-being

In Chapter 4, the theories that researchers had used as the rationale for the development of the different measures were examined. Once more, huge diversity was evident. The three most dominant models approached the topic from differing perspectives: Diener's model of SWB (Diener, 1994), the WHO definition of health (World Health Organization, 1948) and Ryff's theory of psychological well-being (Ryff & Keyes, 1995). Each of these theories describes well-being in terms of a set of dimensions; however, there is no overlap in the dimensions that these three approaches describe. In total 99 different theories were explicitly referenced as being influential in the development of at least one of the measures of well-being. This original finding of excessive theoretical variation further demonstrates how wide ranging and broad the topic of well-being has become.

In addition, network analysis methods were used to illustrate and characterise the ways in which measuring well-being is dependent on theoretical influences. By doing so, an extensive and diverse list of almost 100 influential theories, models and definitions have been provided. The illustration itself (Chapter 4, Figure 4.4) demonstrates that while some of these measures are designed to reflect as many as 11 different theories, other tools are developed using no theoretical grounding at all. Providing a map of these relationships would be particularly useful for those seeking to empirically test theories of well-being using specifically developed measures. Given the policy implications of measuring well-being (Kahneman & Deaton, 2010), developing a richer understanding of these measures should remain a priority.

8.2.4. Key factors associated with SWB among middle aged/older adults

In Chapter 5, the key factors related to SWB within a longitudinal dataset of adults in the US were investigated. Strong evidence was found for the importance of work satisfaction, mental health and social integration across each of the three measures of SWB used in the dataset (life satisfaction, positive affect and negative affect). This suggests that these three factors may have an impact on both the enduring evaluations that people make about their lives and the emotions that they feel.

These findings imply that it may be beneficial to facilitate engagement in personally satisfying work, the enhancement of mental healthiness and engagement in wider social settings in middle aged and older adults in the US. As individuals' age and eventually leave employment it remains vital for people to take part in productive activities and remain connected to the community. Volunteering is one activity which incorporates both of these characteristics and has previously been linked to improvements in SWB (Binder & Freytag, 2013; Pilkington, Windsor, & Crisp, 2012).

In contrast to these findings, some of the remaining significant effects were dependent on the measure of SWB used. For example, support from friends was only significantly associated with positive affect, and experiencing multiple chronic health conditions was only significantly associated with negative affect. These findings suggest that studies which use single measures of SWB might risk missing out on other significant findings. Similarly, the conclusions drawn in empirical studies using one measure of SWB may be

vastly different from the conclusions that would be drawn if an alternative measure was used, or an alternative population was under investigation.

8.2.5. Preferences for life satisfaction among emergent adults

In Chapter 6, stated preference methods were used to estimate which attributes of well-being were most important to the choices made by emergent adults in the UK within an experimental setting. To my knowledge this is the first time DCE methods have been used to examine how individuals would trade-off between different dimensions of well-being for their life in the future. Emergent adults had a significant preference for support from family, the absence of mental illness, engagement in meaningful activities and a higher annual salary in the future. The strongest of these effects was for social support from family members, suggesting that young people may be less willing to sacrifice this resource in favour of competing interests.

Another key finding was that the respondents opted out of approximately 1/3 of the DCE scenarios presented to them. Opting-out was noticeably higher in the well-being scenarios compared to the unrelated warming up exercises; therefore, there is a need to better understand the factors driving the decision to opt out of DCE scenarios. A re-analysis of the data indicated that there was a significantly higher likelihood of opting out when both hypothetical options presented to the respondents involved them living with a mental health condition in the future. Further thought is required in order to weigh up the advantages and limitations of using 'forced choice' response formats in DCE studies.

8.3. Theoretical, methodological and empirical contributions to the literature

The early sections of the thesis present a detailed overview of the many theories used to understand well-being, however later sections of the thesis provide a more focussed investigation into Diener's theory of SWB (Diener, 1994). The most important theoretical message from Chapter 5 was support for the structure of SWB proposed by Diener's model. The fixed-effects analyses provided significant support for the suggestion that life satisfaction, positive affect and negative affect are distinct from each other. This evidence further validates this theoretical structure.

This finding also provides support for the independence of positive and negative affect as more than simply opposite poles of the same concept (Kapteyn, 2015). Positive affect was significantly related to age and support from friends, while negative affect was significantly related to chronic illness morbidity. This finding implies that the causes of a person's positive emotions may be unrelated to the causes of a person's negative emotional experiences. Consequently, improving a person's emotional well-being may involve the facilitation of happiness (positive affect) in addition to the alleviation of misery (negative affect).

The central contribution to methodology is the development of a systematically developed and thematically organised framework for measuring well-being. The Thematic Well-being Framework presented in Chapter 3 addresses the lack of detailed guidance within the literature on the differences between the many available measures of well-being. The objective of this framework is to: (1) Highlight the many measures of well-being available, (2)

outline the multitude of dimensions available within these measures, (3) provide readers with a glossary of brief descriptions for each dimension, (4) organise the measures and dimensions available on the basis of six key themes of well-being. This resource enables researchers to select measures of well-being from a large range of options, with a more in-depth awareness of the differences between the instruments.

One of the overarching empirical contributions of this thesis is an investigation into the entangled relationship between mental health and well-being. Part 1 of the thesis highlighted that well-being and mental health are frequently used synonymously (Chapter 2), mental health features within measures of well-being (Chapter 3) and theories related to mental health have influenced the development of new measures of well-being (Chapter 4). Part 2 of the thesis identified that mental health was one of the strongest predictors of SWB among a sample of middle aged and older adults in the US (Chapter 5) and that emergent adults in the UK have a significant aversion to the prospect of experiencing mental health complications in their future (Chapter 7). Together, these results provide a strong empirical basis for claims that mental health and SWB are distinct yet highly connected experiences.

8.4. Limitations

8.4.1. The lack of a concise definition of well-being

Whilst exploring the literature, there were no simple, concise definitions of well-being available. In Chapter 2, well-being was defined as 'the multidimensional quality of a person's life, which can be broadly broken down into 'subjective' and 'objective' forms'. The breadth of this definition was a useful way of

acknowledging how broad the topic of well-being has become. However one trade-off is that in an attempt to be comprehensive, definitions such as this are unable to offer precise clarity to the question of 'what does well-being actually mean?'.

If broad definitions of well-being are criticised as being too 'general', focused definitions are criticised for being too narrow in focus. As an example, of a very general definition, the Royal Society in the UK have defined well-being as 'a positive and sustainable state that allows individuals, groups or nations to thrive and flourish' (Huppert, Baylis, & Keverne, 2005) however this would be contested by those who view well-being as a dynamic process, rather than a discrete state. Definitions of well-being are relatively easy to contest while the subject continues to divide opinion; therefore a wider limitation of the topic is that it has remained resistant to definition.

One of the few widely agreed characteristics of well-being is its multidimensionality, therefore it remains important to define these dimensions and outline how they are related to each other, and the wider topic. For example, if a definition is provided for happiness, it is of limited usefulness until the authors clarify how 'happiness' fits into the wider topic of well-being. Within this thesis 'happiness' is described as one of the main components of 'positive affect', one of two emotional dimensions within the dominant model of SWB (Diener, 1994).

8.4.2. The generalisability of results yielded from western samples

A limitation that arises from the samples studied in this thesis refers to the reliance on western populations. Both samples are drawn from western

participants, who are well educated and live in industrialised rich democratic countries (the US and UK). Within the literature these samples have been described as WEIRD 'Western, Education, Industrialised, Rich and Democratic' and unrepresentative of the remaining 88% of the world's population (J. Henrich, Heine, & Norenzayan, 2010; Jones, 2010). As such, it would be an overgeneralisation to suggest that the results yielded from this thesis's empirical studies represent the determinants and preferences of people outside of the contexts studied.

The practical limitations of this PhD project made it difficult to undertake cross-cultural work. Going forward however more cross-cultural research would be beneficial. Within Chapter 5 the importance of work satisfaction, mental health and social integration for SWB was identified, however it has yet to be demonstrated whether these effects could be reproduced in countries outside of the US. Social integration may be even more important within countries that have a historically collective culture. Although cross-cultural data are not always available in existing databases, the World Values Survey is an open source of longitudinal secondary data on individuals across the globe which has collected data on well-being (Bruni & Stanca, 2006).

8.4.3. Non-systematically reviewing the literature

Both systematic and non-systematic searches of the literature were conducted as part of this thesis. Three chapters rely on systematic searches (Chapter 3, Chapter 4 and Chapter 6) while Chapter 2 includes a non-systematic literature review and Chapter 5 includes a table of evidence (Table 2) gathered through non-systematic means. One of the limitations of non-systematically searching the literature is that the insight provided may be more prone to bias (Booth,

Sutton, & Papaioannou, 2016). It should be acknowledged however that there may be many reasons to describe the literature that do not require a search to be reproducible or provide a complete picture of all of the relevant literature (F. Rowe, 2014). Expert guidance on the topic has often stressed that with respect to the purpose of the work and available resources, systematic searches are not always the most appropriate option (Booth et al., 2016).

A systematic review of all relevant literature was not required in Chapter 2 to demonstrate that there is ambiguity surrounding the definition of well-being and its related terms. Identifying every definition which has been used to describe well-being was also out of the scope of this chapter – a review of this size could arguably form an entire PhD on its own. Similarly, the empirical studies presented in Chapter 6 (Table 2) were compiled solely to highlight that: relevant studies exist, the evidence from these studies is mixed and many methodologies have been used. Practical limitations required the use of both systematic and non-systematic review methods.

8.5. Future research priorities

This thesis has proposed one framework that could better inform the way in which researchers measure well-being, however work should be undertaken to assess its usefulness. Investigating the extent to which use of the framework enables researchers to better target specific aspects of well-being would provide insight on the framework's practical value. This work would help to

refine its content of the framework, validate its structure and hopefully improve its usability. The extent to which it is possible to 'validate' a qualitative interpretation of the data however remains a difficult methodological and epistemological challenge (Jonsen & Jehn, 2009). It might nonetheless be useful to examine which themes would arise if the interpretation provided in Chapter 3 was triangulated with other interpretations of the same data.

All measures of well-being require respondents to reflect on their life and feelings with a time-period in mind, yet reviews have yet to address these differences. For instance, a person may be asked to reflect on their feelings in that immediate moment, or over a period such as two weeks or a month. Alternatively, some instruments may be interested in a person's life overall, with no explicit time reference given – with a specific rationale in mind, or because the authors of the instrument have not considered the impact of time. Each of these options involves respondents engaging in a different thought process, with differing levels of recall. Exploring these differences would provide insight into the extent to which the responses people give are sensitive to these distinctions in time.

There are numerous ways in which the empirical evidence concerning the interaction between mental health and well-being could be advanced. Within this thesis original empirical insight has been provided on the ways in which changes in mental health (Chapter 5) or the prospect of mental illness (Chapter 6) influence different forms of well-being. These studies however did not explore the extent to which mental health difficulties might challenge a person's ability to maintain a positive outlook on life and avoid negative emotional states such as anxiety and sadness. Studying this bi-directionality would help to build a more complete understanding of the dynamics of well-being.

8.6.   Conclusions

The work presented in this thesis has been conducted against a backdrop of ambiguity within the literature. This uncertainty has been evidenced within the thesis, particularly in the number of measures of well-being identified and the inconsistencies among definitions found within the literature. Within this thesis, SWB has been a useful and informative outcome for the empirical sections of the thesis, however future work should critically reflect on the dominance of this approach within studies of well-being. The empirical work presented here has highlighted the importance of factors such as social support and mental health. This evidence is not definitive, however the development of better insight into the factors important for well-being will not be possible until there is more clarity about what is meant by the term 'well-being' and how we can assess it. There is also a need to be clearer about the generalisability of effects yielded in individual empirical studies. Nonetheless, as more data becomes available and studies estimate statistical models less prone to bias a clearer picture on this topic should emerge.

It is also worth reflecting on the practical usefulness of well-being as a subject area. Beyond measuring health or income in isolation, measuring well-being prompts us to acknowledge the multiple ways in which a person's life may go 'well'. In this way, assessing well-being helps to paint a more complete and comprehensive picture of what it means for people to 'live a good life'. While self-rated well-being may not be deemed as 'objective' as other measurable concepts, it is a useful way of assessing how people perceive their own circumstances.

APPENDICES

Appendix A – Systematic search strategy used in Chapter 3

This search strategy was used to identify measures of well-being

Search strategy: MEDLINE, EMBASE, EconLit, PsycINFO, Cochrane Library and CINAHL

	Searches
1	(wellbeing or well-being).ti.
2	(wellbeing or well-being).kw.
3	1 or 2
4	Review*.ti,ab,pt.
5	3 and 4
6	limit 5 to yr="1993-2014"

Appendix B - Glossary of well-being dimensions in Chapter 3

Below is a list of the dimensions identified within measures of well-being, with their definitions (as defined by the authors).

A

Absorption: Vivid imagination, experiences of high awareness and highly responsive to stimuli.

Acceptance: Being able to accept situations and outcomes that cannot be controlled and an ability to forgive oneself and others.

Achievement: Ambition, effort, challenging tasks, persistence and hard work.

Achievement at work: How well somebody performs at work at the degree to which it is recognised.

