DOWN MEMORY LANE: A MIXED METHOD INVESTIGATON OF THE REMINISCENCE BUMP IN THE DYNAMICS OF AUTOBIOGRAPHICAL MEMORY

by

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Abstract

Research into the reminiscence bump aims to improve our understanding of how the memories formed during our adolescence and early adulthood subsequently influence our autobiographical recollections later in life. The purpose of this study was to investigate the temporal dynamics of autobiographical memory in a sample involving two different age groups of adult South African participants. The main objective of the research was to explore the participants' memories for salient events and to determine whether these memories exhibit the typical reminiscence bump that has been found in autobiographical memory research.

This sample consisted of two sets of cohorts, totalling 48 research participants. The first group comprised participants ranging between the ages of 40 and 59 years, and the second group involved participants ranging between the ages of 60 to 79 years. A convergent parallel mixed method approach was adopted in this study. Both quantitative and qualitative data, on the distribution, valence and life domain importance of the reminiscence bump, were collected through the lifeline interview method. The results confirmed that reminiscence bumps are reflected in the memories of both age groups between the ages of 10 and 30 years. Most life events recalled were of positive affect thus confirming the positivity bias in older adults. The family and home life domains were indicated as the most important life domains in the autobiographical memories of both groups.

The main conclusion drawn from the study was that there was not a significant difference in the dynamics of the autobiographical memories between the two groups, as reflected in the temporal characteristics of their reminiscence bumps. Future research could further explore the patterns of memories, and researchers could in particular investigate the semantic and affective aspects of these autobiographical memories in more depth.

Keywords: Autobiographical memory, reminiscence bump, valence, life domain importance, South African sample

Declaration

I declare that "Down Memory Lane: A Mixed Method Investigation of the Reminiscence Bump in the Dynamics of Autobiographical Memory" is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I further declare that I submitted the thesis to originality checking software. The result summary is attached.

I further declare that I have not previously submitted this work, or part of it, for examination at University of South Africa (Unisa) for another qualification or at any other higher education institution.

Signature

30 January 2019

Date

Dedication

I want to dedicate this dissertation to the one person without whom I would never have embarked on this adventure, my mother, Marti Venter.

Mom, you have been my inspiration, my role model and my pillar of strength and mere words can never express my profound gratitude for your support, encouragement and your unwavering belief in me.

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I wish to express my thanks to Professor Chris Janeke, for his guidance the past couple of years, through both my Honours and my Masters degrees.

A special word of thanks for my friend and mentor "He who is the voice of reason". You have taught me so much. Thank you for you patience. You have been a rock.

I would like to extend my deepest thanks to my friends and peer reviewers, who so generously contributed their time and critical reading skills to my dissertation. I am indebted to each of you for the part you played to get me to this point. Thank you, I could not have done this without you:
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List of Abbreviations

AM	Autobiographical memory
fMRI	Functional magnetic resonance imaging
LIM	Lifeline interview method
RB	Reminiscence bump
RIS	Remembering imagining system

Table of contents

List of Tables

List of Figures

Chapter 1. General overview

We are what we remember. If we lose our memory, we lose our identity and our identity is the accumulation of our experiences. When we walk down the memory lane, it can be unconsciously, willingly, selectively, impetuously or sometimes grudgingly. By following our stream of consciousness, we look for lost time and things past. Some reminiscences become anchor points that can take another scope with the wisdom of hindsight.

(E. Pevernagie[1], personal communication, September 12, 2017).

1.1 Down memory lane

The phrase 'down memory lane' conjures up visions of people reminiscing about the past or the 'good old days'. In an Internet search of song lyrics, the phrase "memory lane" is present in 1,224 lyrics (Lyrics, 2016). In a Google search, the phrase elicits 7 980 000 results. The earliest mention of the phrase in literature is in a short story "*That Frozen Pipe*" by William Bowen, published in the Detroit Free Press in 1881 (English Language & Usage Stack Exchange, 2015). The sheer number of results reveals the significance of the phrase and emphasises the importance that people attach to the ability to recall memories.

To remember is a core component of our daily function, on a social and intellectual level, and it is central to everything we do (Weisberg & Reeves, 2013). Memory enables us to know ourselves, our values, goals, beliefs, and helps to define who we are (Conway & Pleydell-Pearce, 2000). Without memory, simple tasks would be impossible as there would be no recollection of how to accomplish these tasks. The ability to recall, discuss, and share memories is crucial for our sense of identity, social coherence, and direction in life. The introductory quote by Erik Pevernagie encapsulates the importance of memory in our lives.

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[1] Permission received from Erik Pevernagie to use the quote in this dissertation.

To walk down memory lane or recall personal memories involves using autobiographical memory (hereafter called AM). AM allows an individual to construct a personal life story through recall (Conway & Pleydell-Pearce, 2000; Rubin, 2005). Thus, an autobiographical memory is the recollection of a life event (hereafter called an event), which happened at a specific place and a time (Figure 1.1). The detail and duration can vary and the event can contain self-defining characteristics such as emotion, valence, novelty and reminiscence frequency. The quote by Pevernagie (2017) also reveals the inextricably linked nature of AM and the 'self'. AM is therefore a dynamic system that allows us to keep track of changes during a lifespan while it gives us a sense of being a stable entity with a purpose.

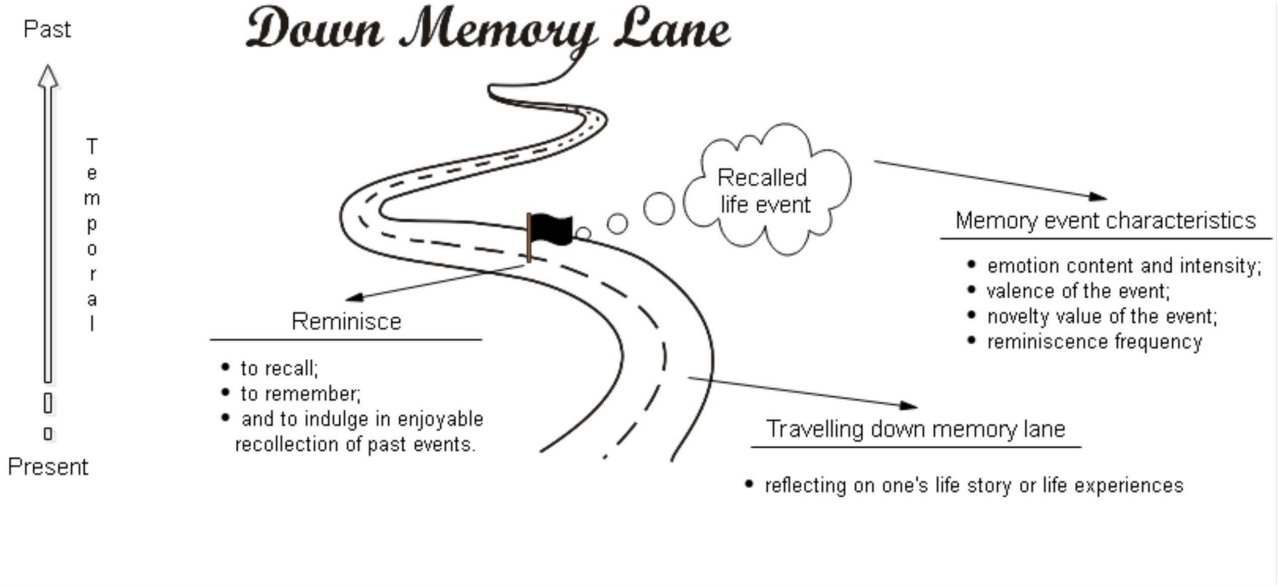

Figure 1.1 A diagram of an autobiographical memory event (Own construction, 2018)

Researchers study AM across sub-disciplines of psychology such as cognitive psychology, developmental psychology, neuropsychology, and personality psychology, to name a few. Each sub-discipline focuses on a specific aspect or aspects of AM using different methods, and operates independently (Assink & Schroots, 2010). Most AM research focuses on retrospective voluntary autobiographical memories. Over the past three decades, research into AM has grown substantially despite challenges to the research process (Conway, & Rubin, 1993; Rubin, Wetzler & Nebes, 1986).

When researchers conduct a memory study in a laboratory setting, they have control over the encoding and retrieval process of the participants, thus minimising the methodological and validity issues. Autobiographical memories, in contrast, are encoded in the real world complexity of everyday life (Conway, 1996a). In an AM study, the researcher requests a participant to report personal events or memories. Because of the complex nature of the encoding process of autobiographical memories, the activation method to elicit memories may itself be limiting regarding the content, structure and characteristics of recalled events (Holland & Kensinger, 2010).

The two main methods of memory activation are cued recall and free recall (or referred to as the important memories method) (Cleary, 2018). In cued recall, the researcher presents a word (for example, apple) and the participant has to retrieve a specific memory that relates to the word (Conway & Haque, 1999; Schrauf & Rubin, 1998). This is a traditional memory research method that provides a greater probability of successful recall than recall without cues (Cleary, 2018). In free recall, the researcher request a participant to recall a self-nominated event that meets pre-determined criteria; or an event from a particular lifetime period; or to provide a narrative account of lifetime events (Holmes & Conway, 1999). This method allows the researcher to understand participant-initiated self-cuing and retrieval strategies (Cleary, 2018). A detailed discussion on these processes is presented in chapter 2, section 2.4.2.

AM studies concentrate on one or more of the following aspects of the formation, function and retrieval of AM; meaning, quality, and the structure of the content of autobiographical memories; distribution and organization of autobiographical periods; emotional and socio-cultural aspects of AM (Berntsen & Rubin, 2012). In retrieval, the researcher focuses on the mechanisms of memory activation that predisposes the individual to recall a specific event, and the details of that event.

To enhance our understanding of the content of autobiographical memories, researchers investigate objective measures of events (negative vs. positive, recent vs. remote), and subjective characteristics of the events (ratings of valence, emotional intensity, vividness, novelty, etc.) (Holland & Kensinger, 2010). Different sources such as specific memories, vivid memories, events that comprise a life story, life scripts, or autobiographical knowledge provide the researcher with data. The researcher codes collected data for patterns and themes and analyse it statistically. The result allows the researcher to formulate theories about mediating factors that influence the content of autobiographical memories, such as emotion and socio-cultural aspects.

The retention and distribution of autobiographical memories across different periods manifests as a lifespan retrieval curve. The lifespan retrieval curve comprises three components, which include the period of childhood amnesia, the reminiscence bump (hereafter called RB), and recency (Robinson-Riegler & Robinson-Riegler, 2008).

Rubin, Wetzler and Nebes (1986) first identified the RB as an increased recall of personal events, between the ages 10 years (adolescence) and 30 years (early adulthood), and in people over the age of 40 years. The systematic literature review revealed that during the past three decades, researchers have studied the phenomena of the RB extensively in different countries with a variety of methodologies and samples to try and find a theoretical explanation for the RB.

Most studies focus on explaining a theoretical framework that would account for the RB. Currently, there are five main theoretical accounts proposed by researchers. The identity formation account emphasises the importance of adolescence and young adulthood experiences in the formation of the individual's identity. The cultural life script account deals with important cultural transitional events and their impact on the individual in adolescence and young adulthood. The cognitive account shows that first-time experiences or

novelty experiences has a lasting impact. The cognitive abilities account explains the RB as an increased encoding ability of neural networks. The life story account is a single framework that integrates aspects of the preceding four accounts (Rubin & Schulkind, 1997; Baddeley et al., 2015). These five accounts involve cognitive, social, and cultural explanations for the RB. Further discussion on these accounts is presented in chapter 2, section 2.14.

1.2 Rationale for research into the reminiscence bump

Globally, the world population is aging, and predictions are that by 2050 the population of adults aged 60 years and older will grow by 116% and thus more than double the current number (see Table 1.1). In Africa, the population of adults aged 60 years and older will triple by 2050 (United Nations, 2017).

Table 1.1

Number of adults aged 60 and older in 2017 and 2050 for the world and Africa

	2017	2050
Population	Number of people in millions	Number of people in millions
World	926.3	2080.5
Africa	68.7	225.8

Besides major social, health, and economic consequences, population ageing also influences future memory research (Ohta, 2002). The impact of aging on the individuals' memory functioning and cognitive decline can place an immense burden on society in terms of the age cohort's psychological well-being (Park & Reuter-Lorenz, 2009).

As AM plays a vital role in the individual's sense of identity, social coherence, and direction in life it directly affects the quality of life and well-being of the older adult. In AM, the RB provides a quantitative description of nostalgia, and does not conform to standard decreasing retention functions for memory. Understanding the role, mechanisms and contribution of the RB provides insight into factors that individuals share on a cohort and generational level. The prospective value of RB research lies in the application of therapeutic interventions with older adults, as well as, practical and commercial applications.

A practical example is the study conducted by Tung and Richie (2011). The study focussed on special and unforgettable travel experiences and the travel RB of older adults. The tourism market has recognised that older adults live longer after retirement. They have more time and more financial resources. This makes them a highly profitable market sector, as they will spend more on travel and leisure activities.

Tung and Richie (2011) hypothesised that recalling memorable travel experiences makes older adults more susceptible to suggestions of new travel destinations and packages. This can give marketers in the tourism sector a competitive advantage. The study applied the effects of the RB to explain the psychological phenomenon of memorable travel experiences. Their study concluded that it is important to understand the RB travel experiences, as "seniors will continue to remember, imagine, share, and even yearn to revisit with their family and friends" (Tung & Richie, 2011, p.333).

Ultimately, research into the RB aims to improve our understanding of how we construct and remember our personal past, and how our memories formed during adolescence and early adulthood influences our autobiographical recollection and wellness later in life. As the RB is attributed to occurring in people over the age of 40 years an enhanced understanding of the phenomenon can enable researchers to help make the "longer old-age stage of life" more interesting, rewarding, and meaningful for older adults (Ohta, 2002, p.3).

1.3 Motivation for conducting the study

The reminiscence bump plays an important part in the reminiscence activities of older adults. Motivation for conducting this study arose from recent developments in RB research where the use of different methods of memory activation resulted in a variation in size and temporal location on the lifespan retrieval curve (Koppel & Rubin, 2016). This result and the absence of South African published studies on RB sparked the impetus for the current study.

In addition, peer-reviewed literature showed that most studies used primarily quantitative research designs. Upon reflection, it became clear that the content of autobiographical memories provides valuable qualitative data that cannot be fully utilised or explored through a quantitative design alone. Thus, the researcher used a single memory activation method in a mixed method approach to investigate aspects of the RB, such as distribution, valence and life domain importance.

1.4 Purpose of the study

The purpose of this study, using the convergent parallel mixed method was to investigate if there is a difference in the dynamics of AM during the RB between middle-aged adults (40-59 years), and older adults (60-79 years) in a small South African sample. The dynamics of AM for this study comprised of the temporal distribution of autobiographical memories, valence of recalled events, and the life domain importance of recalled events.