Activation: How enthusiastic, motivated, energetic or excited a person is.

Affection: The love one gets for being who they are.

Affective suffering: Emotional aspects of depression, such as tearfulness.

Aggression: Having a confrontational temperament towards others.

Agitation: Age related anxiety, restlessness or a generally dysphoric mood.

Alcohol consumption: On average, how many units of alcohol a person is consuming.

Alienation: Feelings of being exploited, mistreated, betrayed or unlucky.

Anhedonic depression: The inability to experience pleasure from activities usually found enjoyable and low positive affect.

Anxiety: A state of mental tension, stress, worry, strain and nervousness.

Anxiety/depression: Whether an individual is extremely, severely, moderately, slightly or not at all anxious or depressed.

Anxious arousal: Feeling dizzy, shaky, faint, numb or sweaty.

Attachment: The ability to interact with others for support, contact and love.

Attitude towards aging: How an individual evaluates the age related changes occurring in their life.

Autonomy: Confidence in one's independence.

B

Bad mood: Feelings of sadness/melancholy and a possible inability engage with humour.

Behavioural confirmation: The feeling to have done "the right thing" in the eyes of relevant others.

Being at peace: A person's general sense of being at peace.

Breathing: Able to breathe normally, without shortness of breath or other difficulties.

C

Cheerfulness: Positive affectivity, in terms of being in good spirits and feeling merry.

Civic action: Citizenship and community involvement and democratic participation.

Cognition: Able to think, remember and problem solve clearly.

Comfort: The absence of physical discomforts such as pain, hunger or cold

Community and services support: Good and safe neighbourhood, available resources and other services.

Community well-being: Support provided by and to the community surrounding individual.

Competence: Ability to carry out usual activities in life.

Confusion-bewilderment: A negative mood categorised by disorientation.

Contentment: General gratification with life.

Control: A person's ability to be independent.

Creativity: Satisfaction with your ability to express yourself through hobbies or everyday activities.

D

Depression: The assessment of symptoms largely associated with depression or depressive episodes, such as: anxiety, agitation, tiredness, poor appetite and not feeling like oneself, or just general feelings of being depressed.

Depression/happiness: A continuum with feelings of depression at one end and feelings of depression at the other

Dexterity: Functional use of hands and fingers.

Discomfort and symptoms: Physical pains, aches, nausea or itching.

Distress: Feeling anxious, stressed or nervous.

Downward social comparisons: The belief that your fortune is worse than another person's.

E

Eating: Able to eat normally without help from others.

Eco-awareness: The extent to which an individual is enriched by, and or nurtures the natural physical and biological environment around them. This may include an individual feeling personally connected with nature and in awe of it.

Elimination: Problem free bladder and bowel functioning.

Emotional reaction: The extent to which things get you down, the ability to enjoy yourself and how easily you lose your temper or control.

Emotional well-being: The emotions, affects or feelings that a person has about their life, including their happiness, sadness and self-regard.

Energy level: Feelings of tiredness and running out of energy easily.

Enjoyment: Enjoyment, pleasure and fun gained from undertaken activities.

Environmental mastery: The capacity to manage effectively one's life and surrounding world.

Environmental quality of life: Satisfaction with external living conditions and having the economic resources to meet a person's needs.

Existential well-being: An overall sense of existential life satisfaction.

F

Faith/belief: Trust in god or a supreme being, and an afterlife.

Family: Quality of relationships with parents, siblings and other family members.

Fatigue-inertia: Feelings of mental and physical tiredness.

Financial distress/well-being: The stress, satisfaction, worry and limitations that arise from a person's financial position.

Financial situation: Satisfaction with one's monetary situation.

Fitness: How physically fit and energetic a person is.

Friendliness: How socially warm a person is towards others around them.

Friendships: Number and or quality of close friendships.

Fulfilment of needs: Generally how well a person's self-defined needs are being met.

Functional well-being: The ability, or inability of an individual to undertake activities of life, generally or as the result of some condition of life.

Future life satisfaction: The fulfilment that an individual anticipates later on in their life.

Future security: Thinking about the future without any concern.

G

General coping: Able to relax, see the positive light and move on when feeling stressed.

General health: How generally healthy an individual thinks they are, and not limited to physical quality of life.

Global affect: Whether an individual is calm, happy, peaceful, relaxed and enthusiastic.

Goal congruence: The extent to which a person believes they have achieved the objectives in life they have set themselves.

H

Happiness: The extent to which a person reports that they are a happy person.

Harm avoidance: Feelings of risk aversion.

Hearing: Ability to hear speech normally.

Home: Satisfaction with where you live, in terms of its physical characteristics.

Home life: Quality of the relationships with people who you live with.

Hope: A future oriented evaluation concerned with ambition and confidence concerning things that may come a person's way.

Hostility: Feelings of aggression, rage and annoyance.

House-keeping: Able to cook, clean and complete jobs around the home.

Illness: Reliance on medication, aids, treatment.

Independent living: Whether a person is able to look after yourself, complete household activities unaided, and being physically mobile.

Inner balance and biological order: How balanced a person would assess their inner state health to be.

Inner haven: The ability to tap into an inner calm, strength and peace

Intellectual wellness: The presence of activities that satisfy intellectual appetite and the energising feeling that results from this stimulation.

Interactive function (salutogenic): The interaction between an individual and their environment. This includes elements of health that are more focused on the context.

Interests/hobbies: A person's experience of sports, arts and crafts and DIY type activities.

Inter-personal functioning: Able to respond and relate well to family, friends and groups.

Intrapersonal characteristics (salutogenic): Interactions between different internal sub-systems, such as tension, energy levels and states of morale.

L

Learning: Acquisition of intellectual and practical knowledge through formal and informal forms of education.

Leisure situation: How satisfied a person is with the leisure time that they have.

Life engagement: The phenomena of being lost in a highly absorbing life activity, where time may pass more quickly and attention is highly focused.

Life meaning: How significant an individual perceives their life to be.

Life purpose and satisfaction: How satisfied a person is in themselves and their activities, and the sense of life purpose in life that they have developed as a result.

Life satisfaction: The cognitive, overall evaluation individuals make about the satisfaction they have with the life they are living.

Life satisfaction/ self-actualisation: Believing in your own spirituality, meaning and purpose.

Life/self-responsibility: Being able to set goals and make decisions.

Life-scheme: Alienation, in terms of knowing who you are, where you fit in and what your purpose is.

Lonely dissatisfaction: Feelings associated with having few social connections such as the worthiness of life and sadness.

M

Mental alertness: How well a person is able to get started, take on challenges and the effort that they put in.

Mental functions: The ability to think and remember clearly.

Mental health/symptoms: The extent to which a person is mentally healthy, or the presence of specific symptoms of mental illness.

Mobility: The ability of physical movement and ambulation.

Mood tone: Taking pleasure from life and expressing a happy and optimistic temperament.

Motivation: A loss of interest, drive and enjoyment in life.

N

Need for relatedness: The pursuit of social connectedness, both in terms of the support that a person receives and the love and care they provide for others.

Negative affect: Undesirable emotional states such as anger, anxiety, sadness and grief.

Neighbourhood: Satisfaction with your immediate local environment, including access to green spaces, exposure to crime and the services available.

Nothingness: How lost a person feels, and the extent to which their ongoing life feels aimless or empty.

Nutritional balance: The amount of fibre, fruit, vegetables or high in fat foods a person consumes.

O

Objective factors: How an individual would assess themselves against non-subjective aspects of life such as their status or what they have achieved.

Occupational functioning: Being able to carry out usually activities, specifically those such as those that are linked to paid and unpaid work (employment, school and housekeeping activities).

Optimism: The tendency to expect positive outcomes in the future, opposed to negative expectations.

P

Pain: The experience of physical bodily distresses.

Parenting: How important a person's role as a parent is to them, and how well they believe they have been raising their children.

Partner relations: Quality of intimate, romantic and sexual relationships with another.

Past life satisfaction: The degree of life satisfaction a person has experienced in the past.

Peace of mind: A peaceful life, and an understanding of its meaning.

Personal fulfilment: Feelings of balance, dignity, experiencing sexuality and the arts.

Personal growth: The process of self-development, realising your own potential and the development of either a boring or interesting life.

Personal growth and autonomy: Confidence making decisions, expressing one's self and being goal-oriented.

Personal safety: How safe an individual feels in their current environmental context.

Philosophy of life: Having a set of guiding values, goals and beliefs.

Physical activity: The extent to which a person physical exerts themselves or is involved in exercise or other high intensity activity.

Physical and mental well-being: An overlapping assessment of both physical and mental functioning, including fitness, energy, mood and self-esteem.

Physical functioning: Vigorous activities, moderate activities, lift, climb, bend, walk, bathe and dress.

Physical senses: The quality of a person's vision, hearing, communication.

Physical well-being (overall): Overall physical health/well-being.

Pleasure: The pursuit or attainment of favourable sensory stimuli, and the maximised enjoyment of experiences.

Positive affect: Positive emotions such as joy and excitement.

Positive readiness and expectancy: A sense of direction, optimism, belief that life has value and the ability to recall positive events.

Praise and Respect from others: The extent to which others recognise and acknowledge a person.

Psychological and Spiritual Well-Being: Satisfaction with self, life in general, achievement of goals, faith in a higher power and peace of mind.

Psychological well-being (eudaimonic): psychological well-being as conceptualised from the perspective of eudaimonic theory, broadly concerning the meaning an individual has in their life.

Psychological well-being (other): Psychological well-being conceptualised as sleep, feelings and pain.

Psychological well-being (overall): Overall mental, cognitive and emotional quality of life.

Psycho-social flourishing: A combination of good quality positive social relationships and living life with purpose.

Purpose in life: The presence of life goals, a direction and the belief that life has meaning.

R

Realizing life potential: How well a person is realising their deepest dreams and desires.

Recreation: A person's experience of leisurely activities.

Regret: How proud, upset, guilty or satisfied a person is when evaluating their past.

Relationship with children: Quality of the relationship you have with your children.

Relationships: The quality of person's social connections.

Relaxation: Whether or not an individual feels calm, confident and at ease.

Religious well-being: The relationship a person has to god.

Resolution and fortitude: The extent to which a person accepts responsibility for their life.

Role: Able to do all the things that make you feel valued.

Role-emotional: The extent to which feelings of sadness, anxiety or depression have limited activities or accomplishments.

Role-physical: How difficult it is to complete physical activities, and the specific limitations and time taken as a result.

S

Satisfaction of material needs: Having enough money to do the things a person wants to do.

Search for meaning: Pursing some form of significance and purpose in life.

Self-confidence during stress: The level of anxiety, frustration and fear that a person experiences when they are under pressure or in difficult situations.

Self-discovery: The depth of inner reflection and a search for meaning in life, in order to discover more about the self, grow and heal.

Self-esteem: The positive and negative feelings a person has about themselves.

Self-regard: Like and respecting yourself.

Self-acceptance: The ability to accept the good and bad qualities of yourself, personal qualities and past events.

Self-care: Ability to look after one's self.

Self-control: Whether a person is emotionally stable and in control of their actions, behaviours and thoughts.

Self-efficacy: The belief in one's capacity to overcome problems.

Self-realisation: The opportunity for an active participation in activities that make a person happy   or satisfied.

Self-satisfaction: The degree to which a person has done the things that they have wanted to do.

Sensation seeking: The pursuit of new or novel, and possibly risky experiences.

Seriousness: A frame of mind within which a person is attentive, sober and objective in their perspective, and earnest.

Sex life: Satisfaction in a person's sexual life.

Sleep: The duration and quality of sleep a person has, and how refreshed it leaves them feeling.

Social acceptance: Individuals who illustrate social acceptance trust others, think that others are capable of kindness, and believe that people can be industrious

Social actualisation: The belief in societal progression and potential for continued evolution towards greater progress.

Social and economics: Satisfaction with friends, support network, neighbourhood, home, employment, education and financial needs.

Social closeness: Sociability, socially warm and welcoming of social support.

Social coherence: The ability to make sense of the society we live in and a concern for what goes on within it.

Social commitment: The extent to which a person is committed to the solidarity, harmony, and norms of the group.

Social contribution: The belief that a person is a vital member of society, with something meaningful to contribute to the world.

Social function: The extent to which a person is able to interact in social settings with friends, family and others.

Social integration: The evaluation of the quality of a person's relationship with society and community.

Social isolation: Whether an individual has much social contact with others, any close relationships, and their feelings of loneliness.

Social potency: Enjoying social visibility, being in charge and dominance.

Social service: Pro-social behaviour towards others who would not be classed as friends or relatives.

Social/emotional support: The availability of a trusted network of people able to provide assistance and comfort.

Social well-being (overall): Overall social quality of life, in terms of a person's link to other people and society on the whole.

Somatic symptoms: Soreness, pains, faintness, aches.

Speech: Able to speak normally, without difficulties.

Spiritual fulfilment: Experiences of faith religiosity, and transcendence beyond ordinary material life.

Spiritual symptoms:Harmony, purpose, reason for living, peace of mind, productive life, peaceful, able to reach deep down into yourself for comfort.

Spiritual well-being (overall): An assessment of the overall spiritual quality of a person's life, including their spirituality, peacefulness, faith and the connection they have to some spiritual resource.

Spirituality: Finding comfort in religion or spiritual beliefs, spiritual strength and belief that a higher power looks after you.