This study in part replicated an existing study conducted by Assink and Schroots (2010) in the Netherlands but with a changed version of the lifeline interview method (hereafter called LIM). The LIM accommodated the diversity of the participants in both age cohorts, as well as ethnic, and language groups in a pragmatic approach. It facilitated a visual representation of an individual's life story and enhanced communication in the research process through both quantitative and qualitative data collection. Quantitative data analysis

showed the relationship between the number of memories recalled and age of encoding. While qualitative analysis of the visual lifeline produced valence values, AM descriptions were coded to reveal life domain importance and event content.

1.5 Organisation of the study

This study is reported in five chapters.

Chapter 1: General overview

The chapter begins with an overview of the phrase 'down memory lane' used in the title. It then discusses AM, the complexity of research into AM and RB, and the rationale for studying the RB. It concludes with the motivation for conducting the study, the purpose and organisation of the study.

Chapter 2: Theoretical background and literature review

This chapter contains three sections and is a review of relevant literature addressing AM and RB. The first section starts by integrating the life span developmental perspective in AM. The second section contains an overview of the important aspects of AM and different methods of studying AM. In the last section, the RB and its different theoretical explanations are discussed and aligned with existing research. Gaps in existing research, the implications for this study and the research questions conclude the chapter.

Chapter 3: Research design and method

In this chapter, in-depth reason for choices made in methodology with examples from literature and studies to back it up is discussed. The convergent parallel mixed method research design, quota sample selection, and research instruments are illustrated and discussed. The data collection procedure is explained as well as the process and details of data analysis for both quantitative (statistical procedures) and qualitative data (coding).

Chapter 4: Results

This chapter firstly reports on the demographic profile. It then presents the findings of the study and contains quantitative and qualitative results. The research questions guide the presentation of the findings.

Chapter 5: Conclusions, limitations and recommendations

This chapter contains a discussion of the results. It reaches a conclusion with regard to the primary research aim, which was to investigate the difference in the dynamics of the RB for middle-aged and older adults in the South African sample. Limitations and their implications for future research are discussed as well as the contribution of the study towards future research.

1.6 Conclusion

'Down memory lane' is a road that all people travel. This chapter has introduced AM to emphasize the role, function and importance that it has on a basic level of human functioning. It also highlighted the complexity of some of the aspects and study of AM and the phenomena of the RB. The chapter stated why it is important to study the RB and how a practical application of RB research could be beneficial. The motivation and purpose of this study aimed to set the trend for the rest of the dissertation. In the following chapter, a detailed background for the study is provided in terms of existing literature and the theoretical framework.

Chapter 2. Theoretical background and literature review

2.1 Introduction

The purpose of this chapter is to create a theoretical basis for the study by summarising and synthesising existing literature about AM and in particular the RB. To understand the RB, it is important to include historical research that reveals the context, approaches and focus of studies and the development of research since 1988.

The researcher explored Proquest Central, PsycInfo, Pubmed, PsycARTICLES, ScienceDirect, MIT CogNet, and JSTOR for peer-reviewed literature pertaining to the RB by using the keywords or combination of keywords: reminiscence, bump, peak, effect, and component. The search produced 328 journal articles about individual RB studies and 2 articles featuring systematic reviews. The researcher selected 32 studies[2] for study, analysis and inclusion in the literature review based on inclusion criteria and citation ratings.

The literature review is divided into three sections to reflect the integrated approach that incorporates the lifespan developmental perspective into the AM framework, and to produce a more relevant and meaningful structure. Firstly, aspects of the lifespan developmental perspective in memory research are explained to facilitate integration into the AM background. Secondly, a discussion of the concept, functions and models of AM that applies follow this explanation to the study, as well as different methods of studying AM. Thirdly, the RB is established in AM through a brief discussion of the studies conducted and aligned with the different theoretical explanations of the RB.

[2] Appendix A contains the list of studies analysed and used in the literature review.

2.2 Lifespan developmental perspective[3]: an overarching framework

2.2.1 An overview

An individual grows, develops, changes and ages throughout their lifespan. Stability and change is part the multidimensional and multidirectional life of a human being. Development occurs in biological, cognitive and psychosocial domains simultaneously at different rates (Feldman, 2017; Sigelman & Rider, 2018; Sugarman, 2006).

The lifespan perspective developed in the 1970's from a need to understand and research the complexity of human development in a more integrated manner (Feldman, 2017). The integrated approach advocates that development and important changes take place during the whole lifespan and are multicontextual in nature. Changes, therefore, have to be interpreted in terms of culture as well as context. Interdisciplinary research is encouraged as it enhances our understanding of the interrelatedness of life domains and the influences the environment exerts (Sigelman & Rider, 2018).

The development and utilisation of memory is a crucial part of the cognitive domain in human development. Memory research has contributed information about the mechanisms and emergence of memory to the development of lifespan developmental psychology (Hertzog & Shing, 2011). In a reciprocal manner, the lifespan approach has contributed by providing a framework for theoretical and empirical integration in AM (Ohta, 2002).

2.2.2 The lifespan perspective in autobiographical memory

In writing about dialectics and research on remembering, Kvale (1977, p.165) states, "remembering is a relationship of a developing individual to a developing world". This

[3] For the purposes of this document, the concept 'lifespan developmental perspective' will be referred to as lifespan perspective.

statement provides a strong argument for applying the lifespan perspective to studies about AM, as it highlights not just the developmental aspect but also the effect that the context and environment can have on the act of remembering.

The term 'autobiographical memory' in this study is defined as memory that includes both episodic and semantic components, to describe the personal experiences of an individual through a reflexive lens, in order to build a personal history or timeline. Autobiographical knowledge also encompasses more than just semantic memory as it includes personal, factual and cultural knowledge (Conway & Loveday, 2015).

In recent years, a number of studies have incorporated the lifespan perspective in AM. Studies that refer to lifespan perspective include topics such as the integration of contextual changes in the life script theory (Rubin, Berntsen, & Hutson, 2009); the life story account of the RB (Demiray, Gülgöz, & Bluck, 2009); the development of AM in childhood (Nelson & Fivush, 2004); patterns of events over the lifespan (Assink & Schroots; 2010); the dynamics of AM across the lifespan (Assink & Schroots, 2010; Schroots, Van Dijkum, & Assink, 2004) and linking conceptual autobiographical knowledge to cross cultural aspects in the Self-Memory System (SMS) (Conway & Jobson, 2012).

Incorporating the lifespan perspective in AM allows for an integrated contextualized approach in a pragmatic manner. This broadens the scope of inquiry to highlight that an individual functions in an ever-changing context and that a variety of influences can affect recall of an experienced event. Thus, factors that can affect the process of recall can range from memory functions such as encoding, storage or retrieval to individual development in cognitive, social, cultural and environmental domains since the time the experienced event happened (Fitzgerald & Broadbridge, 2012).

Traditionally, the majority of research into memory used younger adults such as university students as participants. In keeping with the principle that development is a

lifelong process and the fact that because of their life experiences older adults can contribute significantly to AM research, it is ideal to include older age cohorts in AM studies.

To measure and understand change in AM across age cohorts, either a cross-sectional design or a longitudinal design is used. The cross-sectional design is used to compare age cohorts at the same point in time, in a time efficient manner. This allows for comparison between birth cohorts and individuals (inter-individual) (Sugarman, 2006). Assink and Schroots (2010) conducted a longitudinal study into the dynamics of AM using the LIM where participants were interviewed three times over a span of five years, which allowed for intra-individual comparisons. Further aspects of the lifespan perspective are integrated and discussed chapter 2, section 2.7.1.

2.3 Autobiographical memory

Think back about your life. What is your fondest memory? This question would involuntarily evoke private memories of personal experiences that flash like brief pictures through one's mind. All human beings have the same reflexive response to the request to remember and describe experiences that originate from their personal lives (Staudinger, 1996a). The act of remembering combines autobiographical event memory and knowledge through mental synthesis that the individual experiences as memories (Conway & Jobson, 2012).

The concepts of reminiscence and AM are often used interchangeably, but it is important to define the subtle difference. In 1963, Butler wrote a seminal article titled "The life review: An interpretation of reminiscence in the aged". This article formed the cornerstone for research on reminiscence and provided both a description and a name for the process of life review. Butler (1963) described life review as the increased activity of remembering or reminiscence by which a person evaluates his or her life as it nears its end.

Therefore, reminiscence is perceived and studied as an activity associated with mature adults (Parker, 1995; Wong & Watt, 1991). In creating the Reminiscence Functions Scale, Webster (1993, p.256) identified eight distinct memory functions, namely "death preparation, boredom reduction, identity, problem solving, conversation, intimacy maintenance, bitterness revival, and teach/inform". Identity, problem solving, and conversation overlaps with the three functions of AM, and the functions of reminiscence are more specific to life review.

As reminiscence deals with personal events and memories, Webster and Cappeliez (1993) suggested that AM and reminiscence should be studied together. However, Rubin and Schulkind (1997) disagreed because they considered reminiscence to be a conscious process carried out for personal purposes. They differentiated between AM as the process of recollection, and reminiscence as the purpose of recollection.

AM is more than just recollected events that belong to an individual's past or personal history. It is the essence of one's past self, and an integration of recall and interpretation of experienced events, evaluated against one's goals, purpose and self-definition (Conway & Pleydell-Pearce, 2000; Fivush, 2011; Rubin, 2006). Various factors such as age, gender, emotion, developmental stage and culture affect the processes of interpretation and evaluation and thereby influence AM (Gilboa, Rosenbaum, & Mendelsohn, 2018).

The multidimensional nature of AM is constituted by temporal, spatial, emotional, and sensory components, which contribute to the richness and variety of personal experiences (Gilboa et al., 2018; Goldstein, 2015). The ability to communicate AM enables a person to incorporate memories of their personal experiences into a life narrative that defines the 'self' (Fivush, 2011). This life narrative is crucial for a sense of identity, coherence, and direction in life.

2.4 An autobiographical memory research overview

In 1977, Neisser criticised the memory research community for the fact that most research done at that time was conducted in laboratories and could not be readily generalised to everyday memory. Most research focussed on studies that favoured internal validity while ecological validity was virtually ignored (Robinson-Riegler & Robinson-Riegler, 2008). Neisser's critique, and the debate that followed, launched an ecological movement that effected a change in content areas investigated. Research in the field of AM grew and benefited from these debates as the emphasis fell on the importance of everyday memory outside the laboratory and initiated enquiries into the different aspects of AM (Staudinger, 1996b). In AM research, a crucial factor to consider is that all individuals are unique and each individual's AM is affected not only by their personal history but also by their developmental life stage, gender, culture, emotion, and other complex intricacies of their individual variation (Robinson-Riegler & Robinson-Riegler, 2008).

2.4.1 Autobiographical memory domains

In conducting the literature review, it became clear that the aspects studied in AM broadly fall into distinct domains. The domains identified by the researcher include retrieval of AM; organisation of AM; AM and emotion; distribution of AM; socio-cultural aspects of AM; functions of AM, and content of AM. The domains are highly interconnected.

In order to comprehend the complexity and diversity of AM research and the intricate relationships between domains, the researcher constructed a diagram (Figure 2.1). The diagram demonstrates the interconnectedness of the domains through the dotted lines. Each domain forms an important part of the field of AM. It is clear that studying a single domain in isolation is unattainable due to its intricately linked nature. It is not possible within the available space to do a thorough review of literature on all domains.

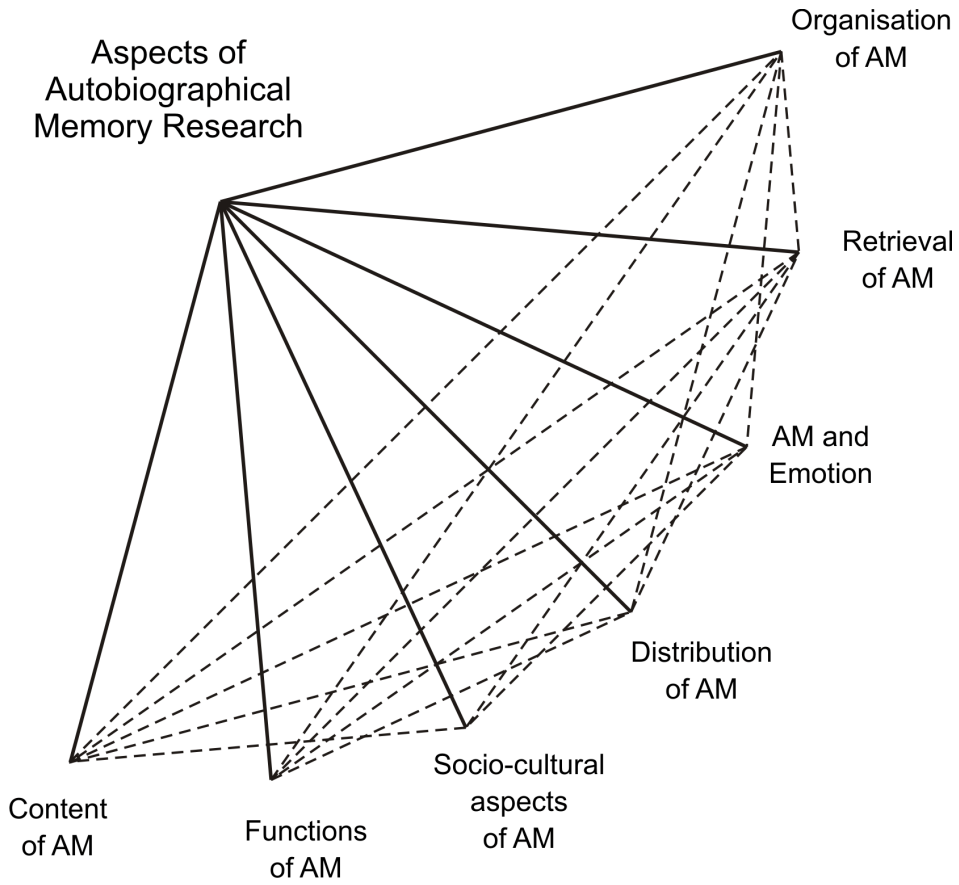

Figure 2.1 Domains of AM research (Own construction, 2018)

What does emerge is that virtually all studies about AM, including the studies[4] that concentrate on the RB, consist of a combination of aspects that can be reflected in the domain categories on the diagram. Understanding the aspects involved provides more depth and clarity with regard to a specific study. As an example, the study Assink and Schroots (2010) conducted into the dynamics of AM using the LIM was plotted graphically (Figure 2.2). The three main aspects studied were the number of events that relates to the distribution domain, the content of the events that relates to the content domain and the affective aspects of the events that relates to the emotion domain.

[4] The matrix in Appendix B provides a complete analysis of AM domains per study, for all 32 articles used in this study.