Stability: The desire for a sense of continuity in life, in terms of friends, work and location.

Status: The social approval afforded to those with socially desired resources such as money, power and education.

Stimulation: Activation which produces arousal, including mental and sensory stimulation and physical effort.

Stress reaction: Prone to worry and guilt, tense and being easily upset.

Symptoms: A range of symptoms linked to disease conditions, including but not limited to blindness, coughing, sleep problems, and anxiety.

Symptoms of stress: How calm an individual feels, how much energy they have, and their experiences of depression, happiness and pressure.

T

Temporality and future: The presence of goals, a positive outlook on life and feelings about the future.

Traditionalism: Advocating high moral standards and traditional ideals.

Transcendental spiritual: The relationship and faith a person has with some higher power, such as god or some other transcendental idea.

Trust: Trusting in a larger plan, and a belief that things happen as they do for a reason.

U

Usual activities: Able to carry out day to day activities such as work, studying and leisure without difficulty.

V

Vacations: The ability to spend leisurely time away from home.

Vigour-Activity: Feelings of excitement, energy and alertness.

Vision: Able to see normally without difficulty.

Vitality: A person's vigour, energy and liveliness.

W

Well-being (overall): A global assessment of overall quality of life.

Work: Satisfaction with your occupation and the work that you do.

Z

Zest for life: A person's enthusiasm towards activities, other people and ideas.

Appendix C – Search terms used in Chapter 6

Below is the search strategy used to identified existing DCEs

Database: MEDLINE; Strategy:
1. "discrete choice".tw.
2. (conjoint adj1 (analys?s or measurement* or stud* or "choice experiment*")).tw.
3. "part-worth utilit*".tw.
4. "functional measurement*".tw.
5. "paired comparison*".tw.
6. "pairwise choice*".tw.
7. (stated adj1 (preference* or choice*)).tw.
8. or/1-7
9. exp animals/ not humans.sh.
10. 8 not 9
11. limit 16 to yr="2000 -Current[52]"

Database: MEDLINE(R) In-Process & Other Non-Indexed Citation; Strategy:
1. "discrete choice".tw.
2. (conjoint adj1 (analys?s or measurement* or stud* or "choice experiment*")).tw.
3. "part-worth utilit*".tw.
4. "functional measurement*".tw.
5. "paired comparison*".tw.
6. "pairwise choice*".tw.
7. (stated adj1 (preference* or choice*)).tw.
8. or/1-7
9. limit 16 to yr ="2000 –Current"

Database: EMBASE; Strategy:
1. "discrete choice".tw.
2. (conjoint adj1 (analys?s or measurement* or stud* or "choice experiment*")).tw.
3. "part-worth utilit*".tw.
4. "functional measurement*".tw.
5. "paired comparison*".tw.
6. "pairwise choice*".tw.
7. (stated adj1 (preference* or choice*)).tw.
8. or/1-7
9. exp animal/ not human/
10. 8 not 9
11. limit 16 to yr="2000 -Current"

Database: PsycINFO; Strategy:
1. "discrete choice".tw.
2. (conjoint adj1 (analys?s or measurement* or stud* or "choice experiment*")).tw.
3. "part-worth utilit*".tw.
4. "functional measurement*".tw.
5. "paired comparison*".tw.
6. "pairwise choice*".tw.
7. (stated adj1 (preference* or choice*)).tw.
8. or/1-7
9. limit 16 to yr="2000 -Current"

Database: HMIC (Health Management Information Consortium); Strategy:
1. "discrete choice".tw.
2. (conjoint adj1 (analys?s or measurement* or stud* or "choice experiment*")).tw.
3. "part-worth utilit*".tw.
4. "functional measurement*".tw.
5. "paired comparison*".tw.

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[52] Current refers to June 2016.

6. "pairwise choice*".tw.
7. (stated adj1 (preference* or choice*)).tw.
8. or/1-7
9. limit 16 to yr="2000 -Current"

Database: Web of Science; Strategy:
1. TITLE: ("discrete choice")
2. TITLE: (conjoint near/0 (analys?s or measurement* or stud* or "choice experiment*"))
3. TITLE: (part-worth utilit*)
4. TITLE: (functional measurement*)
5. TITLE: (paired comparison*)
6. TITLE: (pairwise choice*)
7. TITLE: (stated near/0 (preference* or choice*))
8. #7 OR #6 OR #5 OR #4 OR #3 OR #2 OR #1

Database: EconLit; Strategy:
1. TI "discrete choice" OR AB "discrete choice"
2. TI (conjoint N0 (analys?s or measurement* or stud* or "choice experiment*") OR AB (conjoint N0 (analys?s or measurement* or stud* or "choice experiment*")
3. TI "part-worth utilit*" OR AB "part-worth utilit*"
4. TI "functional measurement*" OR AB "functional measurement*"
5. TI "paired comparison*" OR AB "paired comparison*"
6. TI "pairwise choice*" OR AB "pairwise choice*"
7. TI (stated N0 (preference* or choice*)) OR AB (stated N0 (preference* or choice*))
8. S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7

Database: NHS EED; Strategy:
1. "discrete choice":ti or "discrete choice":ab
2. conjoint near/1 (analys?s or measurement* or stud* or "choice experiment*"):ti or conjoint near/1 (analys?s or measurement* or stud* or "choice experiment*"):ab
3. "part-worth utilit*":ti or "part-worth utilit*":ab
4. "functional measurement*":ti or "functional measurement*":ab
5. "paired comparison*":ti or "paired comparison*":ab
6. "pairwise choice*":ti or "pairwise choice*":ab
7. stated near/1 (preference* or choice*):ti or stated near/1 (preference* or choice*):ab
8. #1 or #2 or #3 or #4 or #5 or #6 or #7 in Economic Evaluations

Appendix D: The 64 attributes of well-being used within the best worst experiment

Block 1	Block 2	Block 3
Role	Self-efficacy	Work
Sex life	Cheerfulness	Self esteem
Trust	Civic action	Learning
Leisure situation	Future security	Home life
Spirituality	Interests/hobbies	Intellectual wellness
Self-care	Life satisfaction	Life engagement
Self-control	Behavioural confirmation	Social commitment
Attachment	Realizing life potential	Social integration
Usual activities	Search for meaning	Purpose in life
Block 4	**Block 5**	**Block 6**
Community well-being	Pain	Social coherence
Comfort	Physical activity	Creativity
Relaxation	Life meaning	Mental health/symptoms
Partner relations	Energy level	Fitness
Acceptance	Pleasure	Enjoyment
Optimism	Family	Status
Activation	Praise and respect from others	Friendliness
Affection	Home	Friendships
Eco-awareness	Social isolation	Community
Block 7	**Block 8**	
Physical senses	Future life satisfaction	
Self-regard	financial situation	
Downward social comparisons	Cognition	
Mobility	Control	
Emotional well-being	Mental alertness	
Social contribution	Goal congruence	
Sensation seeking	Negative affect	
Anxiety	Need for relatedness	
Neighbourhood	Sleep	

Appendix E: Example set of Best-worst experiment scenarios:

Participants were presented with the following Best-worst scenarios and asked to select the most and least important things for their well-being. In this study, the least important factors were not examined.

PLEASE SELECT FOR EACH SCENARIO ONLY "ONE MOST IMPORTANT" & "ONE LEAST IMPORTANT" ASPECT THAT WOULD IMPROVE YOUR WELL-BEING IN GENERAL BY PUTTING AN X IN EACH COLUMN

Scenario 0

Most important		Least important
	Aspect 1	X
X	Aspect 2	
	Aspect 3	
	Aspect 4	

SCENARIO 1

Most important		Least important
	Civic action *Citizenship and community involvement*	
	Alienation *Feelings of being exploited, mistreated, betrayed or unlucky*	
	Realizing life potential *How well you are realising your aspirations*	
	Future security *Thinking about the future without any concern*	

SCENARIO 2

Most important		Least important
	Search for meaning *Pursing some form of significance and purpose in life*	
	Future security *Thinking about the future without any concern*	
	Cheerfulness *Being in good spirits and feeling merry*	
	Interests/Hobbies *Participation in sports, arts and crafts and DIY type activities*	

SCENARIO 3

Most important		Least important
	Alienation *Feelings of being exploited, mistreated, betrayed or unlucky*	
	Interests/Hobbies *Participation in sports, arts and crafts and DIY type activities*	
	Search for meaning *Pursing some form of significance and purpose in life*	
	Cheerfulness *Being in good spirits and feeling merry*	

SCENARIO 4

Most important		Least important
	Realizing life potential *How well you are realising your aspirations*	
	Behavioural confirmation *The feeling to have done ''the right thing'' in the eyes of others*	
	Interests/Hobbies *Participation in sports, arts and crafts and DIY type activities*	
	Search for meaning *Pursing some form of significance and purpose in life*	

SCENARIO 5

Most important		Least important
	Self-efficacy *The belief in one's capacity to overcome problems*	
	Search for meaning *Pursing some form of significance and purpose in life*	
	Behavioural confirmation *The feeling to have done ''the right thing'' in the eyes of others*	
	Alienation *Feelings of being exploited, mistreated, betrayed or unlucky*	

SCENARIO 6

Most important		Least important
	Future security *Thinking about the future without any concern*	
	Cheerfulness *Being in good spirits and feeling merry*	
	Self-efficacy *The belief in one's capacity to overcome problems*	
	Civic action *Citizenship and community involvement*	

SCENARIO 7

Most important		Least important
	Interests/Hobbies *Participation in sports, arts and crafts and DIY type activities*	
	Self-efficacy *The belief in one's capacity to overcome problems*	
	Civic action *Citizenship and community involvement*	
	Realizing life potential *How well you are realising your aspirations*	

SCENARIO 8

Most important		Least important
	Behavioural confirmation *The feeling to have done ''the right thing'' in the eyes of others*	
	Realizing life potential *How well you are realising your aspirations*	
	Future security *Thinking about the future without any concern*	
	Self-efficacy *The belief in one's capacity to overcome problems*	

SCENARIO 9

Most important		Least important
	Cheerfulness *Being in good spirits and feeling merry*	
	Civic action *Citizenship and community involvement*	
	Alienation *Feelings of being exploited, mistreated, betrayed or unlucky*	
	Behavioural confirmation *The feeling to have done ''the right thing'' in the eyes of others*	

Appendix F: Results from the best worst experiment

These results indicate which of the dimensions were the 'most important' for well-being among participants in the target population. Dimensions with the highest frequencies were the most selected options within the blocks[53].

BLOCK 1	Freq.	Percent	Cum.
Trust	24	5.71	5.71
Self-care	40	9.52	15.24
Attachment	92	21.9	37.14
Leisure	21	5	42.14
Usual activities	68	16.19	58.33
Sex life	7	1.67	60
Spirituality	10	2.38	62.38
Role	52	12.38	74.76
Self-control	106	25.24	100

BLOCK 2	Freq.	Percent	Cum.
Self-efficacy	58	13.71	13.71
Interests/Hobbies	36	8.51	22.22
Behavioural confirmation	25	5.91	28.13
Cheerfulness	111	26.24	54.37
Search for meaning	44	10.4	64.78
Alienation	4	0.95	65.72
Realizing life potential	67	15.84	81.56
Civic action	6	1.42	82.98
Future security	72	17.02	100

BLOCK 3	Freq.	Percent	Cum.
Learning	26	6.15	6.15
Life engagement*	103	24.35	30.5
Social integration	39	9.22	39.72
Home life	64	15.13	54.85
Self-esteem	98	23.17	78.01
Intellectual wellness	18	4.26	82.27
Social commitment	20	4.73	87
Work	43	10.17	97.16
Purpose in life	12	2.84	100
Note: * = This dimension was selected as an attribute for use in the DCE			

[53] All the attributes were independent by row and column and all participants answered both blocks. This means that the overall frequency of choice of each attribute is a valid estimate of the preference ranking of the attributes given that all the attributes appear the same number of times and the attributes are as likely to appear with one another across blocks.

BLOCK 4	Freq.	Percent	Cum.
Community well-being	6	1.6	1.6
Acceptance	37	9.84	11.44
Activation	60	15.96	27.39
Comfort	49	13.03	40.43
Eco-awareness	9	2.39	42.82
Optimism	30	7.98	50.8
Affection	77	20.48	71.28
Relaxation	57	15.16	86.44
Partner relations	51	13.56	100

BLOCK 5	Freq.	Percent	Cum.
Life meaning	41	10.9	10.9
Family*	84	22.34	33.24
Home	15	3.99	37.23
Energy level	36	9.57	46.81
Social isolation	71	18.88	65.69
Physical activity	13	3.46	69.15
Pleasure	68	18.09	87.23
Pain	11	2.93	90.16
Praise and respect from others	37	9.84	100

Note: * = This dimension was selected as an attribute for use in the DCE

BLOCK 6	Freq.	Percent	Cum.
Mental illness*	101	26.86	26.86
Status	14	3.72	30.59
Friendships	95	25.27	55.85
Fitness	18	4.79	60.64
Community	15	3.99	64.63
Creativity	22	5.85	70.48
Enjoyment	56	14.89	85.37
Social coherence	22	5.85	91.22
Friendliness	33	8.78	100

Note: * = This dimension was selected as an attribute for use in the DCE

BLOCK 7	Freq.	Percent	Cum.
Physical senses	44	11.7	11.7
Emotional well-being	129	34.31	46.01
Sensation seeking	30	7.98	53.99
Self-regard	42	11.17	65.16
Neighbourhood	9	2.39	67.55
Social contribution	18	4.79	72.34
Anxiety	49	13.03	85.37
Downward social comparisons	7	1.86	87.23
Mobility	48	12.77	100

BLOCK 8	Freq.	Percent	Cum.
Cognition	48	12.77	12.77
Goal congruence	43	11.44	24.2
Need for relatedness	60	15.96	40.16
Control*	51	13.56	53.72
Sleep	25	6.65	60.37
Financial situation	25	6.65	67.02
Mental alertness	15	3.99	71.01
Contentment	94	25	96.01
Regret	15	3.99	100
Note: * = This dimension was selected as an attribute for use in the DCE			

Appendix G – Pilot study DCE survey

Next we will be asking you about your preferences

First we present *two practice exercises* in order to familiarise you with the format of the questions in this section

Instructions: Please put a tick ✓ under the travel option that you would prefer on your way to a friend's house, or indicate (choice C) if you do not want either of the available choices

WARM UP EXERCISE 1

Choice A	Choice B	Choice C
60 mins	20 mins	
£3.00	£10.00	**I do not want** A or B
Scenic route	Non-scenic route	
Not guaranteed a seat	Guaranteed a seat	

WHAT WOULD YOU CHOOSE?

Choice A ☐	Choice B ☐	Choice C ☐

****

WARM UP EXERCISE 2

Choice A	Choice B	Choice C
60 mins	20 mins	
£3.00	£10.00	**I do not want** A or B
Non-scenic route	Scenic route	
Guaranteed a seat	Not guaranteed a seat	

WHAT WOULD YOU CHOOSE?

Choice A ☐	Choice B ☐	Choice C ☐

The following hypothetical scenarios reflect what your life could be like in **10 years' time**. Please put a ✓ in the box to indicate **the life that you would be most satisfied with**. Take your time and think about your answers.

SCENARIO 1

Choice A	Choice B	Choice C
Supportive relationship with immediate family	*Unsupportive* relationship with immediate family	
The presence of a mental health condition	*The presence* of a mental health condition	**I do not want** A or B
Feeling that you are *not in control* of your life	Feeling that you are *in control* of your life	
Engaged in personally meaningful work and/or non-work activities	*Not engaged* in personally meaningful work and/or non-work activities	
Annual salary *£56,000*	Annual salary *£14,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐   Choice B ☐   Choice C ☐

SCENARIO 2

Choice A	Choice B	Choice C
Unsupportive relationship with immediate family	*Unsupportive* relationship with immediate family	
The presence of a mental health condition	*The absence* of a mental health condition	**I do not want** A or B
Feeling that you are *in control* of your life	Feeling that you are *not in control* of your life	
Not engaged in personally meaningful work and/or non-work activities	*Engaged* in personally meaningful work and/or non-work activities	
Annual salary *£56,000*	Annual salary *£84,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐   Choice B ☐   Choice C ☐

SCENARIO 3

Choice A	Choice B	Choice C
Supportive relationship with immediate family	*Unsupportive* relationship with immediate family	
The presence of a mental health condition	*The presence* of a mental health condition	
Feeling that you are *not in control* of your life	Feeling that you are *in control* of your life	**I do not want** A or B
Engaged in personally meaningful work and/or non-work activities	*Not engaged* in personally meaningful work and/or non-work activities	
Annual salary *£56,000*	Annual salary *£14,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐   **Choice B** ☐   **Choice C** ☐

SCENARIO 4

Choice A	Choice B	Choice C
Supportive relationship with immediate family	*Supportive* relationship with immediate family	
The absence of a mental health condition	*The presence* of a mental health condition	
Feeling that you are *in control* of your life	Feeling that you are *not in control* of your life	**I do not want** A or B
Not engaged in personally meaningful work and/or non-work activities	*Engaged* in personally meaningful work and/or non-work activities	
Annual salary *£84,000*	Annual salary *£14,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐   **Choice B** ☐   **Choice C** ☐

SCENARIO 5

Choice A	Choice B	Choice C
Unsupportive relationship with immediate family	*Supportive* relationship with immediate family	
The absence of a mental health condition	*The absence* of a mental health condition	
Feeling that you are *not in control* of your life	Feeling that you are *in control* of your life	**I do not want** A or B
Not engaged in personally meaningful work and/or non-work activities	*Engaged* in personally meaningful work and/or non-work activities	
Annual salary *£56,000*	Annual salary *£14,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	**Choice B** ☐	**Choice C** ☐

SCENARIO 6

Choice A	Choice B	Choice C
Supportive relationship with immediate family	*Supportive* relationship with immediate family	
The absence of a mental health condition	*The presence* of a mental health condition	
Feeling that you are *in control* of your life	Feeling that you are *not in control* of your life	**I do not want** A or B
Engaged in personally meaningful work and/or non-work activities	*Not engaged* in personally meaningful work and/or non-work activities	
Annual salary *£56,000*	Annual salary *£28,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	**Choice B** ☐	**Choice C** ☐

SCENARIO 7

Choice A	Choice B	Choice C
Supportive relationship with immediate family	*Unsupportive* relationship with immediate family	
The absence of a mental health condition	*The presence* of a mental health condition	**I do not want** A or B
Feeling that you are *in control* of your life	Feeling that you are *in control* of your life	
Not engaged in personally meaningful work and/or non-work activities	*Engaged* in personally meaningful work and/or non-work activities	
Annual salary *£28,000*	Annual salary *£84,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	**Choice B** ☐	**Choice C** ☐

SCENARIO 8

Choice A	Choice B	Choice C
Unsupportive relationship with immediate family	*Supportive* relationship with immediate family	
The absence of a mental health condition	*The presence* of a mental health condition	**I do not want** A or B
Feeling that you are *not in control* of your life	Feeling that you are *not in control* of your life	
Engaged in personally meaningful work and/or non-work activities	*Not engaged* in personally meaningful work and/or non-work activities	
Annual salary *£28,000*	Annual salary *£84,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	**Choice B** ☐	**Choice C** ☐

Appendix H – Pilot study results (logistic regression)

	Coef.	Std. Err.	P	Lower 95% CI	Upper 95% CI
Support from family	1.887	.323	0	1.253	2.522
Mental illness	-2.140	.506	0	-3.132	-1.148
Control	1.277	.486	.009	.323	2.230
Meaningful activities	.908	.313	.004	.294	1.522
Annual Salary	.031	.008	0	.015	.045
Observations	168				

Appendix I – Pilot study exit interview questions

How did you find the experiment?

Did you struggle at any stage or struggle to make sense of the scenarios?

Were the attributes appropriate for you?

Appendix J – Table of the 32 scenarios (2 block design) used in the experiments

Scenarios	Choice A					Choice B					Choice C
	Family	Mental illness	Control	Meaningful activities	Income (£)	Family	Mental illness	Control	Meaningful activities	Income (£)	I do not want either
Scenario 1A	Supportive	Presence of	Not in control	Engaged	14,000	Unsupportive	Absence of	In control	Not engaged	14,000	Opt out
Scenario 2A	Unsupportive	Absence of	In control	Engaged	28,000	Supportive	Absence of	In control	Engaged	84,000	Opt out
Scenario 3A	Supportive	Presence of	Not in control	Engaged	84,000	Unsupportive	Absence of	In control	Not engaged	84,000	Opt out
Scenario 4A	Unsupportive	Absence of	Not in control	Not engaged	56,000	Supportive	Absence of	Not in control	Engaged	28,000	Opt out
Scenario 5A	Supportive	Presence of	Not in control	Not engaged	28,000	Unsupportive	Absence of	In control	Engaged	28,000	Opt out
Scenario 6A	Supportive	Presence of	Not in control	Engaged	28,000	Unsupportive	Presence of	In control	Engaged	14,000	Opt out
Scenario 7A	Supportive	Absence of	In control	Engaged	56,000	Unsupportive	Presence of	Not in control	Engaged	56,000	Opt out
Scenario 8A	Unsupportive	Absence of	In control	Engaged	14,000	Unsupportive	Presence of	Not in control	Engaged	56,000	Opt out
Scenario 9A	Supportive	Absence of	Not in control	Not engaged	14,000	Unsupportive	Absence of	Not in control	Not engaged	28,000	Opt out
Scenario 10A	Supportive	Presence of	In control	Engaged	56,000	Supportive	Presence of	In control	Engaged	28,000	Opt out
Scenario 11A	Supportive	Absence of	In control	Not engaged	84,000	Unsupportive	Presence of	Not in control	Not engaged	84,000	Opt out
Scenario 12A	Supportive	Absence of	In control	Not engaged	14,000	Supportive	Absence of	In control	Not engaged	56,000	Opt out
Scenario 13A	Unsupportive	Presence of	In control	Not engaged	28,000	Unsupportive	Presence of	Not in control	Not engaged	14,000	Opt out
Scenario 14A	Supportive	Absence of	In control	Not engaged	14,000	Unsupportive	Presence of	Not in control	Not engaged	14,000	Opt out
Scenario 15A	Supportive	Presence of	Not in control	Not engaged	28,000	Supportive	Absence of	Not in control	Not engaged	84,000	Opt out
Scenario 16A	Unsupportive	Presence of	In control	Engaged	56,000	Supportive	Presence of	Not in control	Engaged	84,000	Opt out
Scenario 1B	Unsupportive	Absence of	In control	Not engaged	56,000	Supportive	Presence of	Not in control	Not engaged	56,000	Opt out
Scenario 2B	Supportive	Presence of	Not in control	Engaged	28,000	Unsupportive	Presence of	In control	Engaged	84,000	Opt out
Scenario 3B	Supportive	Presence of	In control	Not engaged	56,000	Unsupportive	Absence of	Not in control	Not engaged	56,000	Opt out
Scenario 4B	Supportive	Absence of	Not in control	Not engaged	28,000	Unsupportive	Presence of	In control	Not engaged	28,000	Opt out
Scenario 5B	Supportive	Absence of	In control	Engaged	28,000	Unsupportive	Presence of	Not in control	Engaged	28,000	Opt out
Scenario 6B	Supportive	Presence of	Not in control	Engaged	14,000	Unsupportive	Presence of	Not in control	Engaged	56,000	Opt out
Scenario 7B	Unsupportive	Absence of	Not in control	Not engaged	84,000	Supportive	Presence of	In control	Not engaged	84,000	Opt out
Scenario 8B	Supportive	Absence of	Not in control	Engaged	56,000	Supportive	Absence of	In control	Engaged	84,000	Opt out
Scenario 9B	Supportive	Absence of	Not in control	Engaged	14,000	Unsupportive	Presence of	In control	Engaged	14,000	Opt out
Scenario 10B	Unsupportive	Presence of	In control	Not engaged	84,000	Supportive	Absence of	Not in control	Not engaged	84,000	Opt out
Scenario 11B	Supportive	Presence of	In control	Engaged	14,000	Unsupportive	Absence of	Not in control	Engaged	14,000	Opt out
Scenario 12B	Supportive	Absence of	In control	Not engaged	14,000	Supportive	Absence of	In control	Not engaged	28,000	Opt out
Scenario 13B	Unsupportive	Presence of	In control	Engaged	56,000	Supportive	Absence of	Not in control	Engaged	56,000	Opt out
Scenario 14B	Unsupportive	Presence of	Not in control	Not engaged	84,000	Unsupportive	Presence of	Not in control	Not engaged	14,000	Opt out
Scenario 15B	Supportive	Presence of	In control	Not engaged	28,000	Unsupportive	Absence of	Not in control	Not engaged	28,000	Opt out
Scenario 16B	Unsupportive	Presence of	In control	Not engaged	56,000	Unsupportive	Absence of	In control	Not engaged	84,000	Opt out

BACKGROUND INFORMATION

1. How old are you?

_____

2. What is your ethnic group?

White/White British/ White other ☐
Black/Black British/Black other ☐
Asian/Asian British/Asian other ☐
Mixed/Multiple ethnic groups ☐
Other (please state below):

_____

3. What are the first 3 letters of the postcode where you grew up?

(if multiple state the one where you spent the most time)

_____

4. What is your current housing situation?

Halls of residence ☐
Rented house ☐
Living with parents ☐
Owned/mortgaged house ☐
Other (please state below): ☐

_____

5. What is your relationship status?

Single ☐
In a relationship/dating ☐
Married ☐
Rather not say ☐

6. Do you have a student loan?

Yes ☐
No ☐
Rather not say ☐

ASPECTS OF YOUR LIFE

7. How would you rate your *personal* financial situation?

Excellent ☐
Very good ☐
Good ☐
Fair ☐
Poor ☐

8. How would you rate your *family's* financial situation?

Excellent ☐
Very good ☐
Good ☐
Fair ☐
Poor ☐

9. In general, how is your *physical health?*

Poor ☐
Fair ☐
Good ☐
Very good ☐
Excellent ☐

10. In general, how is your *mental health?*

Excellent ☐
Very good ☐
Good ☐
Fair ☐
Poor ☐

11. How would you rate your *romantic life*?

Excellent ☐
Very good ☐
Good ☐
Fair ☐
Poor ☐

12. How would you rate your *graduate prospects*?

Poor ☐
Fair ☐
Good ☐
Very good ☐
Excellent ☐

13. How would you rate your *social life*?

Excellent ☐
Very good ☐
Good ☐
Fair ☐
Poor ☐

HEALTH RELATED BEHAVIOURS

One pint of beer/larger/ cider (2 units)	One alcopop or can of larger (1.5 units)	One regular glass of wine (175ml) (2 units)	One single measure of spirit (1 unit)	One bottle of wine (9 units)

14. How often do you have a drink containing alcohol?

Never ☐
Once a month ☐
Once a week ☐
2 to 3 times a week ☐
4 or more times a week ☐

15. How many alcohol units do you have on a typical day when you are drinking?

_____

16. How often do you exercise?

Almost every day ☐
Three times a week ☐
Once a week ☐
Once a month ☐
Never ☐

17. How often do you cook with fresh ingredients for yourself?

Never ☐
Once a month ☐
Once a week ☐
Every other day ☐
Every day ☐
Multiple times a day ☐

18. Thinking about your life in the last five years, are you generally more or less satisfied with your life?

Much more satisfied	Somewhat more satisfied	No change	Somewhat less satisfied	Much less satisfied
☐	☐	☐	☐	☐

Instructions: Please put a tick ✓ in the box next to the answer of your choice.