Assink, M., & Schroots, J. J. (2010).
The dynamics of autobiographical memory: Using the LIM\| life-line interview method.

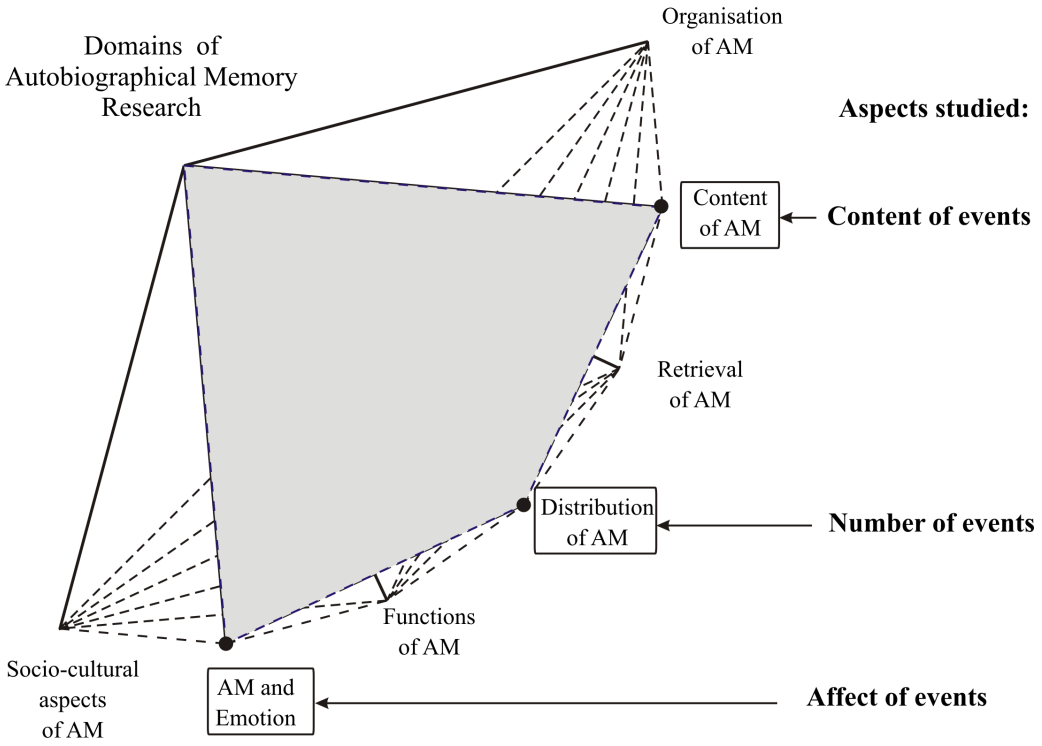

Figure 2.2 Study by Assink and Schroots (2010) plotted (Own construction, 2018)

2.4.2 Memory activation methods used to study autobiographical memory

In AM, researchers study self-memories from past events of individuals. The main challenge is verifying the accuracy of the specific memories. Although it is possible to check dates of memories successfully, details of memories are more difficult to verify. Therefore, researchers concentrate on aspects of memories that they can assess such as the vividness, detail and emotional intensity. They also try to determine how the memory characteristics differ across cultures and age cohorts.

In AM studies, the memory activation method can influence the outcome of the task (Elnick, Margrett, Fitzgerald, & Labouvie-Vief, 1999; Koppel & Rubin, 2016). Researchers use cued recall, free recall and diary studies in combination with a variety of instruments and measurement tools, such as questionnaires, timelines, and neuro-imaging depending on their research focus (see chapter 1, section 1.1 for related discussion).

Neuro-imaging techniques, for example, functional magnetic resonance imaging (fMRI) are used to study brain activity by detecting changes related to the blood flow in the brain (Cabeza & St. Jacques, 2007; Gilboa et al., 2018). Cabeza and others (2004) devised a study where AM were tested with great accuracy. University students took photos of 40 campus locations. Afterwards, they observed their own photos and photos taken by others. They identified their own photos while an fMRI scanner measured their brain activity. When they looked at the photos they took, there was increased activity in the hippocampus and in the prefrontal cortex. This study exercised more control over the encoding conditions of specific visual and spatial episodic details, and determining the precise age of the memories (Cabeza et al., 2004; Holland & Kensinger, 2010).

Analysis of data collected in AM studies varies greatly. In some studies although content of memories (qualitative data) is retrieved, only some information such as the age of encoding of the memory (quantitative data) is used. This section provides a brief overview of methods used to study AM.

2.4.2.1 Cued recall. This method was originally devised in 1879 by Galton and revived by Crovitz and Shiffman in 1974 (Goldstein, 2015). This is a popular method to study AM. This method retrieves a memory by association with a cue. Retrieved memories are then dated and depending on the focus of the study, the researcher may use rating scales to determine the phenomenological experience of each recalled memory.

The advantage of this method is that different cue types such as words, pictures and odours can be used. Limitations include lack of control and direction over content of retrieved memories. It is difficult to assess the accuracy of retrieved memories. The effectiveness of the cue type can also vary due to cultural and language differences. Researchers identified the RB using cued recall to determine age distribution of encoding of memories (Conway & Haque, 1999; Rubin, Schulkind, & Rahhal, 1999).

2.4.2.2 Free recall. The free recall method does not use any specific form of cueing (Munawar, Kuhn & Haque, 2018). This method, a participant is required to generate a self-nominated event that meets a pre-determined criterion. Pre-determined criteria can include requests for most vivid memories (Fitzgerald, 1988); most emotional memories (Alea, Ali & Marcano, 2014; Berntsen & Rubin, 2002; Conway & Haque1999); and most important memories (Gluck & Bluck, 2007; Thomsen & Berntsen, 2008; Zimprich & Wolf, 2016).

Different measures use free recall to generate a life story or life narrative through techniques that sometimes include a chronological search strategy (Berntsen and Rubin, 2002; Rubin and Berntsen, 2003; Conway et al., 2004). An example of this is the extended life-story technique developed by McAdams (1993). His technique consists of a three-hour interview in which the participant divides his life story into its main chapters and provides a plot summary for each chapter to identify important events. Additional methods that elicit important events and autobiographical information include the lifeline interview method (Assink & Schroots, 2010); lifelines (Brugman, 2000), timelines (Rappaport, Enrich, & Wilson, 1985; Elnick et al., 1999), and the life history timeline method (Conway & Holmes, 2004).

In addition to free recall, a participant is sometimes asked to imagine an event or a series of events. A 'free imagine' task is used to obtain information of a prospective event. Neuro-imaging evidence has shown that there is a direct link between imagination, episodic memory and predicting the future (Mullally & Maguire, 2014). The cultural life script task instructs the participant to imagine what events are expected to occur in the life of a prototypical infant within a culture (Bohn & Berntsen, 2011; Janssen, 2015; Janssen, Uemiya & Naka, 2014; Ottsen & Berntsen; 2014). The results of retrospective memories are combined with prospective expectations and this allows researchers to formulate theories about an individual's life within different cultures (McAdams, 2012).

The advantage of the free recall method is that the event descriptions are provided in the context of the participant's life. However, due to large quantities of information it makes analysis complicated and time consuming.

2.4.2.3 Diary studies. The diary method requires participants to record a specific number of events each day that can be tested at a later stage. In a study with female students, Burt, Kemp and Conway (2003) found that participants combined different daily diary entry episodes to form an autobiographical event. The advantage of the diary method is that it makes it possible to test the accuracy of the participant's memories and allows for a broader range of memories to be sampled. The limitation is that it is reliant on the record keeping of the participant and the fact that the participant may be biased in the events that are recorded. In recent studies, the diary method has also been used to record involuntary memories (Berntsen, 2009).

2.5 Theoretical frameworks in autobiographical memory

AM is a diverse field covering many research areas using different methods of study. Currently, there is no single theoretical framework that covers the diversity of topics in AM research (Conway & Pleydell-Pearce, 2000). Rather, there are different theoretical models that cover specific topics.

2.5.1 The basic-systems model

This model developed by Rubin (2006), focuses on encoding and retrieval of autobiographical memories and operates from the perspective that AM is constructed from a number of independent basic systems. Each system functions as a separate network with a specific role in the recollection of events, and interacts with the other networks to produce AM information. Systems include sensory systems, motor activity, spatial imagery, emotion, language, narrative, explicit memory, search and retrieval (Rubin, 2006). Studies that were

conducted using the basic-system model include the study of the relationship between visuospatial, verbal memory and AM (Janssen, Kristo, Rouw & Murre, 2015), and the study of spatio-temporal dynamics of AM in which recall, emotional intensity, and memories were explored (Daselaar, et al., 2007).

2.5.2 The social-cultural developmental model

Developed by Fivush and Nelson (2004), this model focuses on the role that language and social interaction play in the formation of autobiographical memories. The model highlights the interaction among various functions, such as memory, language, and self-representations in AM. The emergence of a functional AM system from the age of five years is the culmination of the gradual development of cognitive functions (episodic and semantic memory) and social functions (language and communication) that continues into adolescence (Fivush, 2007).

The model highlights important aspects of the role of language. This includes the fact that autobiographical memories are communicated in verbal format. Language facilitates awareness of memories as representations of the personal past, which in turn, is influenced through communication with others to contribute to the AM organisation (Nelson & Fivush, 2004).

The socio-cultural development model was used in a study conducted by Fivush (2008) that explored how individual lives are constructed in family narratives through remembering and reminiscing. Other studies that used this model included topics such as children's development of understanding, children's development of self and how children communicate with their parents (Fivush, 2007; McLean, Pasupathi & Pals, 2007).

2.5.3 The self-memory system

Conway and Pleydell-Pearce (2000) developed the SMS. It is a framework that

incorporates the role of the conceptual self with current goals, in order to construct a hierarchical transitory representation of events, which are experienced as autobiographical memories through conscious effort. The three levels of the hierarchy represent lifetime periods, general events, and event-specific knowledge (Conway & Pleydell-Pearce, 2000).

The SMS has two main components, namely the autobiographical knowledge base and the working self. The autobiographical knowledge base is organised to support our sense of self. The working self contains a goal hierarchy, and various other internal mechanisms such as beliefs, values and attitudes. When the autobiographical knowledge base engages with the working self through the act of remembering, a unique memory is retrieved.

Both systems can also operate independently. Numerous studies used the SMS as a theoretical framework. Examples include studies on AM and the SMS in posttraumatic stress disorder (Sutherland & Bryant, 2008), functional independence within the SMS from two cases of developmental amnesia (Picard et al., 2013), and neural substrates of the SMS (Martinelli, Anssens, Sperduti & Piolino, 2013).

2.6 The organisation of autobiographical memory

The organization of AM is concerned with the basic mechanisms, the views and debates around the interdependence and integration of episodic and semantic memory.

Although AM is studied across multiple disciplines, there are still debates about the nomenclature and lack of a specific theoretical framework for either the diversity or distinctiveness of AM (Assink & Schroots, 2010; Conway & Pleydell-Pearce, 2000; Neath & Surprenant, 2006). Two types of memory linked to AM are semantic memory and episodic memory (Goldstein, 2015). Episodic memory is a memory for the details of events (remembering) and semantic a memory for facts (knowing).

In AM, the individual is involved and invested, thus it is more complex than just the

detached recall of an event or a fact (Fivush, 2011). The concept of autonoetic consciousness describes the individual's experience of self (Tulving, 2002). Autonoetic consciousness is the distinguishing factor between recalling the factual details of a general event and a personal event, in which the individual participated. Similarly, it emphasizes the difference between a general fact and a personal fact.

To demonstrate the interaction between episodic, semantic, and AM the researcher constructed the diagram (Figure 2.3). It shows the separate components and interactions in order to produce a memory of a specific event in school.

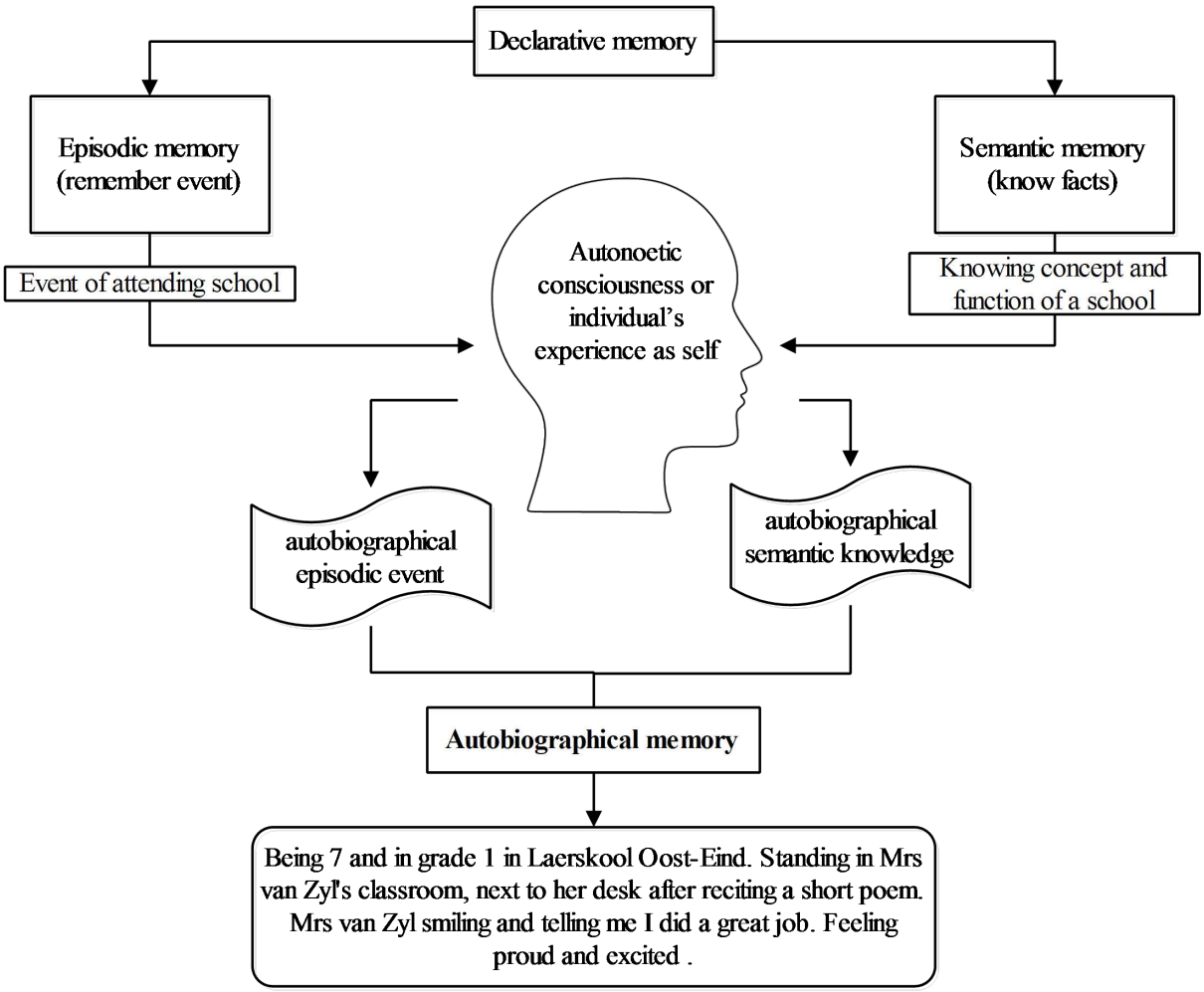

Figure 2.3 An example of autobiographical memory (Own construction, 2018)

Episodic memory is often likened to 'mental time travel'. Remembering the personal events that make comprise a life story can place or transport the individual back into a specific situation at a specific time of personal significance (Tulving, 2002). Semantic memories enable an individual to form self-images. This allows an individual to identify with roles such as knowing one is a teacher, wife and a mother through our autobiographical knowledge about the self, comprising traits, family roles and group-membership.