WARMING UP EXERCISE 1

Choice A	Choice B	Choice C
60 mins	20 mins	
£3.00	£10.00	**I do not want either**
Scenic route	Non-scenic route	A or B choices
No guaranteed a seat	Guaranteed a seat	

WHAT WOULD YOU CHOOSE?

Choice A ☐	Choice B ☐	Choice C ☐

****

WARMING UP EXERCISE 2

Choice A	Choice B	Choice C
60 mins	20 mins	
£3.00	£10.00	**I do not want either**
Non-scenic route	Scenic route	A or B choices
Guaranteed a seat	No guaranteed a seat	

WHAT WOULD YOU CHOOSE?

Choice A ☐	Choice B ☐	Choice C ☐

PLEASE TAKE YOUR TIME AND BE SURE TO READ THE SCENARIOS ON THE FOLLOWING PAGE CAREFULLY AND IN FULL

The following hypothetical scenarios reflect what your life could be like in **10 years' time**.
Please put a ✓ in the box to indicate **the life that you would be most satisfied with**.
Take your time and think about your answers.

SCENARIO 1

Choice A	Choice B	Choice C
Supportive relationship with immediate family	***Unsupportive*** relationship with immediate family	
The presence of a mental health condition	***The absence*** of a mental health condition	**I do not want either** A or B choices
Feeling that you are ***not in control*** of your life	Feeling that you are ***in control*** of your life	
Engaged in personally meaningful work and/or non-work activities	***Not engaged*** in personally meaningful work and/or non-work activities	
Annual salary ***£14,000***	Annual salary ***£14,000***	

WHAT WOULD YOU CHOOSE?

Choice A ☐	**Choice B** ☐	**Choice C** ☐

SCENARIO 2

Choice A	Choice B	Choice C
Unsupportive relationship with immediate family	***Supportive*** relationship with immediate family	
The absence of a mental health condition	***The absence*** of a mental health condition	**I do not want either** A or B choices
Feeling that you are ***in control*** of your life	Feeling that you are ***in control*** of your life	
Engaged in personally meaningful work and/or non-work activities	***Engaged*** in personally meaningful work and/or non-work activities	
Annual salary ***£28,000***	Annual salary ***£84,000***	

WHAT WOULD YOU CHOOSE?

Choice A ☐	**Choice B** ☐	**Choice C** ☐

SCENARIO 3

Choice A	Choice B	Choice C
Supportive relationship with immediate family	*Unsupportive* relationship with immediate family	
The presence of a mental health condition	*The absence* of a mental health condition	**I do not want either**
Feeling that you are *not in control* of your life	Feeling that you are *in control* of your life	A or B choices
Engaged in personally meaningful work and/or non-work activities	*Not engaged* in personally meaningful work and/or non-work activities	
Annual salary *£84,000*	Annual salary *£84,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	**Choice B** ☐	**Choice C** ☐

SCENARIO 4

Choice A	Choice B	Choice C
Unsupportive relationship with immediate family	*Supportive* relationship with immediate family	
The absence of a mental health condition	*The absence* of a mental health condition	**I do not want either**
Feeling that you are *not in control* of your life	Feeling that you are *not in control* of your life	A or B choices
Not engaged in personally meaningful work and/or non-work activities	*Engaged* in personally meaningful work and/or non-work activities	
Annual salary *£56,000*	Annual salary *£28,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	**Choice B** ☐	**Choice C** ☐

SCENARIO 5

Choice A	Choice B	Choice C
Supportive relationship with immediate family	*Unsupportive* relationship with immediate family	
The presence of a mental health condition	*The absence* of a mental health condition	**I do not want either**
Feeling that you are *not in control* of your life	Feeling that you are *in control* of your life	A or B choices
Not engaged in personally meaningful work and/or non-work activities	*Engaged* in personally meaningful work and/or non-work activities	
Annual salary *£28,000*	Annual salary *£28,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	**Choice B** ☐	**Choice C** ☐

SCENARIO 6

Choice A	Choice B	Choice C
Unsupportive relationship with immediate family	*Unsupportive* relationship with immediate family	
The presence of a mental health condition	*The presence* of a mental health condition	**I do not want either**
Feeling that you are *not in control* of your life	Feeling that you are *in control* of your life	A or B choices
Engaged in personally meaningful work and/or non-work activities	*Engaged* in personally meaningful work and/or non-work activities	
Annual salary *£28,000*	Annual salary *£14,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	**Choice B** ☐	**Choice C** ☐

SCENARIO 7

Choice A	Choice B	Choice C
Supportive relationship with immediate family	*Unsupportive* relationship with immediate family	
The absence of a mental health condition	*The presence* of a mental health condition	**I do not want either** A or B choices
Feeling that you are *in control* of your life	Feeling that you are *not in control* of your life	
Not engaged in personally meaningful work and/or non-work activities	*Engaged* in personally meaningful work and/or non-work activities	
Annual salary *£56,000*	Annual salary *£56,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	Choice B ☐	Choice C ☐

SCENARIO 8

Choice A	Choice B	Choice C
Unsupportive relationship with immediate family	*Unsupportive* relationship with immediate family	
The absence of a mental health condition	*The presence* of a mental health condition	**I do not want either** A or B choices
Feeling that you are *in control* of your life	Feeling that you are *not in control* of your life	
Not engaged in personally meaningful work and/or non-work activities	*Engaged* in personally meaningful work and/or non-work activities	
Annual salary *£14,000*	Annual salary *£56,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	Choice B ☐	Choice C ☐

SCENARIO 9

Choice A	Choice B	Choice C
Supportive relationship with immediate family	*Unsupportive* relationship with immediate family	
The absence of a mental health condition	*The absence* of a mental health condition	**I do not want either**
Feeling that you are *not in control* of your life	Feeling that you are *not in control* of your life	A or B choices
Not engaged in personally meaningful work and/or non-work activities	*Not engaged* in personally meaningful work and/or non-work activities	
Annual salary *£14,000*	Annual salary *£28,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	**Choice B** ☐	**Choice C** ☐

SCENARIO 10

Choice A	Choice B	Choice C
Supportive relationship with immediate family	*Supportive* relationship with immediate family	
The presence of a mental health condition	*The presence* of a mental health condition	**I do not want either**
Feeling that you are *in control* of your life	Feeling that you are *in control* of your life	A or B choices
Engaged in personally meaningful work and/or non-work activities	*Engaged* in personally meaningful work and/or non-work activities	
Annual salary *£56,000*	Annual salary *£28,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	**Choice B** ☐	**Choice C** ☐

SCENARIO 11

Choice A	Choice B	Choice C
Supportive relationship with immediate family	**Unsupportive** relationship with immediate family	
The absence of a mental health condition	**The presence** of a mental health condition	**I do not want either** A or B choices
Feeling that you are **in control** of your life	Feeling that you are **not in control** of your life	
Engaged in personally meaningful work and/or non-work activities	**Not engaged** in personally meaningful work and/or non-work activities	
Annual salary **£84,000**	Annual salary **£84,000**	

WHAT WOULD YOU CHOOSE?

Choice A ☐	Choice B ☐	Choice C ☐

SCENARIO 12

Choice A	Choice B	Choice C
Supportive relationship with immediate family	**Supportive** relationship with immediate family	
The absence of a mental health condition	**The absence** of a mental health condition	**I do not want either** A or B choices
Feeling that you are **in control** of your life	Feeling that you are **in control** of your life	
Engaged in personally meaningful work and/or non-work activities	**Not engaged** in personally meaningful work and/or non-work activities	
Annual salary **£14,000**	Annual salary **£56,000**	

WHAT WOULD YOU CHOOSE?

Choice A ☐	Choice B ☐	Choice C ☐

SCENARIO 13

Choice A	Choice B	Choice C
Unsupportive relationship with immediate family	*Unsupportive* relationship with immediate family	
The presence of a mental health condition	*The presence* of a mental health condition	**I do not want either** A or B choices
Feeling that you are *in control* of your life	Feeling that you are *not in control* of your life	
Not engaged in personally meaningful work and/or non-work activities	*Not engaged* in personally meaningful work and/or non-work activities	
Annual salary *£28,000*	Annual salary *£14,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐   **Choice B** ☐   **Choice C** ☐

SCENARIO 14

Choice A	Choice B	Choice C
Supportive relationship with immediate family	*Unsupportive* relationship with immediate family	
The absence of a mental health condition	*The presence* of a mental health condition	**I do not want either** A or B choices
Feeling that you are *in control* of your life	Feeling that you are *not in control* of your life	
Engaged in personally meaningful work and/or non-work activities	*Not engaged* in personally meaningful work and/or non-work activities	
Annual salary *£14,000*	Annual salary *£14,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐   **Choice B** ☐   **Choice C** ☐

SCENARIO 15

Choice A	Choice B	Choice C
Supportive relationship with immediate family	*Supportive* relationship with immediate family	
The presence of a mental health condition	*The absence* of a mental health condition	**I do not want either**
Feeling that you are *not in control* of your life	Feeling that you are *not in control* of your life	A or B choices
Not engaged in personally meaningful work and/or non-work activities	*Not engaged* in personally meaningful work and/or non-work activities	
Annual salary *£28,000*	Annual salary *£84,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐   **Choice B** ☐   **Choice C** ☐

SCENARIO 16

Choice A	Choice B	Choice C
Unsupportive relationship with immediate family	*Supportive* relationship with immediate family	
The presence of a mental health condition	*The presence* of a mental health condition	**I do not want either**
Feeling that you are *in control* of your life	Feeling that you are *not in control* of your life	A or B choices
Not engaged in personally meaningful work and/or non-work activities	*Engaged* in personally meaningful work and/or non-work activities	
Annual salary *£56,000*	Annual salary *£84,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐   **Choice B** ☐   **Choice C** ☐

SCENARIO 17

Choice A	Choice B	Choice C
Unsupportive relationship with immediate family	*Supportive* relationship with immediate family	
The absence of a mental health condition	*The presence* of a mental health condition	
Feeling that you are *in control* of your life	Feeling that you are *not in control* of your life	**I do not want either** A or B choices
Engaged in personally meaningful work and/or non-work activities	*Not engaged* in personally meaningful work and/or non-work activities	
Annual salary *£56,000*	Annual salary *£56,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	**Choice B** ☐	**Choice C** ☐

SCENARIO 18

Choice A	Choice B	Choice C
Supportive relationship with immediate family	*Unsupportive* relationship with immediate family	
The presence of a mental health condition	*The presence* of a mental health condition	
Feeling that you are *not in control* of your life	Feeling that you are *in control* of your life	**I do not want either** A or B choices
Not engaged in personally meaningful work and/or non-work activities	*Engaged* in personally meaningful work and/or non-work activities	
Annual salary *£28,000*	Annual salary *£84,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	**Choice B** ☐	**Choice C** ☐

SCENARIO 19

Choice A	Choice B	Choice C
Supportive relationship with immediate family	*Unsupportive* relationship with immediate family	
The presence of a mental health condition	*The absence* of a mental health condition	**I do not want either**
Feeling that you are *in control* of your life	Feeling that you are *not in control* of your life	A or B choices
Engaged in personally meaningful work and/or non-work activities	*Not engaged* in personally meaningful work and/or non-work activities	
Annual salary *£56,000*	Annual salary *£56,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	Choice B ☐	Choice C ☐

SCENARIO 20

Choice A	Choice B	Choice C
Supportive relationship with immediate family	*Unsupportive* relationship with immediate family	
The absence of a mental health condition	*The presence* of a mental health condition	**I do not want either**
Feeling that you are *not in control* of your life	Feeling that you are *in control* of your life	A or B choices
Engaged in personally meaningful work and/or non-work activities	*Not engaged* in personally meaningful work and/or non-work activities	
Annual salary *£28,000*	Annual salary *£28,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	Choice B ☐	Choice C ☐