In AM, semantic memory also plays a role in the organisation of memory (Rathbone, Holmes, Murphy, & Ellis, 2015). According to research, episodic memories become less accessible as we age, while semantic autobiographical memories are remembered (Levine, Svoboda, Hay, Winocur, & Moscovitch, 2002).

Theoretical discussions of the role that episodic and semantic memory plays in AM and conscious experiences, and how it relates to the retrieval of autobiographical memories are ongoing. Viewpoints on the subject range from AM being considered as equal to episodic memory due to the fact that fMRI studies activate the same areas for AM as for episodic memory (Gilboa et al., 2004); to the view that AM is an integration of semantic and episodic memory (Cabeza & St. Jacques, 2007); and to the conclusion that AM is the sum of interactions between episodic and semantic memory, language, imagery, and social functions (Nelson & Fivush, 2004; Rubin, 2006).

2.7 Content of autobiographical memory

The content of AM provides researchers with information about what kinds of experiences an individual is most likely to remember. It also relates to the organisation of episodic, semantic and autobiographical memories. In the content of AM domain, the experience and memory of events are related to the lifespan perspective.

2.7.1 Life event from a lifespan perspective

The life story or life narrative of an individual is the basis of AM. It is a chronological account of events and experiences integrated from the different phases, aspects or events, transitions and domains of the individual's life integrated to be coherent in a visuospatial imagery format (Cabeza & St. Jacques, 2007; Goldstein, 2015; Sugarman, 2006).

Sugarman (2006, p.127) describes events as "benchmarks in the human life cycle" that make up the life story of the individual. From a lifespan perspective and a contextual or pragmatic paradigm approach, the root metaphor is a historical event. In AM research, an individual often recalls an event that influenced and shaped their perception of the world and their interpretation of their reality. An event in AM refers to a unique specific event. The detail and the duration of special events can vary. It is also the link between abstract thematic autobiographical knowledge and representations of specific experience in event specific knowledge (Burt, et al., 2003).

To account for contextual influences, an event is classified as a normative age graded event (for example, starting a career in early adulthood), a normative history graded event (such as the 9/11 attack on New York), and a non-normative age graded event (for example, being a victim of a violent crime in childhood). Normative age graded events are normally associated with life script theory and most often reported by participants in life stories (Scherman, Salgado, Shao, & Berntsen, 2017; Thomsen & Berntsen, 2008). Transition points in an individual's life are points at which his/her life changed due to an experience or an event. These points are recalled easily due to their significance (Goldstein, 2015). Events are linked together in a personal narrative to form a life story or a personal lifeline. The life narrative is a way to order life events in a temporal sequence for coherence (Sugarman, 2006).

2.7.2 Autobiographical memory knowledge base

The autobiographical knowledge base has a hierarchical nested or partonomic structure that represents levels of autobiographical knowledge (Conway & Loveday, 2015). The hierarchy has both a temporal and a specificity component (Figure 2.4).

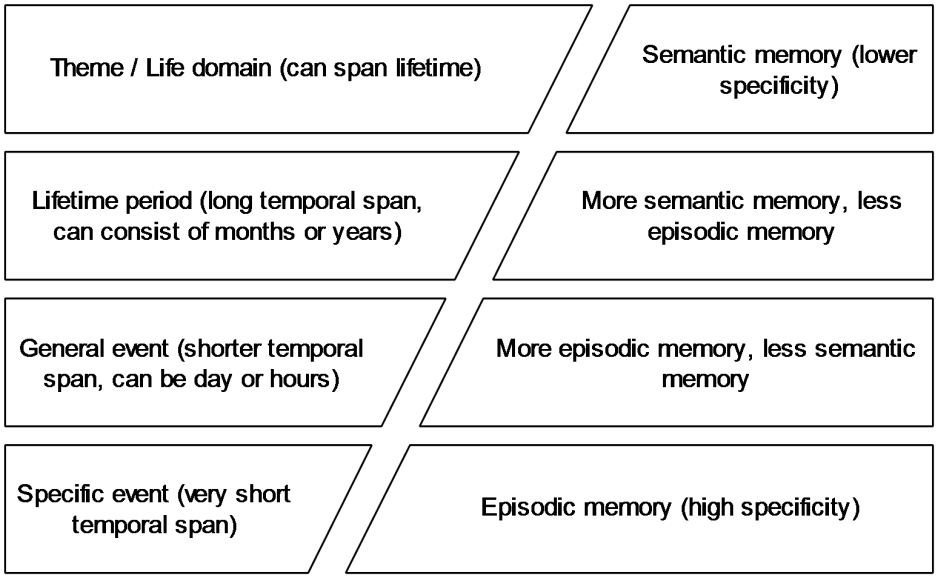

Figure 2.4 Temporal specificity relationship of autobiographical knowledge base (Own construction, 2018)

From a temporal perspective, the autobiographical knowledge base has a top-down configuration with life domains or themes that can span an individual's whole life, whereas a specific event can last seconds or minutes. This corresponds inversely to specificity, which has a bottom-up configuration. In specificity, a specific event is comprised of an episodic event, which is "fragmentary knowledge derived from experience" and highly specific (Conway & Loveday, 2015, p.575). Themes and lifetime periods contain more semantic than episodic memories and are less specific (Cabeza & St. Jacques, 2007).

In the autobiographical knowledge base, an individual's life story is linked through themes or lifetime periods that can be organised around relationships, work or education (Bluck & Habermas, 2000). In the example constructed below (Figure 2.5) the themes are education and work.

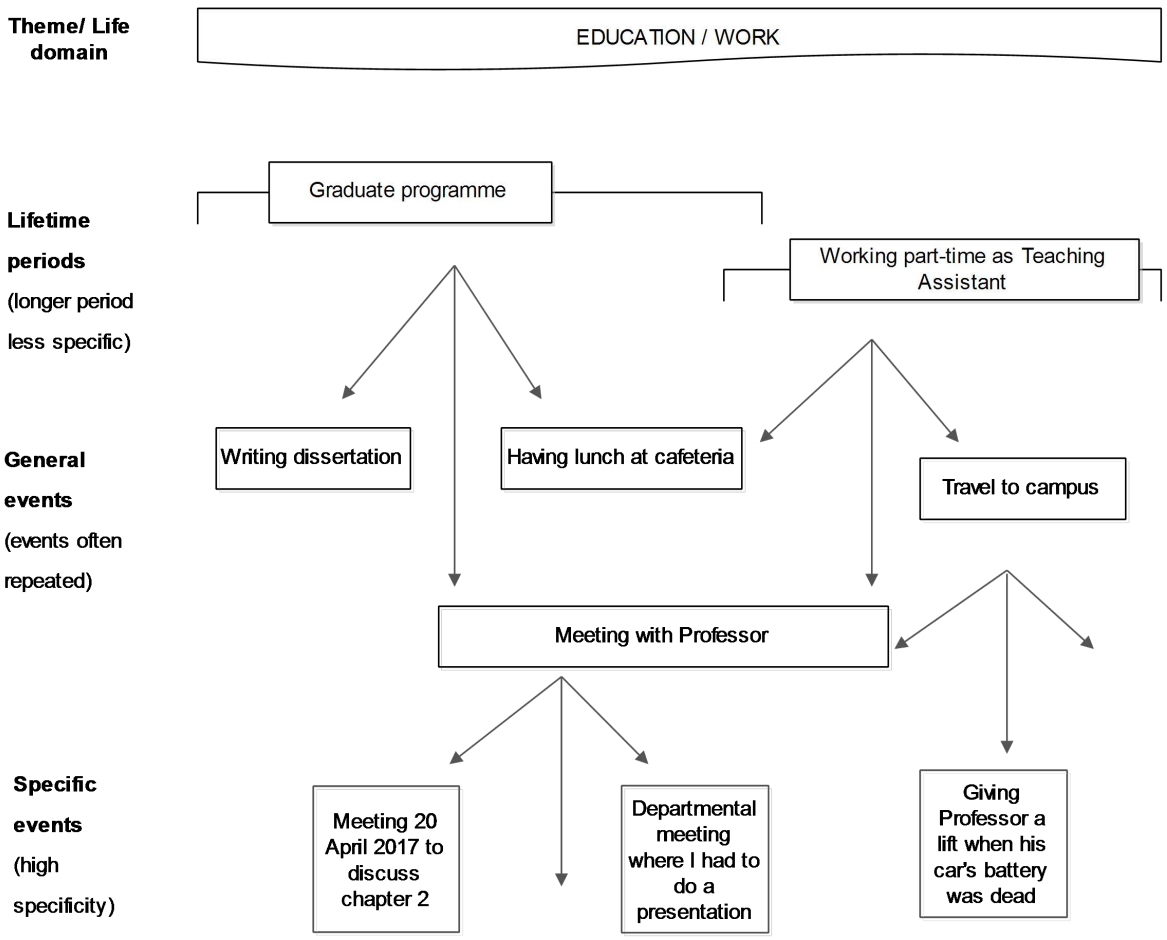

Figure 2.5 Example of autobiographical knowledge base (adapted from Cabenza & St Jacques, 2007)

These themes are broad and include a number of sub themes or lifetime periods that define the theme for the individual at a certain age or age period. This individual is in his twenties and in graduate school, while he simultaneously works part time as a teaching assistant at the university. His AM is organised by lifetime periods that contain both general events and interact with his episodic memory to retrieve specific events.

General events such as travelling to campus and having lunch in the cafeteria are events that happen repeatedly, and are abstract, but can be used to prime retrieval of more detailed events. This is illustrated in the specific event knowledge of giving the professor a lift after his car battery died and he needed to get to a certain destination. This specific memory would be recalled from existing episodic memories. Conway (2009) classifies episodic memory representations as three types, namely episodic elements, simple episodic

memories, and complex episodic memories.

When episodic elements, which are formed outside conscious awareness, are framed by contextualised knowledge, it becomes a simple episodic memory. Simple episodic memories framed by contextualised knowledge become a complex episodic memory (Conway, 2009; Conway & Jobson, 2012). In the example, recalling a rainy Friday afternoon with the professor struggling to start his car and being in a rush constitute a complex episodic memory due to the detail. This example illustrates a simple fragment of the autobiographical knowledge base which provides a mechanism in which AM together with the episodic memory can retrieve personal memories.

2.8 Autobiographical memory retrieval

An autobiographical memory is multidimensional, because it describes a specific event that occurred at a particular place (spatial) and time (temporal), within a specific context and involved emotional and sensory components, for the individual (Goldstein, 2015). This type of event memory is consciously accessible and can be communicated flexibly because the individual can describe the details of the event even if they never verbalised it before (Gluck, Mercado, & Myers, 2008).

2.8.1 Autobiographical memory retrieval processes

There are two types of retrieval processes in autobiographical memories, namely generative (strategic) retrieval and automatic (direct) retrieval (Conway, 2005; Goldstein, 2015). Both methods relate to how the autobiographical knowledge base is searched for a specific memory. The process of searching the autobiographical knowledge base triggers a pattern of activation, where one episodic event can trigger simple episodic memories or complex episodic memories, until the memory that is being searched for is found (Conway & Loveday, 2015).

Generative or strategic retrieval is an active top down search process that requires effort. The search is conducted in a strategic and cyclic form. In this type of retrieval, a cue is compared to stored episodic information in the autobiographical knowledge base. If the cue matches an event, the episodic information is recalled. However, if the cue does not match the stored information, the search continues in a strategic and cyclic search process. An example of this would be the word 'apple' in a cued recall study. The autobiographical knowledge base is searched for a memory that contains an apple. This process will continue until the relevant memory is retrieved (Conway & Pleydell-Pearce, 2000; Goldstein, 2015).

Automatic or direct retrieval is a process of association where a retrieval cue or episodic event maps directly onto a specific episodic event in the autobiographical knowledge base and comes to consciousness (Goldstein, 2015). An example is that on a rainy afternoon an individual sees someone struggling to start a car and involuntarily remembers the professor in the same situation. Direct retrieval is a bottom-up process and does not need much attention or retrieval effort, as it is a spontaneous recollection. In direct retrieval, the strategic and cyclic search process is skipped and the cues map directly onto the same type of event information (a rainy afternoon, car trouble) that result in a spread of activation. This type of activation produces an immediate recollection (Conway & Pleydell-Pearce, 2000).

2.8.2 Factors that affect autobiographical memory retrieval

Various factors and methodological issues can affect the specificity and accuracy of AM retrieval. Autobiographical memories are not an accurate account of experienced events since they involve personal interpretations. Due to the constructive nature of memory, an individual often reconstructs a memory to fit with a personal scheme of self (Barslou, 1988; Conway, 1996a). The process of recall is subjective and influenced by cognitive processes, including perception, imagination, beliefs and is therefore prone to bias and errors (Gilboa et al., 2004; Rathbone, Conway, & Moulin, 2011). If the same autobiographical memory is

recalled a number of times, the details will not be identical but can differ depending on the circumstances, the listeners involved, and the motivation and goals of the individual recounting the memory (Conway, 1996b).

Memory accuracy is defined as an interaction between coherence and correspondence (Conway, 2005). Coherence is a memory representation that is consistent with the self-beliefs of the conceptual self, thus "true to self" (Conway & Loveday, 2015, p.578). Correspondence is a memory representation that is similar to or compatible with a previously experienced event, thus "true to the event" (Conway & Loveday, 2015, p.578).

All memory representations are a combination of correspondence and coherence, and can be plotted on a 2-dimensional space of coherence and correspondence (Figure 2.6). An exact account of an event, which is rare and unusual, falls in the high correspondence-high coherence quadrant, while most autobiographical memories fall in the low correspondence-high coherence quadrant.

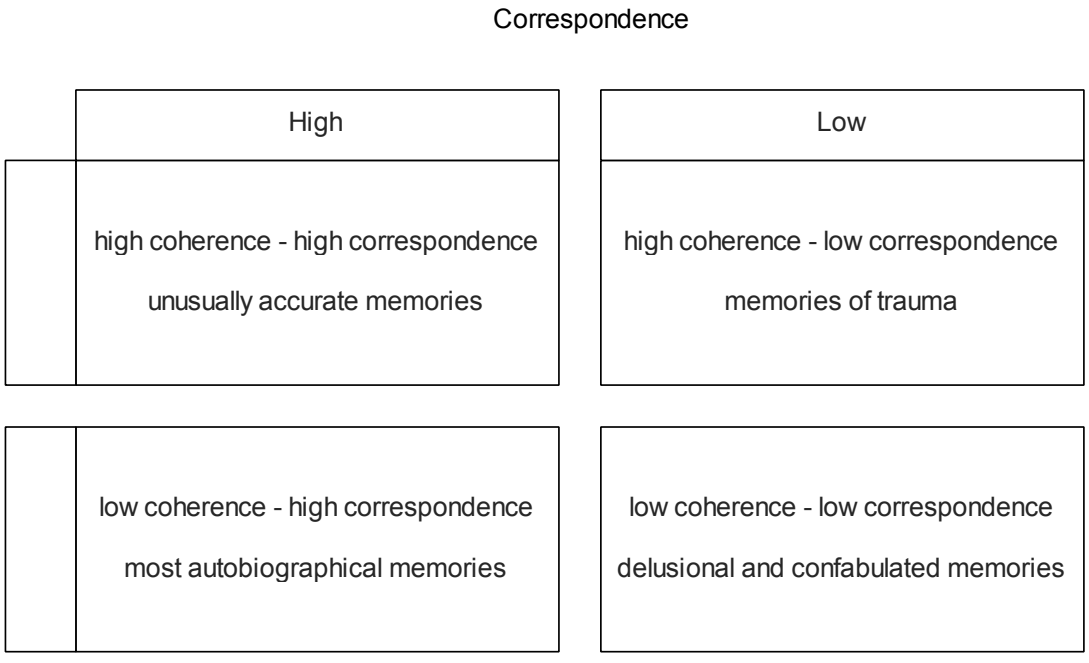

Figure 2.6 Correspondence-coherence model (constructed from Conway & Loveday, 2015, p.578)

When a memory is confabulated and details are omitted, distorted, changed or left out, it falls in the low correspondence-low coherence quadrant. Often, this type of reconstructed memory can be classified as a veridical memory. In a veridical memory, the individual who recalls the event is not trying to provide a false version of the event, but truly believes that the event happened exactly in the way he/she recounted it. Their version of the event is their truth at the moment they recall it. Thus, an individual's internal representation of the world might not reflect the external world (Bluck & Levine, 1998). This is often a problem in witness testimony.

Research by Hannula, Baym, Warren, and Cohen (2012) suggests that eye movement is an accurate measure in determining veridical accounts of past events and experiences. Measures of eye movement have successfully been used to study different cognitive processes. Eye movement patterns, constrained eye movement and blink rate provides unique information about memory retrieval processes, and can provide a practical tool in applied settings to study AM in the future.

Memory specificity, as discussed in relation to the autobiographical knowledge base, refers to the level of recall and the number of details of an event. Talarico and Rubin (2003), in a study about flashbulb memories, found that a vivid detailed memory is not always completely accurate. The more specific and detailed a recalled memory is, the more the possibility of error increases (Roediger et al., 2012). However, the effect of gender differences in AM is a mediating factor that can affect detailed recall.

Research into gender difference effects in AM show that females recall more detailed autobiographical memories (Pillemer, Wink, DiDonato, & Sanborn, 2003); show greater episodic memory specificity (Fuentes & Desrocher, 2013; Wang, Hou, Tang, & Wiprovnick, 2011); and are faster to recall and date the memories accurately than males (Davis, 1999; Skowronski & Thompson, 1990). The memories recalled by females are also more vivid and

emotional in nature (Buckner & Fivush, 1998; Wang et al., 2011). Most researchers interpret these results from the perspective of gender differences in encoding and reminiscence practices.

In research about parental reminiscence style, both mothers and fathers were found to reminisce differently with their sons and daughters. With daughters, the parents elaborated more, discussed emotional aspects of the past and provided more feedback than with their sons. This might contribute to the fact that females at a later stage tend to recall more information by adding spatial-temporal and evaluative context to their recalls (Buckner & Fivush, 1998; Rubin et al., 1999). It might also account for the fact that females encode and store autobiographical memories in more detail than males (Bloise & Johnson, 2007).

2.9 The functions of autobiographical memory

The consensus on the functions of AM is that it contributes to the adaptive nature of the individual. The three main functions therefore focus on self-definition or identity, self-in-relation or social interaction and self-regulation or direction in the life of the individual. The lifespan perspective delineates life phases where each phase is seen within the context of its development, goals and concerns. The functions of AM relates directly to these life phases.

Research in AM often focuses on the purpose that recalling personal memories in a reflexive manner serve in an individual's life. Personal experiences over time contribute to self-definition (Conway & Pleydell-Pearce, 2000; Bluck & Alea, 2008); how the individual relates and interacts with other people based on experiences (Fivush, 2011; Nelson & Fivush, 2004); and how the individual organises and plans based on learning from personal experiences (Joordens & Teaching Company, 2011). Therefore, the three main functions of AM are self, social, and directive (Goldstein, 2015; Bluck, Alea, Habermas, & Rubin, 2005).

To examine the use of AM, a theory-based questionnaire, the Thinking of Life

Experience Scale (TALE) was developed by Bluck, Alea, Habermas and Rubin in 2005. The questionnaire asked participants to specify particular situations in which memories were created, and then to categorize the reports as either directive, self-related, or related to social relationships. The study found a concurrence between the self-related function and directive function (Bluck et al., 2005). A problem in studying the different functions of AM is that researchers assume that participants are aware of the functions and can properly categorise autobiographical memories. Often participants forget the details or the context of autobiographical memories and to the participant it was just an event (Baddeley et al., 2015). In line with the lifespan perspective, research showed that there are both gender and life stage variations in the purpose of thinking and talking about one's life. Age cohorts show different priorities about the functions of AM (Bluck & Alea, 2009; Vranić, Jelić, & Tonković, 2018; Wolf & Zimprich, 2015).

The self-function of AM allows an individual to keep track of changes over a lifespan, while the self-narrative gives a sense of being a stable entity with a purpose, and thus a validation of identity. This also allows the individual to reflect on aspects such as who I am, how have I changed or how have I stayed the same, and why (Bluck et al., 2005). It is important to remember that AM differs across ages, and that culture affects the way people think and therefore shape their memories (Glück & Bluck, 2007). Research has shown that the way an individual remembers past events influences both their sense of self and their general well-being (Rathbone et al., 2015; Bluck, 2003).

The social function allows sharing of autobiographical memories to build, promote and maintain social relationships and is often regarded as the primary function of AM (Bluck et al., 2005; Pillemer, 1998). The sharing of personal experiences facilitates understanding, enhances empathy and creates emotional intimacy. Emotional intimacy creates the perceptual experience of being close to another individual, and fosters expectations of a relationship that involves caring and understanding (Sinclair & Dowdy, 2005). The social function of AM is

also used to pass valuable life lessons from mother to child or from generation to generation (Wang, 2013).

The directive function of AM involves decision-making based on experiences that influence or direct future choices and decisions (Baddeley, Eysenck, & Anderson, 2015; Bluck et al., 2005). This function accesses the remembering imagining system (RIS). Conway and Loveday (2015, p.577) describe the RIS as a "window of accessibility of memories of the recent past and near future". The RIS is important for goal processing as it extends the present not only into the past but also into the future in imagining what can happen. This function is also involved with problem solving. Assink and Schroots (2010) included a study of prospective AM in which participants were asked to draw their future lifeline. Results showed that in general participants predicted normative events for their future and younger participants showed an unstable view of the future. This can be explained in light of the fact that generally young adults have limited experiences in comparison to older adults (Assink & Schroots; 2010).

When single, recurring and extended events were compared based on the AM function they served, single events served a self and directive function, while recurring events served a social function. Self, directive and social functions were all comparatively high for extended events. This suggests that event characteristics might be an important aspect to consider in future research (Waters, Bauer, & Fivush, 2014).

2.10 Autobiographical memory and socio-cultural aspects

In recent years, the socio-cultural aspects of AM has been emphasised in research. Studies generally focus on the effect that the social and cultural context has on the memory of the individual as well as on the content and retrieval of AM.

Culture defines social norms, interactions, customs, beliefs and activities of a group

and determines what is and is not acceptable behaviour (Hofstede, 1980). The culture group shares a common worldview and representation of reality through the shared characteristics and experience of everyday life. Values and practices are instilled in infants and young children through their observation and participation in adult activities (Fivush, 2011).

In different cultures, the concept of 'self' is interpreted, explained and expressed in different ways (Markus & Kitayama, 1991). As the 'self' plays such a crucial role in AM, it is important to consider the consequences of cultural self-constructions. There are two main culture groupings namely Eastern (collective or communal) and Western (individualistic) (Hofstede, 1981). The distinction between the two groups is nestled in the way that the 'self' of the individual is constructed in relation to the others through bonds, links, attitude and behaviour (Darwish & Huber, 2003; Hofstede, 1981).

In collective cultures, the self is interdependent on others for the benefit of the whole group. This is characterised by placing the needs of others above the need of the individual, personal identity defined by the individuals place and rank within the group, and abiding by group decisions (Darwish & Huber, 2003). Collective cultures typically include Asian countries such as China, Japan, India and Pakistan but African nations, traditionally, also have a communal or collective culture. Independent or individualistic cultures focus on the individual first. Personal autonomy, privacy, independence and self-realisation co-occur with more self-centred and less concerned with others (Darwish & Huber, 2003). The United States, Australia, Great Britain, Canada, and countries in Europe have predominantly individualistic cultures.

In recounting autobiographical memories, adults from individualistic cultures focus on their own thoughts, feelings and activities and give detailed descriptions. Adults from collective cultures are more prone to recount their actions in relation to the group; their descriptions are more general, and less detailed (Fivush, 2011; Wang & Ross, 2007).

According to Conway and Jobson (2012), the differences in the goal orientation of individualistic cultures in comparison to that of more communal and collective cultures directly influence the operation of AM through the interaction between conceptual self and goal-related actions in the SMS. Therefore, culture does not only influence AM but AM in turn influences culture. Research has shown that this happens through local culture; local habits; rules of social interaction; role models; general attitudes, and peer interaction (Conway & Jobson, 2012).

According to Berntsen and Rubin (2004), culture dictates the timing and even the order of life events in life scripts. Events such as starting to work, getting married, having children are some examples of transitional life events in the cultural life script. Even the average date of the first memory differs between collective and individualistic cultures (Wang, 2013). Cross-cultural studies also reflect differences between parents' reminiscing style (Leichtman, Wang, & Pillemer, 2003), and traditions of thought and practice (Weber and Morris, 2010).

2.11 Autobiographical memory and emotion

Research shows that emotion is one of the determinants in making certain events more memorable (Shulkind & Woldorf, 2005). Many life experiences are personal events, individuals are emotionally involved and therefore it can affect both encoding and retrieval. Emotional memories are easier to remember than non-emotional memories because there are more vivid details (Comblain, D'Argembeau, & Van der Linden, 2005; García-Bajos & Migueles, 2017).

The emotional experience of an event has either positive or negative characteristics. Positive or negative characteristics can influence how a memory is encoded, stored, and retrieved. The emotion that an individual feels at retrieval of an event influences the way in

which he/she reconstructs an experience (Holland & Kensinger, 2010). The distribution of positive and negative events differs across the lifespan as positive memories are recalled more frequently than negative memories (Rubin & Berntsen, 2003). However, studies with individuals who suffer from depression and PTSD have shown that they tend to remember the negative experiences more readily than the positive experiences; this is attributed to their negative self-concept (Leist, Ferring, & Filipp, 2010; Sharot, 2011).

In many studies, positive events are recalled easier than negative events. One explanation for this is that most individuals' self-schemas are more positive than negative. Remembering experiences and behaviours as more positive than they were, may allow the individual to maintain a coherent, positive sense of self and to establish and forge positive social relationships (Holland & Kensinger, 2010).

Younger adults produce narratives that are more positive, while older adults included more sensory images in their narratives. Bluck and Alea (2008) argue both younger and older adults share positive memories with others in order to re-experience the positive affect of the memory. This in turn contributes to the emotional well-being of individuals. Positive events are fundamental to the life story and identity of the individual (Berntsen, Rubin, & Siegler, 2011).

Most research about emotional memories across the lifespan has focused on individualistic cultures (Berntsen & Rubin, 2002; Berntsen et al., 2011). However, it is not possible to generalise these findings to other cultures without considering that cultural factors have an effect on the self and the AM of the individual. Cultural beliefs about the emotional content of events can also bias the way that the individual reconstruct experiences (Holland & Kensinger, 2010).

2.12 Distribution of autobiographical memory across the lifespan

Distribution of autobiographical memories has enabled researchers to study what periods of the lifespan yield the most vivid and easily retrieved memories. This section will briefly recount the history of the lifespan retrieval curve and explore the components.

In the 1970's and early 1980's the distribution of memories over lifespan was tested with undergraduates. Crovitz and Schiffman (1974) did the first systematic study in AM when they presented undergraduates with twenty high frequency nouns and asked them to think of a personal memory associated with each word and date each memory. The study wanted to establish how many memories were recalled per unit time of a person's life. The hypothesis was that the older memories would be fewer than recent memories and that the memory distribution would follow a forgetting curve (Conway & Williams 2008).

The result was a power function ($y=at^{-b}$) of time since the event occurred. When the power function was plotted on logarithmic scales, it became a straight line (Rubin, Wetzler & Nebes, 1986). At the time the power function was a common choice for a retention function and it was believed that AM and laboratory memory shared the same patterns of forgetting (Rubin, 2002). Rubin, Wetzler, and Nebes (1986) found that the slope of the retention curve was different for older adults. They used a linear scale in addition to the log scale but due to a shortage of data they combined data with three other studies (Franklin & Holding, 1977; Fitzgerald & Lawrence, 1984; Zola-Morgan, Cohen, & Squire, 1983).

The result was the lifespan retrieval curve that reflected the AM retention function and represented the distribution of personal episodic memories across the person's lifespan (Figure 2.7) (Janssen, Rubin, & St. Jacques, 2011). The three components of the RB represent the ages from birth to approximately five years (the period of childhood amnesia), ten to thirty years (RB), and the age of thirty-one to the present age (the period of forgetting or the recency effect)(Robinson-Riegler & Robinson-Riegler, 2008).