SCENARIO 21

Choice A	Choice B	Choice C
Supportive relationship with immediate family	*Unsupportive* relationship with immediate family	
The absence of a mental health condition	*The presence* of a mental health condition	
Feeling that you are *in control* of your life	Feeling that you are *not in control* of your life	**I do not want either** A or B choices
Not engaged in personally meaningful work and/or non-work activities	*Engaged* in personally meaningful work and/or non-work activities	
Annual salary *£28,000*	Annual salary *£28,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	**Choice B** ☐	**Choice C** ☐

SCENARIO 22

Choice A	Choice B	Choice C
Supportive relationship with immediate family	*Unsupportive* relationship with immediate family	
The presence of a mental health condition	*The presence* of a mental health condition	
Feeling that you are *not in control* of your life	Feeling that you are *not in control* of your life	**I do not want either** A or B choices
Engaged in personally meaningful work and/or non-work activities	*Engaged* in personally meaningful work and/or non-work activities	
Annual salary *£14,000*	Annual salary *£56,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	**Choice B** ☐	**Choice C** ☐

SCENARIO 23

Choice A	Choice B	Choice C
Unsupportive relationship with immediate family	*Supportive* relationship with immediate family	
The absence of a mental health condition	*The presence* of a mental health condition	**I do not want either** A or B choices
Feeling that you are *not in control* of your life	Feeling that you are *in control* of your life	
Engaged in personally meaningful work and/or non-work activities	*Not engaged* in personally meaningful work and/or non-work activities	
Annual salary *£84,000*	Annual salary *£84,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	**Choice B** ☐	**Choice C** ☐

SCENARIO 24

Choice A	Choice B	Choice C
Supportive relationship with immediate family	*Supportive* relationship with immediate family	
The absence of a mental health condition	*The absence* of a mental health condition	**I do not want either** A or B choices
Feeling that you are *not in control* of your life	Feeling that you are *in control* of your life	
Engaged in personally meaningful work and/or non-work activities	*Engaged* in personally meaningful work and/or non-work activities	
Annual salary *£56,000*	Annual salary *£84,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	**Choice B** ☐	**Choice C** ☐

SCENARIO 25

Choice A	Choice B	Choice C
Supportive relationship with immediate family	*Unsupportive* relationship with immediate family	
The absence of a mental health condition	*The presence* of a mental health condition	**I do not want either** A or B choices
Feeling that you are *not in control* of your life	Feeling that you are *in control* of your life	
Not engaged in personally meaningful work and/or non-work activities	*Engaged* in personally meaningful work and/or non-work activities	
Annual salary *£14,000*	Annual salary *£14,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	Choice B ☐	Choice C ☐

SCENARIO 26

Choice A	Choice B	Choice C
Unsupportive relationship with immediate family	*Supportive* relationship with immediate family	
The presence of a mental health condition	*The absence* of a mental health condition	**I do not want either** A or B choices
Feeling that you are *in control* of your life	Feeling that you are *not in control* of your life	
Engaged in personally meaningful work and/or non-work activities	*Not engaged* in personally meaningful work and/or non-work activities	
Annual salary *£84,000*	Annual salary *£84,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	Choice B ☐	Choice C ☐

SCENARIO 27

Choice A	Choice B	Choice C
Supportive relationship with immediate family	*Unsupportive* relationship with immediate family	
The presence of a mental health condition	*The absence* of a mental health condition	**I do not want either**
Feeling that you are *in control* of your life	Feeling that you are *not control* of your life	A or B choices
Not engaged in personally meaningful work and/or non-work activities	*Engaged* in personally meaningful work and/or non-work activities	
Annual salary *£14,000*	Annual salary *£14,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	Choice B ☐	Choice C ☐

SCENARIO 28

Choice A	Choice B	Choice C
Supportive relationship with immediate family	*Supportive* relationship with immediate family	
The absence of a mental health condition	*The absence* of a mental health condition	**I do not want either**
Feeling that you are *in control* of your life	Feeling that you are *in control* of your life	A or B choices
Engaged in personally meaningful work and/or non-work activities	*Not engaged* in personally meaningful work and/or non-work activities	
Annual salary *£14,000*	Annual salary *£28,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	Choice B ☐	Choice C ☐

SCENARIO 29

Choice A	Choice B	Choice C
Unsupportive relationship with immediate family	*Supportive* relationship with immediate family	
The presence of a mental health condition	*The absence* of a mental health condition	**I do not want either**
Feeling that you are *in control* of your life	Feeling that you are *not in control* of your life	A or B choices
Not engaged in personally meaningful work and/or non-work activities	*Engaged* in personally meaningful work and/or non-work activities	
Annual salary *£56,000*	Annual salary *£56,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	**Choice B** ☐	**Choice C** ☐

SCENARIO 30

Choice A	Choice B	Choice C
Unsupportive relationship with immediate family	*Unsupportive* relationship with immediate family	
The presence of a mental health condition	*The presence* of a mental health condition	
Feeling that you are *not control* of your life	Feeling that you are *not in control* of your life	**I do not want either** A or B choices
Not engaged in personally meaningful work and/or non-work activities	*Not engaged* in personally meaningful work and/or non-work activities	
Annual salary *£84,000*	Annual salary *£14,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	**Choice B** ☐	**Choice C** ☐

SCENARIO 31

Choice A	Choice B	Choice C
Supportive relationship with immediate family	*Unsupportive* relationship with immediate family	
The presence of a mental health condition	*The absence* of a mental health condition	**I do not want either**
Feeling that you are *in control* of your life	Feeling that you are *not in control* of your life	A or B choices
Engaged in personally meaningful work and/or non-work activities	*Not engaged* in personally meaningful work and/or non-work activities	
Annual salary *£28,000*	Annual salary *£28,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	Choice B ☐	Choice C ☐

SCENARIO 32

Choice A	Choice B	Choice C
Unsupportive relationship with immediate family	*Unsupportive* relationship with immediate family	
The presence of a mental health condition	*The absence* of a mental health condition	**I do not want either**
Feeling that you are *in control* of your life	Feeling that you are *in control* of your life	A or B choices
Not engaged in personally meaningful work and/or non-work activities	*Not engaged* in personally meaningful work and/or non-work activities	
Annual salary *£56,000*	Annual salary *£84,000*	

WHAT WOULD YOU CHOOSE?

Choice A ☐	Choice B ☐	Choice C ☐

Please place a check mark in the box that best represents experiences and feelings.

During the past month, how often did you feel the following ways …	Never	Once or twice	About once a week	2 or 3 times a week	Almost everyday	Every day
1. Happy						
2. Interested in life						
3. Satisfied with life						
4. That you had something important to contribute to society						
5. That you belonged to a community (like a social group, school, neighbourhood, etc.)						
6. That our society is a good place, or is becoming a better place, for all people						
7. That people are basically good						
8. That the way our society works made sense to you						
9. That you liked most parts of your personality						
10. Good at managing the responsibilities of your daily life						
11. That you had warm and trusting relationships with others						
12. That you had experiences that challenged you to grow and become a better person						
13. Confident to think or express your own ideas and opinions						
14. That your life has a sense of direction or meaning to it						

1. I feel that there is social stigma attached to having a mental health condition

Strongly agree ☐
Agree ☐
Neither agree nor disagree ☐
Disagree ☐
Strongly disagree ☐

2. My family (parents/guardians, siblings and extended family) provide me with the emotional support I need

Strongly agree ☐
Agree ☐
Neither agree nor disagree ☐
Disagree ☐
Strongly disagree ☐

3. Which of the following job industries are you considering for the future:
(Please tick all that apply to you)

Accountancy/financial management ☐
Charity sector ☐
Construction and building services ☐
Consumer goods and FMCG ☐
Creative arts/design ☐
Engineering ☐
Medicine/Healthcare ☐
Hospitality/leisure industry ☐
HR and recruitment ☐
Investment banking ☐
IT and technology ☐
Law ☐
Logistics, transport/supply chain ☐
Management and business ☐
Management consulting ☐
Marketing, PR and Advertising ☐
Media, journalism and publishing ☐
Property ☐
Public service ☐
Retail, buying and merchandising ☐
Sales ☐
Science and research ☐
Social care ☐
Teaching ☐
Other (please state below)
_____

Appendix L: Overall opt-out rate by choice

Experiment 1:

Choice	Freq.	Percent
A	505	30.35
B	498	29.93
C (opt out)	661	39.72
Total	1664	100

Experiment 2:

Choice	Freq.	Percent
A	390	33.850
B	361	31.340
C (opt out)	401	34.81
Total	1,152	100

Appendix M – Frequency of participants opting-out per scenario

Scenario	E1		E2	
	Freq. of participants opting out	Percent. Of participants opting out	Freq. of participants opting out	Percent. Of participants opting out
1A	31	62.00	22	61.11
2A	0	0	0	0
3A	23	46.00	12	33.33
4A	16	32.00	9	25
5A	26	52.00	16	44.44
6A	35	70.00	20	55.56
7A	8	16.00	7	19.44
8A	36	72.00	21	58.33
9A	30	60.00	19	52.78
10A	15	30.00	10	27.78
11A	1	2.00	0	0
12A	5	10.00	3	8.33
13A	35	70.00	21	58.33
14A	14	28.00	7	19.44
15A	11	22.00	10	27.78
16A	20	40.00	15	41.67
1B	22	40.74	14	38.89
2B	25	46.3	21	58.33
3B	22	40.74	11	30.56
4B	18	33.33	5	13.89
5B	16	29.63	8	22.22
6B	37	68.52	21	58.33
7B	20	37.04	10	27.78
8B	0	0	0	0
9B	37	68.52	23	63.89
10B	18	33.33	14	38.89
11B	42	77.78	23	63.89
12B	7	12.96	5	13.89
13B	11	20.37	3	8.33
14B	36	66.67	24	66.67
15B	23	42.59	12	33.33
16B	21	38.89	15	41.67

Appendix N - HESG paper **title 'The pursuit of life satisfaction: a discrete choice experiment'**

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Abstract

Discrete choice experiments (DCEs) are regularly used in economics to evaluate individual preferences for policies and their consequences, but a forthcoming review of the literature has found few applications to the area of well-being. The objective of this paper was to investigate the application of DCE methods to ongoing efforts to understanding the determinants of subjective well-being. The attributes were derived from: a recent review on well-being, best worst scaling, cognitive interviews and a pilot study with university students. Five attributes were deemed to be important for life satisfaction, these were: support from family, mental illness, control in life, meaningful activities and salary. A convenience sample of 140 university students were randomly assigned to one of three versions of a main effects and interactions experimental self-completed questionnaire, with two unlabelled life prospects each. Participants were asked to indicate which of the options they would be most satisfied with in ten years' time or opt out of choosing either of them. All of the attributes had a statistically significant effect on the choices made and choices were particularly influenced by the presence of a supportive relationship with immediate family. Further, the marginal utility of income was moderated by support from family, control, mental illness and meaning or purpose in prospective life choices. This study provides

important insights into the feasibility of studying well-being using DCE methods, the importance of family to young people, and the moderating effect of income on the negative impact of mental illness.

Keywords: well-being; discrete choice experiments.

INTRODUCTION

Well-being refers to the overall condition and quality of a person's life. This condition is defined by a person's possession of the psychological, social and economic resources required to deal with the challenges they face in their life (Dodge, Daly, Huyton, & Sanders, 2012). Given the general nature of this definition, it is necessary to divide this term into at least two components: objective well-being and subjective well-being (see figure 1). Objective well-being (OWB) encapsulates a person's material resources, consumption and income (Alatartseva & Barysheva, 2015; Schueller & Seligman, 2010). Subjective well-being (SWB) refers to an individual's personal perspective on the quality of their own life (Diener, 1994). SWB is composed of two distinct features: a person's fluctuating emotional experiences (positive and negative affect) and the more stable cognitive evaluations they make about their life in the whole (life satisfaction).

Figure 27. Model of well-being components
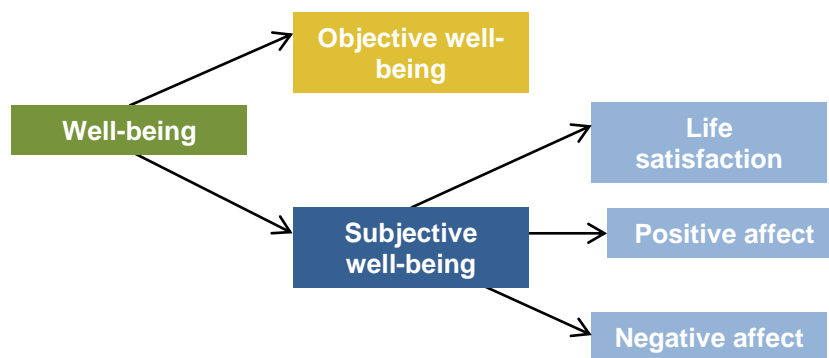
Amid ongoing disagreement surrounding this topic (Kahneman & Krueger, 2006), researchers regularly agree that well-being is best understood as a multidimensional concept (Ryan & Deci, 2001). This perspective has been part

of the rationale for acknowledging that well-being must be determined by more than traditional economic metrics like income or at macro level gross domestic product (Fitoussi, Sen, & Stiglitz, 2009). This shift towards a more multidimensional approach to well-being has already begun to influence policy as evidenced by the well-being initiatives led by international organisations such as the OECD and WHO. Further research is required in order to understand the determinant of well-being at the individual level.

A recent review into the measurement of well-being has provided a   description of well-being as a multifaceted construct. Within the 99 measures of well-being that this review included, 196 dimensions of well-being were identified (Linton, Dieppe, & Medina-Lara, 2016). This work provides a methodological and practical challenge - given so many ways of conceptualising well-being, how are researchers able to ensure that the dimensions of well-being included within their own studies reflect what is important for their target population? Answering this and related questions is essential for valid outcome assessments and the development of context-appropriate preference elicitation experiments.

In order to address this challenge we sought to design a discrete choice experiment (DCE) that elicited preferences from individuals using their responses to a series of hypothetical scenarios (Lancsar & Louviere, 2008). DCEs are well suited to addressing this challenge as there are several stages of the experimental design process where the viewpoints of prospective participants can be incorporated. Participant input is encouraged during the selection of study attributes (Coast & Horrocks, 2007) and during the piloting

stage when the clarity and acceptability of the experiment is being assessed (Lancsar & Louviere, 2008).

A systematic search was conducted in order to investigate the nature of existing DCEs focussing on well-being. Analysis and synthesis of the identified studies is ongoing, however only a small number of DCEs were found to be explicitly relevant to this topic. There also appeared to be a focus on the development of tools, rather than understanding the trade-offs among dimensions of well-being that drive preferences in particular groups. Among the few examples found, Dolan and colleagues have emphasised the need for additional research to investigate the detrimental impact of mental illness on life satisfaction (Dolan, Kavetsos, & Tsuchiya, 2013).

The current study sought to investigate how expected life satisfaction is determined by participant derived attributes of well-being. We developed, piloted and conducted a series of experiments using a convenience sample of university students. We also examined whether the preferences elicited were sensitive to gender effects, and ran an additional experiment with more scenarios in order to examine whether the results would be sensitive to increases in cognitive burden.

METHODS

Attributes and levels

Attributes were derived and levels selected during three phases as outlined in Figure 2 below:

Phase 1 – Identification of well-being dimensions through a systematic search of the literature which yielded 196 dimensions of well-being (Linton et al., 2016). For the purposes of the current study 132 of these dimensions were deemed to be irrelevant for young adults (MJL and AML). For example attitude towards ageing that referred to: "How an individual evaluates the age related changes occurring in their life".

Phase 2 – The 64 remaining dimensions were used in a best worst experiment (Louviere, 1988) with 40 students with the objective to obtain a smaller selection of well-being dimensions for young adults that enabled us to empirically test preferences for future life satisfaction within a discrete choice experiment.

Phase 3 – We were also aware that income is a highly studied topic within well-being (Kahneman & Krueger, 2006) and for this reason income was included as a potential attribute.

Figure 3. Design phases for attributes and levels
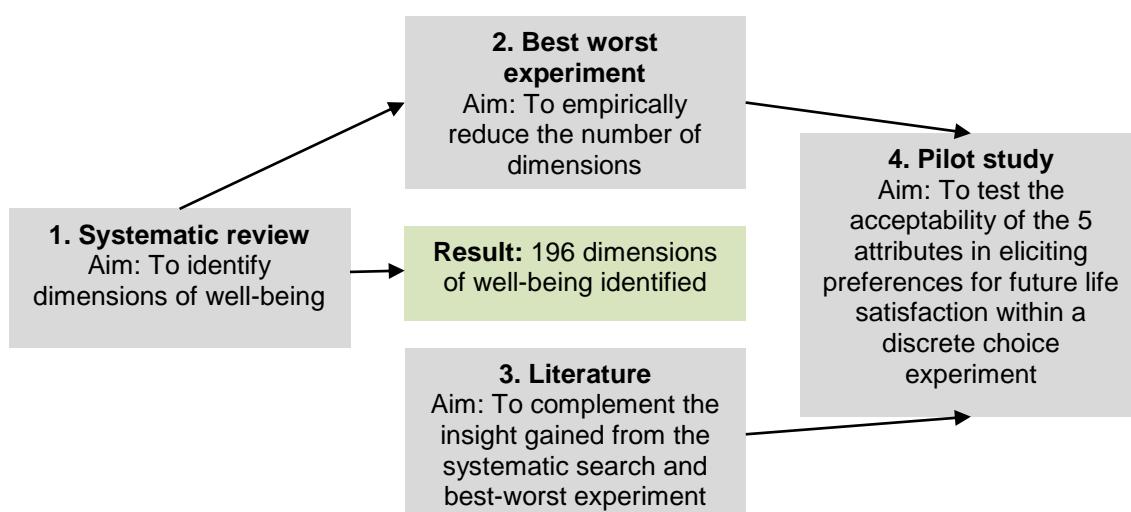
The number of attributes and their levels are in line with recommendations of good practice to avoid making the task too cognitively burdensome (Bridges et al., 2011). The attribute levels were presented in a written description format as opposed to using images or graphics; these can be found in Table 1 below.

Table 1.   Attributes and levels of future life satisfaction attributes

Attributes	Levels
Social support from family	*Unsupportive* relationship with immediate family *Supportive* relationship with immediate family
Mental illness	*The absence* of a mental health condition *The presence* of a mental health condition
Control	Feeling that you are *not in control* of your life Feeling that you are *in control* of your life
Meaningful activities	*Not engaged* in personally meaningful work and/or non-work activities *Engaged* in personally meaningful work and/or non-work activities
Income	Annual salary *£14,000* Annual salary *£28,000* Annual salary *£56,000* Annual salary *£84,000*

Piloting

The experiment was piloted following good practice guidelines (Lancsar & Louviere, 2008). The pilot contained 8 scenarios and involved n=40 participants. The pilot provided an opportunity to explore whether the attributes and the levels chosen were understood by participants in the target population. It also allowed us to estimate a mixed logit model of discrete choices for future life satisfaction as a function of wellbeing attributes, where the coefficients (β_s) for each attribute served to assess whether or not the experiment would be able to yield statistically informative results. The estimated coefficients were used to improve the experimental design and for estimating the sample size required for the discrete choice experiment. A main effects model using a logistic regression was estimated with the pilot data. In addition, exit interviews (n=8) were conducted to examine whether participants had any difficulties understanding the experiment.

Experimental design

The experiment was designed as unlabelled, described only by the levels of the generic attributes within them, with an opt-out choice. It used a fractional factorial design able to accommodate the analysis of main effects and interactions between income and each of the other attributes. These interactions allowed us to identify whether or not the level of income in a hypothetical life moderates the impact that the other attributes had on preferences for the future. The scenarios within the experiment were block designed (Block A and B with 16 scenarios each). Two versions of the experiment were run. In experiment 1, participants responded to one of the two available blocks and experiment 2, participants responded to all 32 scenarios. The second version of the experiment was a test to see if a more cognitively demanding experiment (twice as many scenarios) would yield divergent results. Scenario dominance and logically implausibility were also considered (further discussion in section 2.6.1).

Participants were randomised to one version of the questionnaire for Experiment 1. Before starting the discrete choice experiment, participants completed two 'warming up exercises' unrelated to the experiment (choices of transport taken when visiting a friend). The warming up exercise let participants to familiarise themselves with the task and also gave them the opportunity to ask questions. Before completing the DCE task additional information was collected on age, gender, degree and future employment aspirations.

The optimal fractional-factorial 4^1 x2^4 (4 for income, 2 for the remaining other attributes) level, 2-block, 32 choice (16 choice per block) main effect plus interaction (income versus all other attributes) design was used. It has a 57% D efficiency, the efficiency gap being caused by the addition of the interactions to the experimental design. The levels were orthogonally distributed across attributes, with the correlation matrix having off-diagonal values less than 0.25 in all instances except (to be completed). This set of choice questions was designed with the restriction that no duplicates occur.

The experimental design was developed using the following steps:

Step 1 - A fractional factorial design of 32 linear D-efficient option profiles under the restriction that the interactions between the income and other attribute interactions are estimable was generated;

Step 2 - The most efficient 32 choice set for a multinomial logit model with main effect coefficient values set equal to 1/8 of estimates from the pilot model (and assuming zero values for interactions) was selected from the 32 D-efficient profiles found under the restriction that no duplicate choice sets are generated. The 1/8 is a conservative assumption for estimating sample size;

Step 3 - The most efficient 32 choice sets were divided into two blocks with the highest possible balance in attribute levels within blocks.

Data collection

Undergraduate students were recruited for both the pilot study and the discrete choice experiment through the Finance and Economics Experimental Laboratory at Exeter (FEELE). Students were invited to participant in the experiment if they were born in the UK and English was their first native language. The experiments

were conducted with groups of 20-40 students at a time. Participants were given a consent form to read and sign; they were also briefed on the anonymity of their data and their right to withdraw from the study at any point. The experiment was explained and it was emphasised that the choices presented about the type of life that they would be most satisfied with in ten years' time were all hypothetical. Participants were rewarded with £10 for their participation in the experiment. Ethical approval was obtained from the Economics Department at the University of Exeter.

Data analysis

Validity of responses

In the current study, validity was assessed by including 'dominant alternatives' i.e. a more favourable alternative in every attribute compared to the other option. When a dominant alternative is present within a scenario and the participant instead selects the less advantageous option it would suggest that people are not reading the options carefully, or have disengaged with the experiment. If dominant alternatives are selected at a high rate it would provide evidence that participants have understood and read the options carefully. A total of 9 dominant alternatives were generated and placed at random throughout the 32 scenarios as part of the experimental design and these were retained in the experiment.

Statistical analysis

Mixed logit models were used to analyse the data from each of the experiments. For experiment 1, data were analysed using a main effects model (model 1), main effects model with interactions (model 3), a male sub-sample with main effects and interactions (model 4), and a female sub-sample with main effects and

interactions (model 5). Finally, for experiment 2, a main effects model (model 6) and a main effects model with interactions (model 7) were estimated.

The estimated model was a random utility model of two life choices, whose utility was determined by the five attributes, and the interaction of income with the other four attributes. To illustrate, the model equation without interactions is:

$$V_{choice\ Ai} = \beta_{\text{Family}}\text{Family}_A + \beta_{\text{MHealth}}\text{MHealth}_A + \beta_{\text{Control}}\text{Control}_A$$
$$+ \beta_{\text{LifeEngage}}\text{LifeEngage}_A + \beta_{\text{Income}}\text{Income}_A + \varepsilon_{Ai}$$

$$V_{Choice\ Bi} = \beta_{\text{Family}}\text{Family}_B + \beta_{\text{MHealth}}\text{MHealth}_B + \beta_{\text{Control}}\text{Control}_B$$
$$+ \beta_{\text{LifeEngage}}\text{LifeEngage}_B + \beta_{\text{Income}}\text{Income}_B + \varepsilon_{Bi}$$

where V is the utility function of option A or B, and the Greek symbols represent coefficients to be estimated for the five attributes, which may differ across options in a choice scenario, as indicated by their A or B subscripts. Conditional on any given set of attributes faced by a participant in a choice scenario, the individual's utility would vary randomly across individuals according to the error terms ε_A, ε_B , as described by the i sub-index. The probability a person will chose option A is given by the likelihood that $V_{choiceA} > V_{choiceB}$, which is determined in turn by the assumed distribution of the ε, terms. The mixed logit model that we adopted is obtained by assuming that the ε follow a Type 1 extreme value distribution (Train 2001).

RESULTS

The results section is split into three main sections. In the first section the sample characteristics for both experiments are described (3.1). In the second section, the main effects, interactions and gender analysis for experiment 1 (E1) is described (3.2). In the final section, details of experiment 2 (E2), the 32 scenario version of the experiment are presented (3.3).

Sample characteristics

Table 1 provides descriptive statistics for the samples in experiment 1 and 2. The mean age of participants in both experiments was comparable (19.79 vs 19.28, respectively); similarly, both included a relatively even split of male and female participants (52.9% in E1and 47.2% in E2 of male participants). Over 50% of participants across both experiments reported being in a relationship or currently dating somebody; however the proportion of single people in experiment 1 was noticeably higher (49.5%). Most of the participants were 'White/White British/White other' (88.8% in E1 and 97.2% in E2). Within experiment 1, most of the participants lived in rented accommodation (65.4%), whereas the majority of participants in experiment 2 lived in university accommodation (63.9%).

Table 1.   Sample characteristics

	Experiment 1 16 scenarios (n=107)	Experiment 2 32 scenarios (n=36)
Age – Mean[range]	19.79 [range]	19.28 [range]
Male %	52.9	47.2
Relationship - %		
Single	49.5	38.9
In a relationship	50.5	61.1
Ethnicity - %		
White[a]	88.8	97.2
Mixed[b]	4.7	2.8
Asian[c]	3.7	0
Black[d]	2.8	0
Housing - %		
University accommodation	32.7	63.9
Rented accommodation	65.4	36.1
Living with parents	0.9	0
Other	0.9	0

Key: [a]= White/White British/ White other; [b]= Black/Black British/Black other; [c]= Asian/Asian British/Asian other and; [d]= Mixed/Multiple ethnic groups.