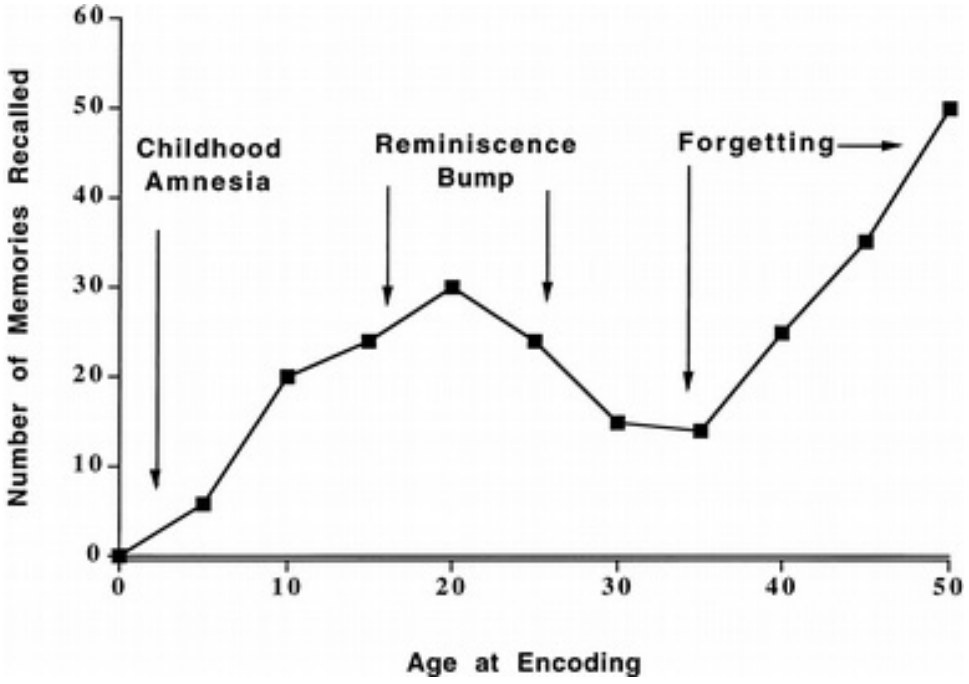

Figure 2.7 The lifespan retrieval curve (Bluck et al., 2005)

Most individuals report no memories before the age of five years and few memories before the age of ten years (Conway & Pleydell-Pearce, 2000). Researchers explain childhood amnesia as due to developmental factors and changes in the emotional, cognitive, and language abilities of children. These explanations have recently been rejected as research showed that children below the age of five years does have specific and detailed autobiographical memories (Conway, Williams & Cohen, 2008; Wang, 2013). Current theories favour explanations that include mother/child interactions, the emergence of narrative abilities of the child and the role of language development (Fivush & Nelson, 2004). The importance of socialization and culture are also emphasised as playing a role in the development of memory. Lastly, if childhood amnesia is approached from a lifespan perspective, the argument exist that the goals of the young child, through which experience is encoded into memory is completely different from that of an adult. This might be the reason why as an adult those memories cannot be accessed (Conway, Williams & Cohen, 2008).

The period of forgetting or the recency effect, in non-clinical samples, is characterised

by an increase in the number of retrieved events as a function of the time since the event occurred (Conway & Pleydell-Pearce, 2000). This occurs, as recent memories are most accessible for retrieval. However, accessibility drops with the passage of time, which causes the memories to be forgotten more readily. Rehearsal of the memory and the importance of the event to the self may have an influence on how easily an event or experience is forgotten (Conway & Pleydell-Pearce, 2000).

2.13 The reminiscence bump

Research has revealed that adults recall more life events from the period of adolescence and young adulthood (Berntsen & Rubin, 2012; Conway, Wang, Hanyu, & Haque, 2005). Memories from the RB are more accurate and more important than memories from other periods (Fromholt & Larsen, 1991; Rubin and Schulkind, 1997).

2.13.1 The reminiscence bump and autobiographical knowledge

The RB occurs not only with the recall of specific autobiographical memories but also with different types of autobiographical (semantic) knowledge. Koppel and Berntsen (2014, p.17) have noted that the RB for autobiographical memories is more "robust and pronounced" than the RB for autobiographical knowledge.

The RB for autobiographical knowledge occurs in temporal distributions of music events (Schubert, 2016); favourite music (Holbrook & Schindler, 1989); books (Copeland, Radvansky, & Goodwin, 2009; Janssen, Chessa, & Murre, 2005); movies (Janssen, Chessa, & Murre, 2005; Sehulster, 1996); best football players (Janssen, Rubin, & Conway, 2012); and public events (Holmes & Conway, 1999; Janssen, Murre, & Meeter, 2008; Tekcan, Boduroglu, Mutlutürk, & Erciyes, 2017).

An explanation for the RB for autobiographical knowledge is generation identity. Generation identity develops when the young adult identifies with a particular social subgroup

based on shared goals, knowledge and existential problems, and this corresponds with the period of identity formation and falls within the RB (Holmes & Conway, 1999). Knowledge gained during the period of generation identity formation, forms the basis for autobiographical memory knowledge structures and remains highly accessible. The content of public knowledge differs from generation to generation. Table 2.1 compares the main aspects of some of the studies mentioned above.

Table 2.1
Main aspects of studies involving autobiographical knowledge

Study	Nationality of participants	Ages of participants (years)	Sample size (*N*)	Task	RB location (years)
Sehulster (1996)	United States	Ages 26 to 67 (*M* = 44.00)	*N* = 89 Male (*n* = 35) Female (*n* = 54)	Participants listed television shows, films, and stage shows that identified their era.	14-24
Holbrook & Schindler (1998)	United States	Ages 16-86 (*M* = 54.3) (57 % > age of 50)	*N* = 108	Participants listened to 28 excerpts of top hits from 1932 to 1986 and rated it.	Peak 23.5
Holmes & Conway (1999)	United Kingdom	Ages 30 to 70 (*M* = 50) (75% > age of 40)	*N* = 10	Experiment 2: Participants completed ambiguous names of famous people.	10-20
Janssen, Chessa, & Murre (2007)	Online study international	Ages 16-75 (*M* = 35.57)	*N* = 1958	Participants named their three favourite books, movies, and records.	16-20
Janssen, Rubin, & Conway (2012)	Netherlands	Ages 16 to 80 Male (*M* = 47.74) Female (*M* = 42.85)	*N* = 619 Male (*n* = 505) Female (*n* = 104)	Participants named 5 best football players of all time.	10-20
Schubert (2016)	Australia	Ages 20 to 22	*N* = 89 Male (*n* = 35) Female (*n* = 54)	Participants recalled memories of listening to music.	15-17
Tekcan, Boduroglu, Mutlutürk, & Erciyes (2017)	Turkey	Ages 18 to 83 (*M* = 37.60) (72% > age of 40)	*N* = 1106 Male (*n* = 794) Female (*n* = 312)	Participants named personal and public events.	20-30 (personal) No bump (public)

The majority of these studies demonstrate that the RB for autobiographical knowledge peaks in adolescence. These studies all utilised the free recall method and a number of these studies were conducted online.

2.14 Theoretical frameworks explaining the reminiscence bump

The theoretical framework surrounding the RB underscores the SMS model of autobiographical memory (Conway & Pleydell-Pearce, 2000). This perspective explains the RB as a period in which the person is primarily concerned with consolidation of the self, and therefore memories are retained more effectively (Baddeley, Eysenck, & Anderson, 2015).

Many researchers suggested different explanations for the phenomenon (Rubin & Berntsen, 2003; Holmes & Conway, 1999; Fitzgerald, 1988; Glück & Bluck, 2007; Rubin, 2002). As more data were gathered and analysed, researchers rejected many of these explanations. When Fitzgerald (1988) found that less than 20% of events typically reported is new experiences, he discarded the novel event account. Currently, apart from the cultural life script account, most accounts are based on encoding differences (Koppel & Rubin, 2016).

Five main explanations of the RB include:

- the identity formation account,
- the cultural life script account,
- the cognitive account,
- the cognitive ability account,
- the life story account (Rubin & Schulkind, 1997; Baddeley et al, 2015).

These accounts involve cognitive, social, and cultural explanations for the RB. Although the life script and the life story account may sound very similar, there are fundamental differences between the two accounts that make it impractical to consolidate two accounts as one. The same reasoning is applicable to the cognitive account and cognitive ability account. Each account will be discussed in brief and include a basic analysis of the studies that support the accounts.

2.14.1 The identity formation account

Originally, Fitzgerald (1988) explained the RB in terms of an individual's self-

narrative. An individual forms a self-narrative to understand the world (Berntsen & Rubin, 2002). This self-narrative develops continuously and helps to shape the individual's identity. In adolescence and young adulthood an individual goes through a process of becoming mature and achieving a stable identity (Rubin, 2002). In his theory of psychosocial development, Erikson (1950) described adolescence as characterised by identity formation. According to Erikson (1950), young adulthood is a period where the focus is on forming social and intimate relationships with other people (Conway & Pleydell-Pearce, 2000; Fitzgerald, 1988). Adolescence and young adulthood are very important stages and can affect an individual's personality positively or negatively, which has consequences for the rest of the individual's lifetime.

For the adolescence stage, the conflict of role confusion affects the process of identity formation, while in the young adulthood a feeling of isolation affects the process to establish a sense of intimacy. To complete a stage successfully the individual must overcome the conflict. In adolescence, the individual not only establishes a sense of identity, but to discover his/her social and ideological values, the individual develops a generational identity as discussed above (Holmes & Conway, 1999). It is postulated that the encoding and retention of identity formation events are heightened because they are involved in solving basic life issues. In addition, many of these events are self-defining and part of the self-narrative and therefore they are rehearsal and recalled more often (Conway & Pleydell-Pearce, 2000).

As knowledge gained during this period forms the basis for autobiographical memory knowledge, the identity formation account forms part of the broader framework of the SMS of the individual, as described in chapter 2, section 2.5.3. According to Conway and Pleydell-Pearce (2000), the processes of SMS produce the RB because the identity consolidates during the RB as the individual formulates long-term goals. Table 2.2 compares the main aspects of some of the studies involving the identity formation account.

Table 2.2

Main aspects of studies involving the identity formation account

Study	Nationality of participants	Ages of participants (years)	Sample size (*N*)	Task	RB location (years)
Fitzgerald (1988)	United States	Ages 62-75 (*M* = 68.7)	*N* = 51 Male (*n* = 25) Female (*n* = 26)	Participants recalled vivid memories and rated the memories for personal importance, national importance, and frequency of rehearsal.	16-20
Holmes & Conway (1999)	United Kingdom	Ages 30 to 70 (*M* = 50)	*N* = 100 (75% over age 40)	Experiment 1: Participants freely listed private events.	20–29
Conway, Wang, Hanyu, & Haque (2005)	Japan Bangladesh England China United States	Ages 38 to 60 (*M* = 52)	*N* = 208 Japan (*n* = 33) Bangladesh (*n* = 40) England (*n* = 27) China (*n* = 54) United States (*n* = 54)	Participants recalled specific memories from own lives of events experienced and rated the memories for vividness, emotionality, personal importance, and extent of rehearsal.	15-25
Rathbone, Moulin, & Conway (2008)	United Kingdom	Study 1 Ages 47–66 (*M* = 54.6) Study 2 Ages 39–76 (*M* = 53.95)	Study 1 *N* = 16 Male (*n* = 5) Female (*n* = 11) Study 2 *N* = 59 Male (*n* = 16) Female (*n* = 43)	Study 1: Participants wrote down 'I am' statements and 10 memories to each of three 'I am' statements. Study 2: Participants wrote down 'I am' statements and 8 memories to each of four statements.	First three memories: 20–40 All memories: No RB
Cappeliez (2008)	Canada	Ages 60–77 (*M* = 65)	*N* = 30 Older females	Participants wrote down dreams for a week and classified according to traumas, wishes, ideals, goals, unsolved problems, and anticipation of events in the near future, novelty.	15–25

2.14.2 The cultural life script account

In this account, it is important to distinguish between life script and life narrative or life story. Life narrative is all the events that happened in a specific individual's lifespan, whereas the life script contains events that typically occur in the individual's culture at specific periods.

In every culture, there are specific normative expectations about the kind and timing

of events that a typical individual will experience in his/her lifetime (Berntsen & Rubin, 2004). An example of this is general events like finishing school, getting married, and having children. These events take place within a certain timeframe, culture, or at a specific age for the typical individual (Bluck & Habermas, 2000). Some cultures have rites of passage that take place at a certain age and involve certain rituals or processes. Culture shapes an individual's life script and ultimately their live narrative or life story (Fivush, 2011).

Researchers determine the cultural life script by asking participants what the typical important events are that would occur in their lives and at what stage. This was demonstrated by Berntsen and Rubin (2004) in a Danish sample; Janssen, Uemiya and Naka (2014) in a Japanese sample; Tekcan, Kaya-Kızılöz and Odaman (2012) in a Turkish sample; Rubin, Berntsen, and Hutson (2009) in an American sample; Janssen, Uemiya and Naka (2014) in an Australian sample; Haque and Hasking (2010) in a Malaysian sample; Ottsen and Berntsen (2014) in a sample from Qatar; and Alea, Ali and Marcano (2014) in a sample from Trinidad. There are both similarities and differences between the type of events and the timing of events in these studies.

The life script account differs from the other theoretical accounts because it emphasises the retrieval process rather than the encoding process. The life script provides search parameters when retrieving an autobiographical memory. These are general guidelines of what an ideal life in the specific culture looks like (Gluck & Bluck, 2007; Bohn, 2010). This might account for the fact that the RB is found in AM for positive events and cultural life scripts, but not for negative events.

In an idyllic life, negative events are not part of the schema and do not have a life script (Bohn, 2010; Rubin & Berntsen, 2003). As a large number of positive important events happen during adolescence and young adulthood, in accordance to cultural expectation, the cultural life script account is offered as an explanation for the RB by researchers (Bohn, 2010; Bohn & Berntsen, 2011; Gluck & Bluck, 2007; Rubin & Berntsen, 2003). Table 2.3

compares the main aspects of some of the studies involving the cultural life script account.

Table 2.3

Main aspects of studies involving the cultural life script account

Study	Nationality of participants	Ages of participants (years)	Sample size (*N*)	Task	RB location (years)
Haque & Hasking (2010)	Malaysia	Study 1 Ages 50–90 (*M* = 56.0) Male (*M* = 56.0) Female (*M* = 58.0) Study 2 Ages 17–23 Male (*M* = 19.47) Female (*M* = 19.53)	Study 1 *N* = 189 Male (*n* = 78) Female (*n* = 111) Study 2 *N* =92 Male (*n* = 19) Female (*n* = 73)	Participants reported the happiest, saddest, most important, most traumatic, and most angry, most in love, most jealous, most proud, most fearful, highest success, and the most surprising events. Study 1: Participants indicated the period during which a typical person would experience these events. Study 2: Participants described events from their own lives.	20-29 (happiest event) 20-29 (most important event) 20-29 (most in love event)
Bohn & Berntsen (2011)	Denmark	Study 1 Grades 3, 5, 6, & 8 (*M* = 10.01, in grade 3) to (*M* = 14.62, in grade 8) Study 2 Grade 8 (*M* = 14.77)	Study 1 *N* = 162 Male (83) Female (79) Study 2 *N* = 28 Male (11) Female (9)	Study 1: Children wrote their future life stories. Study 2: Children imagined future events from their own lives in response to 10 word cues, such as book, chair, and telephone. They also dated future life stories.	future life stories 79% clustered in RB
Kawasaki, Janssen, & Inoue (2011)	Japan	Ages 16–65 Young adults Ages 16-40 Middle-aged adults Ages 40-65	*N* = 252 Young adults (*n* = 174) Male (*n* = 109) Female (*n* = 143) Middle-aged adults (*n* = 78) Male (*n* = 34) Female (*n* = 43)	Participants retrieved memories in response to 10 cue words based on Galton-Crovitz cueing technique	5–13 (young adults) 6–15 (middle-aged adults)
Tekcan, Kaya-Kızılöz & Odaman (2012)	Turkey	Ages 14-96 Adolescents Ages 14–15; (*M* = 14.04) Young adults Ages 18–29; (*M* = 20.61) Older adults Ages 54–96; (*M* = 78.45)	*N* =191 Adolescents (*n* = 98) Young adults (*n* = 51) Older adults (*n* = 42)	Participants listed the 7 most important events that a typical newborn of their own gender would experience in his/ her life. After listing the 7 events, they estimated the age-at-event, and emotional valence for each event.	30–39 (positive events) 13–19 (negative events for adolescents & young adults)
Alea, Ali & Marcano (2014)	Trinidad	Preliminary study Ages 21–69 (*M* = 27.24)	Preliminary study *N* = 88 Students	Preliminary study: Participants agreed or disagreed with given age ranges for each event.	6–15 & 26–30 (for both positive

		Primary study Students Ages 31–59; (*M* = 42.60) University staff Ages 31–59; (*M* = 44.89)	Primary study *N* = 100 Students (*n* = 65) University staff (*n* = 35)	Primary study: Participants retrieved memories in response to 10 cue words based on Galton-Crovitz cueing technique and rated valence of each event.	and negative memories)
Ottsen & Berntsen (2014)	Quatar	Study 1 Ages 19-44 Male (*M* = 24.7) Female (*M* = 21.4) Study 2 Ages 17-30 Male (M = 21.7) Female (M = 20.7)	Study 1 *N* = 55 Male (*n* = 24) Female (*n* = 31) Study 2 *N* = 83 Male (*n* = 36) Female (*n* = 47)	Study 1: Participants listed typical cultural life script events for an imaginary infant. Study 2: Participants generated 7 important events that they would include in their own personal life, from their birth to their current age.	15-30
Janssen, Uemiya & Naka (2014)	Japan	Ages 20-80 (*M* = 51.9) Young adults Ages 20–40 Middle-aged adults Ages 41–60 years Older adults Ages 61–80	*N* = 759 Male (*n* = 361) Female (*n* = 398) Young adults (*n* = 237) Middle-aged adults (*n* = 249) Older adults (*n* = 273)	Participants listed 7 most important events expected to happen in a prototypical Japanese infant's life. Participants categorised the life events, rated it for importance and pleasantness.	16-30
Janssen (2015)	Australia	Study 1 Ages 16–28 (*M* = 18.87) Study 2 Ages 17–29 (*M* = 20.96)	Study 1 *N* = 107 Male (*n* = 19) Female (*n* = 88) Study 2 *N* = 102 Male (*n* = 27) Female (*n* = 75)	Study 1: Participants listed 7 most important events expected to happen to the prototypical infant, categorised the life events in original questionnaire and rate for importance and valence. Study 2: Participants listed 7 most important events expected to happen to prototypical infant, categorised the life events in modified questionnaire and rated for importance and valence.	16-30

2.14.3 The cognitive account

In adolescence and early adulthood, the individual experiences many first time events and changes, in contrast to the more stable adulthood stages that follow (Rubin & Berntsen, 2002). The cognitive account states that individuals recall these new experiences better due to the novelty factor (Rubin et al., 1998). To comprehend the uniqueness of the novel experience increased cognitive processing is necessary to enhance the memory process. Since

the experience or life event is novel and unique, there is very little proactive interference.

The stability that follows when the individual has settled into adult life contributes to the individual using adolescence and early adulthood as a cue or reference point when he/she retrieves an autobiographical memory (Berntsen &Rubin, 2002). The cognitive account is attributed to a combination of factors that enhances recall to produce the RB (Conway & Haque, 1999; Koppel & Rubin, 2015). Table 2.4 compares the main aspects of some of the studies involving the cognitive account.

Table 2.4

Main aspects of studies involving the cognitive account

Study	Nationality of participants	Sample size (*N*)	Ages of participants (years)	Task	RB location (years)
Schrauf & Rubin (1998)	United States (Natives of Argentina, Cuba, Spain. Guatemala, Panama)	Ages 61-69 (*M* = 64.58) Participants immigrated to USA between the ages of 20-35 (M = 5 28.00) and have lived in the USA for 30 years or more.	*N* = 12 Male (*n* = 4) Female (*n* = 8)	Participants retrieved memories in response to 50 cue words. Each participant had two sessions, one in Spanish and one in English. The experimenter with a stopwatch timed memory recall.	RB depends on when participant immigrated
Conway & Haque (1999)	Bangladesh	Ages 20-86 (*M* = 47)	*N* = 106 Male (*n* = 80) Female (*n* = 26)	Participants retrieved memories in response to 50 cue words and rated memories on personal importance, emotional intensity, novelty and how often they thought about the event.	10-30 (young adults) 10-20 & 35-55 (older adults)
Berntsen & Rubin (2002)	Denmark	Ages 20-93 (*M* = 48.35)	*N* = 1241 Male (*n* = 569) Female (*n* = 672)	Participants reported the age of their personal happiest, saddest, most traumatic, most important memory, and most recent involuntary memory.	20–29 (most important) 20–29 (happiest event)

2.14.4 The cognitive abilities account

While the cognitive account focuses on increased recall due to novel experiences, the

cognitive abilities account focus on the increased encoding ability of neural networks (Koppel & Rubin, 2016). Cognitive abilities develop and increase from birth through adolescence to adulthood. During adolescence and early adulthood memory encoding reaches maximum potential, which results in more events being encoded (Janssen & Murre, 2008). As the individual age, memory encoding declines (Cabeza, & St. Jacques, 2007).

A study by Janssen and Murre (2008) concluded that mnemonic capacity is increased during adolescence to adulthood, which leads to the overrepresentation of general and mundane experiences and events in memory. In a recent study, this period was linked to peak performance in a test of verbal and visuospatial memory (Murre, Janssen, Rouw, & Meeter, 2013). In the cognitive abilities account the increased recall of memories are attributed to enhanced encoding due to cognitive peak performance (Janssen & Murre, 2008). This account is closely linked to the basic systems model of Rubin (Janssen, Kristo,Rouw, & Murre, 2015). Table 2.5 compares the main aspects of some of the studies involving the cognitive abilities account.

Table 2.5

Main aspects of studies involving the cognitive abilities account

Study	Nationality of participants	Sample size (*N*)	Ages of participants (years)	Task	RB location (years)
Rubin, Rahhal & Poon (1998)	United States	1984 Study Students Ages 18-22; (*M* = 21.1) Older adults Ages 68-72; (*M* = 69.7) 1994 Study Students Ages 18-22; (*M* = 19.2) Older adults Ages 68-72; (*M* = 69.8)	1984 Study *N* = 60 Students (*n* = 30) Older adults (*n* = 30) 1994 Study *N* = 60 Students (*n* = 30) Older adults (*n* = 30)	Participants reported factual, semantic, general-knowledge, and multiple-choice questions about the Academy Awards, the World Series, and current events.	10–30
Janssen & Murre (2008)	Netherlands	Ages 16-75 (*M* = 42.3)	*N* = 3492 Male (*n* = 1083) Female (*n* = 2409)	Participants retrieved personal memories in response to 10 nouns. Participants dated the memories and rated it for valence, and importance.	6–20
Janssen,	Online study	Ages 18 to 80	*N* = 617	The AM section	n/a

Kristo, Rouw, Murre (2015)	international	(*M* = 45.99)	Male (*n* = 161) Female (*n* = 456)	consisted of a recording and a recall exercise. Participants also did one of the verbal or visuospatial memory tests.

2.14.5 Life story account

The life story account integrates aspects of the preceding four accounts into a single framework (Demiray et al., 2009; Koppel & Rubin, 2015). The basis for the life story account is the lifespan developmental theory (Baltes, Staudinger, & Lindenberger, 1999) and the life-story approach (Bluck & Habermas, 2000) that was later named the lifespan perspective (Bluck & Habermas, 2001).

The lifespan developmental theory component is concerned with the aspect of continuing growth, which stems from Erikson's (1950) theory of psychosocial development and thereby is similar to the identity formation account. The growth aspect encompasses cognitive growth and peak cognitive functioning from the cognitive abilities account. It also incorporates the novel approach from the cognitive account though the acquisition of new skills and abilities, thus allowing the individual to be ready for new and unique experiences, leading to formation and development of the individual's identity (Koppel & Rubin, 2015).

As identity and agency grows and strengthens, the individual is able to make about important life choices. These choices culminate in transitional events such as starting a job, getting married, and having a child, which in turn relates to the cultural life script account. The life experience of the individual represented by a life story account is complementary to the life script account (Koppel & Rubin, 2015).

The life story schema helps to organise important events for recall and has a similar role as the SMS in the identity formation account (Conway & Pleydell-Pearce, 2000; Gluck & Bluck, 2007). Supporters of the life story account postulate that the RB is produced because of the life story schema in combination with complementary aspects of the identity formation

account, the cognitive account, the cognitive abilities and the life script account (Demiray et al., 2009). Table 2.6 compares the main aspects of some of the studies involving the life story account.

Table 2.6

Main aspects of studies involving the life story account

Study	Nationality of participants	Sample size (*N*)	Ages of participants (years)	Task	RB location (years)
Schroots, van Dijkum, & Assink (2004)	Netherlands	Early adulthood Ages 18-30; (*M* = 23.5) Middle adulthood Ages 31-55; (*M* = 43.3) Late adulthood Ages 56-84; (*M* = 67.3)	*N* = 98 Male (*n* = 47) Female (*n* = 51)	Participants drew lifeline for both their past and future events and then dated and labelled each event.	10–40
Gluck & Bluck (2007)	Austria	Ages 50–90 (30% > age of 80)	*N* = 659 Age groups 50–59 years (*n* = 285) 60–69 years (*n* = 195) 70–90 years (*n* = 71)	Participants listed the 15 most important personal memories in their life, gave each memory a brief description, dated it and rated for valence of the event; delayed valence outcomes; perceived control over the event and influence of the event on personal development.	16–30
Thomsen & Berntsen (2008)	Denmark	Ages 71–88 (*M* = 78.04)	*N* = 59 Male (*n* = 32) Female (*n* = 27) Older adults	Participants recalled the 5 events that they considered most central to their life story, provided key words for each memory, rated according to questions and divided the memories into chapters.	6-30
Demiray, Gülgöz & Bluck (2009)	Turkey	Ages 52 – 66 (*M* = 58.25)	*N* = 72 Male (*n* = 32) Female (*n* = 40)	Participants recalled personal memories in response to 11 date cards that represented 5-year intervals, then rated and classified the memories for specific age, novelty, distinctiveness, importance for identity development, transitional events, importance, and vividness.	10-30
Steiner, Pillemer,	United States	Ages 59–92 (*M* = 58.25)	*N* = 34 Male (*n* = 15)	Participants provided oral life stories and divided	17–24

Thomsen & Minigan (2014)			Female (n = 19)	their transcribed narratives into 'chapters' provided their age at the beginning and end of the chapter. Rated chapters for expectedness, impact on self-growth and how difficult they found the task of breaking their life story into chapters, and completed a 5-item Satisfaction with Life Scale.	
Zimprich & Wolf(2016)	Germany	Ages 60–99 (M = 74.3)	N = 118 Male (n = 40) Female (n = 78) Older adults	Participants retrieved memories in response to 39 cue words based on Galton-Crovitz cueing technique, dated and rated it for valence. Participants also completed a self-concept clarity 12-item rating scale and openness to experience rating scale.	10–20

2.15 Recent advances in the reminiscence bump

Recent advances in the understanding of the RB suggest a variation in size and temporal location on the lifespan retrieval curve, depending on the memory activation method used (Koppel & Rubin, 2016). In a study by Rubin and Schulkind (1997) utilising both cued recall and free recall, they found that the cued recall produced a RB between ages 10 to 29 and free recall produced a RB between ages 20 to 29. Koppel and Berntsen (2015) analysed 28 studies using the cued recall and 34 studies using the free recall method and concluded that cued recall produced a RB between ages 8,7 to 22,5 and free recall produced a RB between ages 15,1 to 37,9.

In considering the theoretical accounts of the RB, Koppel and Berntsen (2015) stated that researchers should consider the different accounts carefully for both its consistency with two different methods, cued recall and free recall, as well as the account's consistency with the different temporal location of the RB for each method. In their review, Koppel and

Berntsen (2015, p.77) concluded that the life script, life story, and identity formation accounts are consistent with the bump in free recall because it corresponds with the period of "formative personal and professional experiences". The cognitive account and cognitive abilities account are consistent across both methods. In evaluating the accounts for consistency with in different temporal locations of the RB, Koppel and Berntsen (2015) found that the life script account to be the only account that is consistent across both cueing methods.

2.16 Gaps in existing reminiscence bump research

The researcher analysed, classified and synthesised the selected 32 studies, conducted between 1988 and 2017, in order to obtain a thorough research overview. The tables included with each theoretical account reflected the sample size, ages of participants, the tasks and the location of the RB. This provided a comprehensive view of the variety of studies conducted within each theoretical account. To understand the variety of methodological approaches a table comparing the research approach, method, technique or instruments, and the information that the study sourced was compiled (see Table 2.7).