Experiment 1 – 16-scenario version

For this experiment there were no missing data. A total of 1712 choices were analysed. The majority of participants indicated that they would be satisfied in 10 years with one of the lives described in option 1 or option 2 (59.4%). However on numerous occasions participants indicated that they would not want either of the options presented to them (40.6%). Scenario 11B had the highest rate of opting out (78.9%). Participants selected dominant alternative options in 99.2% of cases (485/489, 0.8%), demonstrating that it is likely participants were engaging with the exercise. The most popular choice was within scenario 2A where 100% of participants selected Option B: Supportive relationship with immediate family, the absence of a mental health condition, feeling that you are in control of your life, engaged in personally meaningful work and/or non-work activities and an annual salary of £84,000. All scenarios are presented in Appendix II.

Main effects and interactions

The main results from experiment 1 can be found within table 2. All of the coefficients for the main (marginal) effects were in the directions expected. The results of the main marginal effects model (model 1) show that having support from family, feeling in control of life, being engaged in meaningful activities and having a higher income had statistically significant positive effects on preference, while having a mental illness had a statistically significant negative effect. These results suggest that the null hypothesis that the study attributes are statistically insignificant can be rejected in favour of the alternative hypothesis that the attributes are important indicators of preference.

The presence of any interaction effects were explored in model 2 (table 2). These results showed that the main effects within model 1 (without interactions) would have been upwardly biased by the effect of the omitted interactions with income; therefore the results of model 2 will be interpreted from here onwards. Model 2 demonstrates that the well-being attribute that had the strongest effect on preferences was support from family (marginal effect = 0.51; 95% CI 0.28 to 0.74). This indicates that participants were 51 percentile points more likely to be satisfied with a life where they had supportive family members. Conversely, the same participants were 34 percentile points less likely to be satisfied with a life where they would have a mental health condition (marginal effect = -0.34; 95% CI -0.28 to -0.18). The least significant main marginal effect was having control in life (marginal effect = 0.09; 95% CI 0.01 to 0.17). Finally, given an additional £1000 in annual salary, participants were 2 percentile points more likely to be satisfied with their life. Therefore, according to this model to achieve the same

increase in life satisfaction as engagement in meaningful activities (marginal

effect = 0.18; 95% CI 0.10 to 0.26), income would need to increase by £9000.

The statistical significance of each of the interaction effects indicates that the

effects of support from family, absence of mental illness, control in life and

meaningful activities on preferences depend on the level of income a person

would receive. For example, although the presence of mental illness was shown

to have a detrimental effect on preferences, its negative effect can be

cushioned by a higher income (income x mental illness: marginal effect = 0.05;

95% CI 0.04 to 0.05). Similarly, where participants are offered a higher income,

meaningful activities have a significantly smaller impact on their preferences.

Table 2. Logistic regression marginal effects for experiment 1 (model 1 and model 2)

	Model 1: Main effects model		Model 2: Main effects and interactions	
	Marginal effect	Standard error	Marginal effect	Standard error
Main effects				
Support from family	0.832***	0.062	0.509***	0.118
Mental illness	-0.567***	0.051	-0.339***	0.081
Control	0.187***	0.046	0.091*	0.040
Meaningful activities	0.223***	0.033	0.179***	0.043
Income (in 000's of £s)	0.020***	0.002	0.022***	0.002
Interactions				
Income x support from family	-	-	0.014***	0.002
Income x mental illness	-	-	0.049***	0.003
Income x control	-	-	0.024***	0.002
Income x meaningful activities	-	-	-0.009***	0.002
Individuals	107		107	
Observations [a]	1045		1045	

*p <.05; **p<.01; ***p<.001 & [a]= number of choices being analysed.

Results split by gender

Table 3 presents the results from the main effects and interactions models split

by male (model 3) and female (model 4) participants. Within both models, all of

the coefficients yielded were in the direction expected. Furthermore there are

few substantial differences in the marginal effects yielded by the two models.

There are however differences in the significance levels of the marginal effects between the models. This may however be due to more variation in responses among female participants and a need for a larger sample size in order to test for significance.

Table 3: Logistic regression marginal effects for male sub-sample - model 3 and model 4

	Model 3: Main effects and interactions -Men		Model 4: Main effects and interactions -Women	
	Marginal effect	Standard error	Marginal effect	Standard error
Main effects				
Support from family	0.468**	0.165	0.496	0.260
Mental illness	-0.353**	0.127	-0.308	0.166
Control	0.079	0.052	0.068	0.058
Meaningful activities	0.126**	0.049	0.207	0.108
Income (in 000's of £s)	0.023***	0.004	0.022***	0.006
Interactions				
Income x support from family	0.009***	0.002	0.018**	0.005
Income x mental illness	0.035***	0.006	0.059***	0.010
Income x control	0.021***	0.003	0.027***	0.005
Income x meaningful activities	-0.005	0.004	-0.012***	0.002

* $p < .05$; **$p < .01$; ***$p < .001$ and [a]= number of choices being analysed.

Experiment 2 – 32-scenario version

For this experiment there were also no missing data. Within experiment 2 a total of 1152 choices were analysed. The majority of participants indicated that they would be satisfied in 10 years with one of the lives described in option 1 or option 2 (65.2%) however as in experiment 1 numerous occasions participants indicated that they would not want either of the stated options (34.8%). Scenario 14B had the highest rate of opting out (66.7%). Participants selected dominant alternative options in 98.5% of cases (319/324, demonstrating that it is likely participants were engaging with the exercise in order to avoid selecting less favourable lives. The most popular choice was within scenario 11a where 100% of participants selected Option A.

Main effects and interactions

The main results from experiment 2 can be found within table 4. Model 5 tests the main effects model and model 6 tests the main effects with interactions. The majority of the findings from experiment 1 (model 1 and model 2) were replicated. All of the coefficients for the main marginal effects were in the directions expected. Within experiment 2 however, only 4 of the 5 hypothesised effects were statistically significant. As table 4 indicates, having support from family, being engaged in meaningful activities and having a higher income had statistically significant positive effects on individual preferences, while having a mental illness had a statistically significant negative effect. Conversely the statistically significant effect of control in life was not replicated within experiment 2. Similarly, the coefficients of the main effects model within experiment 2 were not as upwardly biased as in experiment 1. Finally, each of the interaction effects within model 6 was statistically significant and comparable in strength to the interaction effects demonstrated in experiment 1.

Table 4. Logistic regression marginal effects for experiment 2 (model 5 and model 6)

	Model 5: Main effects model		Model 6: Main effects and interactions	
	Individual effect	Standard error	Individual effect	Standard error
Main effects				
Support from family	0.645***	0.053	0.591***	0.068
Mental illness	-0.464***	0.048	-0.427***	0.057
Control	0.057	0.043	0.042	0.046
Meaningful activities	0.165***	0.032	0.172***	0.033
Income (in 000's of £s)	0.013***	0.001	0.019***	0.002
Interactions				
Income x support from family	-	-	0.021***	0.004
Income x mental illness	-	-	0.039***	0.009
Income x control	-	-	0.025***	0.005
Income x meaningful activities	-	-	-0.009**	0.002
Individuals[a]	36		36	
Observations	751		751	

*p <.05, **p<.01, ***p<.001 and [a]= number of choices being analysed.

DISCUSSION

The current study sought to investigate the extent to which: social support from family, the presence of mental illness, control over life, meaningful activities and salary would influence the preferences of young individuals for life satisfaction in the future.

One of the key findings is the importance that participants placed on the presence of support from family, the absence of mental illness, engagement in meaningful activities and a higher salary, all having a positive and significant effect on preferences for life satisfaction in the future. In addition to this, all coefficients of the attributes yielded to the expected directions. These findings were replicated across the pilot study and the experiments with 16 and 32 scenarios.

Social support from family had the strongest impact on the choices stated. Due to a lack of similar studies in existence there was little way of predicting which attribute would have yielded the largest marginal effect, however previous literature has highlighted the value of family networks as a source of support in the lives of young people (Holland, Reynolds, & Weller, 2007; Patel, Flisher, Hetrick, & McGorry, 2007). These findings support the results of x who found that family and kinship networks are a vital source of support for young people aged, particularly between the ages of 11 and 30. This may be the result of young people viewing family as a reliable source of social support, advice and financial security in an otherwise uncertain future.

Another finding was that the hypothetical prospect of mental health difficulties in the future had a strong and significantly negative effect on the choices made e.g. a detrimental effect on life satisfaction. These findings provide further empirical evidence for the detrimental impact of mental illness on life satisfaction that has been highlighted elsewhere in the literature (Dolan et al., 2013). One practical implication arising from this finding is the need for investment in programmes that safeguard the mental health of young people, as a proactive measure before debilitating mental illnesses arise.

Feeling in control of your life was a positive predictor of choices in the pilot study and in the experiment with 16 scenarios; however in the 32 scenario experiment this attribute was no longer significant. If an individual can satisfy their need for family support, mental health, meaningful activities and salary, it may be that a degree of uncertainty caused by not being in control of their life is tolerable. In addition to this, given that many changes can occur in 10 years, control over your life could have been interpreted as an unrealistically optimistic aspiration. On the whole, these results suggest that the importance of this attribute is questionable.

Finally, there were significant interactions between income and the remaining attributes. These results imply that the effects of social support from family, mental health difficulties, control and meaningful activities were significantly dependent on the level of income individuals would receive. The largest interaction effect found across experiment 1 and 2 was for income and mental health difficulties. One reason why mental illness may be more tolerable with a higher salary is that individuals might predict that wealth or consumption can act

as a buffer to the detrimental effects of mental illness. Alternatively, it may be that the participants in this study have had little real life exposure to the impact of mental health conditions or sustained earnings.

The three stage process (systematic identification of well-being dimensions, empirical quantitative findings and views expressed by prospective participants) undertaken to select the experiment's attributes is a key strength of the present study. As the study of well-being remains a contentious and subjective topic, this process aimed to limit the possibility of bias in the design of the study.

The pilot study provided several empirical benefits. In addition to providing the main study with a set of beta priors for each attribute, and giving participants an opportunity to report on the acceptability of the methods, the pilot study also provided preliminary results that could be tested in the main study with a larger sample size. As has been reported, the results from the main effects model in the pilot study were largely replicated in the main effects model for the main study.

The responses to the scenarios also indicate that participants were actively engaging with the experiment. This claim is supported by the finding that participants selected dominant alternative options 99.2% of the time. If participants were cognitively burdened, inattentive or disengaged it is likely participants would not have spotted the presence of these rationally sensible choices. This result provides strong evidence for the validity of the experiment.

Limitations

One limitation of DCEs on the whole is the use of attributes with ordinal levels. In this study for example, the 'social support from family' attribute included a level for '*supportive* relationship with immediate family' and a level for '*unsupportive* relationship with immediate family'. These qualitatively labelled levels may or may not be interpreted in the same way by participants, as what is defined as a supportive relationship may vary between people.

Almost a third of the choices made in the experiment were instances where participants opted out of choosing one of the two options provided. One reason participants may have opted out could be that the attributes selected were not a sufficient reflection of the essential characteristics of life satisfaction. External to this experiment, a person's life may vary in ways that cannot be perfectly represented by any five attributes. It is possible that for some participants, social support provided by friends or the absence of physical health difficulties may be more valuable. For these individuals the attributes used in the experiments may have simply been a lower priority for their future.

Another possibility is that several of participants studied were unwilling to compromise on their 'ideal future life'. If participants were faced with two suboptimal options, they could either compromise, by trading off one attribute for another or they could opt out. 'Inelastic' individuals with rigid criteria for what would constitute life satisfaction in the future for them may decide to opt-out, instead of compromising. Analysis is ongoing, and we are currently planning to model the opt-out decision itself.

Future research

Three potential explanations for the rate of opting out in the current study have been provided above. Further study would be required in order to determine which of these explanations is accurate. One option to follow up this work would be to investigate the mind-set of individuals completing the experiment. A qualitative study using a 'think aloud' design could explore the thought process and strategies employed by participants. Think aloud methods would be particularly well equipped to address this unresolved issue, as they could pinpoint exactly what people are thinking about during the moments where they are deciding whether or not to opt out. The rationale for this choice could also be immediately probed by researchers.

Within this study (and many DCEs), the order in which the attributes were listed remained fixed. This decision was made in order to reduce the possibility of cognitive overload; however by not randomising the order in which attributes are listed it is possible that an element of bias has been introduced into the results. If the order of the attributes was randomised, participants would need to spend time reorienting themselves to the exercise at the start of each scenario. Further, as the experiment was being delivered in a static paper survey, it would be impractical if not impossible to randomise this order for each individual. The impact of the ordering however remains untested, and a follow up study could investigate this further.

This study was conducted with students as a convenience sample; however the use of DCE methods in the study of well-being could be applied to many populations. Growing interest in subjective well-being within health services

research suggests that clinical populations would be a strong candidate for such research. Given the alleged conceptual differences between health-related quality of life and subjective well-being, it would be interesting to investigate whether there are variations in preferences for both of these outcomes. This represents an interesting and clinically meaningful empirical question as in some contexts there may be a disjoint between what would improve a person's health and what would improve how much they enjoy their life.

Finally, studies into preferences for well-being should not be limited to the dominant model proposed by Diener (1994). It is important that researchers acknowledge that there are several appropriate ways of conceptualising well-being as an outcome. In a palliative care context for example, 'being at peace' may be a more appropriate well-being outcome than life satisfaction.

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Appendix O - Review of 99 self-report measures for assessing well-being in adults: exploring dimensions of well-being and developments over time

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