Table 2.7

Main methodological aspects of RB studies

Authors	Research approach	Method	Technique / instrument	Information retrieved
Sehulster (1996)	Quantitative	Free recall	Face to face interview.	Autobiographical knowledge
Holbrook & Schindler (1998)	Quantitative	Free recall	Group format testing through musical stimuli and a questionnaire with 10 -point rating scale.	Autobiographical knowledge
Holmes & Conway (1999)	Quantitative	Free recall	Experiment 2: Experimental booklet containing 20 ambiguous and 20 unambiguous single names	Autobiographical knowledge
Janssen, Chessa, & Murre (2007)	Quantitative	Free recall	Online study 'Favourites' questionnaire, presented in Dutch and English	Autobiographical knowledge
Janssen, Rubin, & Conway (2012)	Quantitative	Free recall	Online study with questionnaire presented in Dutch.	Autobiographical knowledge

Schubert (2016)	Quantitative	Free recall	Online survey with 8 questions requiring open-ended responses.	Autobiographical knowledge
Tekcan, Boduroglu, Mutlutürk, & Erciyes (2017)	Quantitative	Free recall	Face-to-face interview with survey consisting of 51 questions with rating scales.	Autobiographical knowledge and personal memories
Fitzgerald (1988)	Quantitative	Free recall	Questionnaire with rating scales.	Personal vivid memories
Holmes & Conway (1999)	Quantitative	Free recall	Experiment 1: Experimental booklet	Important public events and personal memories
Conway, Wang, Hanyu, & Haque (2005)	Quantitative	Free recall	Experimental booklet with rating scales was used individually or in small groups.	Specific personal memories
Rathbone, Moulin, & Conway (2008)	Quantitative	Free recall	Study 1: Test booklet with questionnaire. Study 2: Online questionnaire (very similar in format to that used in Study 1).	Personal memories that reflect the participants' identity
Cappeliez (2008)	Qualitative but reported in quantitative format	Diary study	Diary format. Participants were evaluated with Modified Mini-Mental Status Examination.	Dream data
Haque & Hasking (2010)	Quantitative	Free imagine / free recall	Face-face interview included stimuli emotion cues adapted from Berntsen and Rubin (2002) and Rubin and Berntsen (2003). Study conducted in 2 phases, 2 weeks apart.	Typical life script occurrences and personal memories
Bohn & Berntsen (2011)	Quantitative	Free imagine	Free writing exercise in a classroom set up. Modelled on study by Bohn and Berntsen (2008).	Imagined future life stories and events
Kawasaki, Janssen, & Inoue (2011)	Quantitative	Cue word	Online study with questionnaire	Personal memories
Tekcan, Kaya-Kızılöz & Odaman (2012)	Quantitative	Free imagine / free recall	Life script questionnaire based on Berntsen and Rubin (2004).	Typical life script occurrences and personal memories
Alea, Ali & Marcano (2014)	Quantitative	Cue word	Life events questionnaire that listed 14 most-often experienced and expected life scripted events and age ranges in various cultures.	Typical life script occurrences
Ottsen & Berntsen (2014)	Quantitative	Free imagine / free recall	Life script questionnaire developed by Berntsen and Rubin (2004). Life story task questionnaire as used in previous studies (Bohn, 2010 Rubin et al., 2009). Both were translated into Arabic.	Proto typical life script occurrences for both a male and a female infant
Janssen, Uemiya & Naka (2014)	Quantitative	Free imagine / free recall	Online questionnaire inviting only participants from Japan.	Proto typical life script occurrences for infant from Japan
Janssen (2015)	Quantitative	Free imagine / free recall	Two versions of a life script questionnaire. Original version contained 45 categories derived from Berntsen and Rubin (2004), Rubin et al. (2009), and Rubin (2011). Modified version contained 37 categories derived from the public	Proto typical life script occurrences for infant from Australia

			events used by Janssen et al. (2008).	
Schrauf & Rubin (1998)	Quantitative	Cue word	Questionnaire and 50 word cues in Spanish and English.	Personal memories
Conway & Haque (1999)	Quantitative	Cue word	Experimental booklet with a 5-point rating scale.	Personal memories
Berntsen & Rubin (2002)	Quantitative	Free recall	Face to face interview.	Personal emotionally charged memories
Rubin, Rahhal & Poon (1998)	Quantitative	Free recall	Questionnaire packet, which consisted of several questionnaires.	Autobiographical, semantic and general knowledge
Janssen & Murre (2008)	Quantitative	Cue word	Online study with questionnaire that contained a rating scale.	Autobiographical knowledge and personal memories
Janssen, Kristo, Rouw, Murre (2015)	Quantitative	Free recall and memory cues	Diary study and immediate and delayed memory tests.	Personal memories and cognitive memory ability
Schroots, van Dijkum, & Assink (2004)	Quantitative	Free recall	Lifeline interview method and a lifeline graph.	Important personal memories
Gluck & Bluck (2007)	Quantitative	Free recall	Life story questionnaire contained self-report measures of the functions of autobiographical memory as well as personal life views, including wisdom, foolishness, and regret.	Important personal memories
Thomsen & Berntsen (2008)	Quantitative	Free recall	Home-based questionnaire study.	Important personal memories
Demiray, Gülgöz & Bluck (2009)	Quantitative	Free recall	Face-face interview using date cards and rating scales.	Personal memories
Steiner, Pillemer, Thomsen & Minigan (2014)	Quantitative	Free recall	Face-face interview that was recorded and transcribed.	Personal life story
Zimprich & Wolf(2016)	Quantitative	Cue word	Face-face interview and questionnaires that included a self-concept clarity 12-item rating scale and openness to experience rating scale.	Personal memories

The researcher identified three main gaps in existing research. The gaps are methodological in nature and involve the research approach, study locations and sample audiences.

2.16.1 Research approach

All 32 studies followed a quantitative research approach, despite the fact that the

content of autobiographical memories provides valuable qualitative data that is not fully utilised or explored by the pre-set rigour of quantitative research. Considering the real world complexity of AM and the limitations of both the quantitative and qualitative research approaches, the researcher concludes that a mixed method approach would provide a more pragmatic solution to a RB study. Further discussion on the pragmatic paradigm is presented in chapter 3, section 3.5.

2.16.2 Study locations and demographics

Analysis of studies showed that participants from the following countries were included in RB studies (see Table 2.8). Online studies utilising the internet gathered data from international participants and contained large sample sizes that presents challenging logistics in a face-to-face interview situation. In the study conducted by Janssen and Murre (2008), data were gathered from 3492 participants while Murre, Janssen, Rouw, and Meeter (2013), analysed data from 28116 participants.

Table 2.8

Nationality of participants involved in RB studies

Nationality of participants	Studies	Nationality of participants	Studies
Australia	2	Japan	3
Austria	1	Malaysia	1
Bangladesh	2	Netherlands	3
Canada	1	Quatar	1
China	1	Trinidad	1
Denmark	3	Turkey	3
England	1	United Kingdom	4
Germany	1	United States	7

In most studies participants belonged to a single culture within a particular country (Assink & Schroots, 2010; Haque & Hasking, 2010; Ottsen & Berntsen, 2014; Tekcan, Boduroglu, Mutlutürk, & Erciyes, 2017); or the researcher compared different cultures and locations within one study (Conway, Wang, Hanyu, & Haque, 2005; Murre, Janssen, Rouw, & Meeter, 2013). Although the RB has been studied internationally in different countries and

cultures the researcher could not locate any peer-reviewed literature indicating that any studies have been done in Africa, particularly in South Africa.

2.16.3 Sample audience

Since the 1980's, research highlighted different aspects of the RB such as the role of culture, valence and self-definition in a variety of populations (Conway & Haque, 1999; Conway et al., 2005; Janssen, Chessa, & Murre, 2005). However, numerous studies used either younger university students or internet surveys to gather data (Leichtman, Wang & Pillemer, 2003; Nelson, & Fivush, 2004; Alea, Ali, & Marcano, 2014). Studies about memory and aging are usually cross-sectional, involving comparisons of younger adults in their 20's and older adults (60-80), as this provides the most efficient comparisons (Hedden & Gabrieli, 2004).

In studying the RB, contrasting younger university students in their 20's with older adults in their 70's complicates the results. Although it provides a well-defined RB for older adults, the younger student's recollection might be because of the recency effect and not the RB. Unfortunately, cohort differences such as educational background, socio-economic and cultural factors might also influence results and lead to overestimated age-related differences (Hedden & Gabrieli, 2004). Therefore, it is necessary to study middle-aged and older adults in order to establish if there is a difference between two groups.

2.17 Considerations in the current study

From the gaps in the existing literature, the researcher concluded that a mixed method study on the RB with a South African sample, comparing middle-aged and older adults, would contribute to the existing body of knowledge.

As a nation, the South African people have experienced a controversial history that influenced the identity formation of its people (Johnston, 2014). These have the potential to

impact on the autobiographical memories of the participants and provide valuable data.

Applying a pragmatic philosophical paradigm enhanced the research process because it focused on practical applications. This allowed the researcher to find practical solutions to challenges in the research process. The researcher required a data collection method to which all the participants could relate and respond.

The LIM provided a visual communication tool that encouraged the participants to be actively involved in the process by drawing a lifeline, which represents the course of life. It also incorporated both quantitative and qualitative elements. The versatility of the LIM as the data collection method allowed the researcher to investigate the domain of emotion in AM, through the valence of events, as well as the life domain importance reflected in the content of the events.

The following headings will be used throughout the document:

- Temporal distribution of events
- Valence of events
- Life domain importance of events

2.18 Research questions

The study was guided by a primary overarching research question that is informed by three secondary questions.

The primary research question:

I. Is there a difference in the dynamics of AM during the reminiscence bumps of middle-aged adults (40–59 years) when compared to those of older adults (60–79 years)?

In this study, the dynamics of AM within the RB was represented by three components, namely the temporal distribution of events, the valence of events and the

life domain importance of events. Each component was determined by a secondary research question.

- Temporal distribution of events

  Is there a difference in the temporal distribution of the autobiographical memories of middle-aged adults when compared to those of older adults?

The literature review has shown that the distribution of memories produces the lifespan retrieval curve where the RB in a free recall study can vary between ages 20 to 29 (Rubin & Schulkind, 1997) and between ages 15,1 to 37,9 (Koppel & Berntsen, 2015). Therefore, between the ages of the middle-aged adults and the RB the gap is only ten years or less. It was hypothesised that older adults would exhibit a more defined RB and recall a greater portion of memories from adolescence and early adulthood than middle-aged adults.

- Valence of events

  Is there a difference in the valence ratings of the autobiographical memories during the reminiscence bump of middle-aged adults when compared to those of older adults?

Studies have revealed that positive events are recalled easier and more frequently than negative events and that younger adults produce narratives that are more positive, than older adults. Therefore, it is hypothesised that middle-aged adults would produce more positive events than older adults would.

- Life domain importance of events

  Is there a difference in the life domain importance of the autobiographical memories during the reminiscence bump of middle-aged adults when compared to those of older adults?

The content of recalled events represent different domains in an individual's life, such as family, home, work, education, social, and friends. An individual often recalls an event

that influenced and shaped their perception of the world and their interpretation of their reality. By coding and analysing the content of the recalled events, it is possible to determine the life domain importance of events for the two age groups. It is hypothesised that the events regarding family and home life domains would be more important to older adults than work, education, social, and friends. As most middle-aged adults are still pursuing a career, the life domain importance between middle-aged and older adults would differ.

2.19 Conclusion

This chapter provided a comprehensive overview of aspects regarding AM, RB and the lifespan developmental perspective. To conduct the literature review the researcher sourced, analysed, classified and synthesised 32 studies on the RB conducted between 1988 and 2017. These studies were used to demonstrate the domains of AM as well as the theoretical accounts of the RB and variety of methodological approaches that the researchers followed. The lifespan developmental perspective is an important basis for studies in AM as it allows researchers to understand the complexity of human development and the effect that it has on AM. Although there is no single overarching theoretical model in AM, the researcher tried to position the individual models not only with regards to AM but to studies in RB. From the development in RB research over the past three decades it is clear that there is a variety of studies conducted with different populations, sample sizes, research methods and instruments. Most studies are still aiming to prove that the theoretical account it supports is the explanation for the phenomenon of the RB. Recent developments have highlighted the temporal difference of the RB as a result of the memory activation method. From the studies it is clear that a quantitative research approach is predominant in the field. In analysing the literature the successive research strategies is evident. This chapter provided fundamental theoretical assumptions associated with the RB in AM, which cumulated in crystallizing the gaps in existing research on which the researcher could base the study. The chapter concluded with

considerations in the current study and the research questions. The following chapter will discuss the research approach used in the current study.

Chapter 3. Research design and method

3.1 Introduction

Research is the systematic empirical process that we use to investigate a problem in order to find a solution or an answer. The research approach is the blueprint that guides the process and dictates the procedures. According to Creswell (2014) decisions about this blueprint needs to be based on the philosophical assumptions the researcher brings to the study, the research design and methods of data collection, analysis, and interpretation.

The previous chapter provided the fundamental theoretical assumptions associated with the RB in AM that were used to develop this study. This chapter provides details of the research approach utilized to collect, measure, code and interpret data on the RB in the dynamics of AM. The study setting and participants, sample selection, research instruments, validity and reliability, and ethical considerations are part of the chapter's discussion.

3.2 The aims and objectives of the study

The aim of the study is to investigate and determine whether there is a difference in the dynamics of AM during the RB between South African middle-aged and older adults.

This aim is underpinned by three research objectives, namely:

(i) To investigate the temporal distribution of autobiographical memories of both groups and what, if any, differences there is between the RB of these groups.

(ii) To investigate if there is a difference in valence experience of the two groups during the RB.

(iii) To investigate if there is a difference in life domain importance of the two groups during the RB.

3.3 Research approach

A research approach encompasses not just the research design and method of data collection, analysis and interpretation but also the philosophical assumptions or worldview that the researcher uses when addressing the research problem (Creswell, 2014). Traditionally, most studies on the RB were quantitative (Galton-Crovitch cued recall) as opposed to qualitative (narrative method), as seen in the summary of previous studies in chapter 2, section 2.16, Table 2.7.

The limitation to studying the RB using only a quantitative research approach is that the researcher cannot utilise all of the data collected as narrative memory descriptions. A qualitative approach enhances a researcher's understanding of the memory experience of participants but cannot always be generalised to the population (Assink & Schroots, 2010; Creswell & Plano Clark, 2011).

This study is a replication, in part, of a combination of previous international studies, but this time in a South African context and with a mixed method approach. The researcher chose a mixed method approach, which allowed for a combination of quantitative and qualitative approaches, to combine the strength of both approaches while minimizing their weaknesses (Creswell & Plano Clark, 2011). The characteristic of a mixed method approach makes it ideal for this study, as it is more problem than process orientated. Mixed method focuses on the research problem to determine the methods best suited to investigate the research questions (Teddlie & Tashakkori, 2010).

The combined approach has the potential to generate more information than any single approach. This provides the researcher with a more comprehensive understanding of the results (Creswell, 2014). Figure 3.1 shows a graphical representation of the interconnected research framework that highlights relationships between research approach, design, and epistemology or philosophical paradigm and data collection methods.

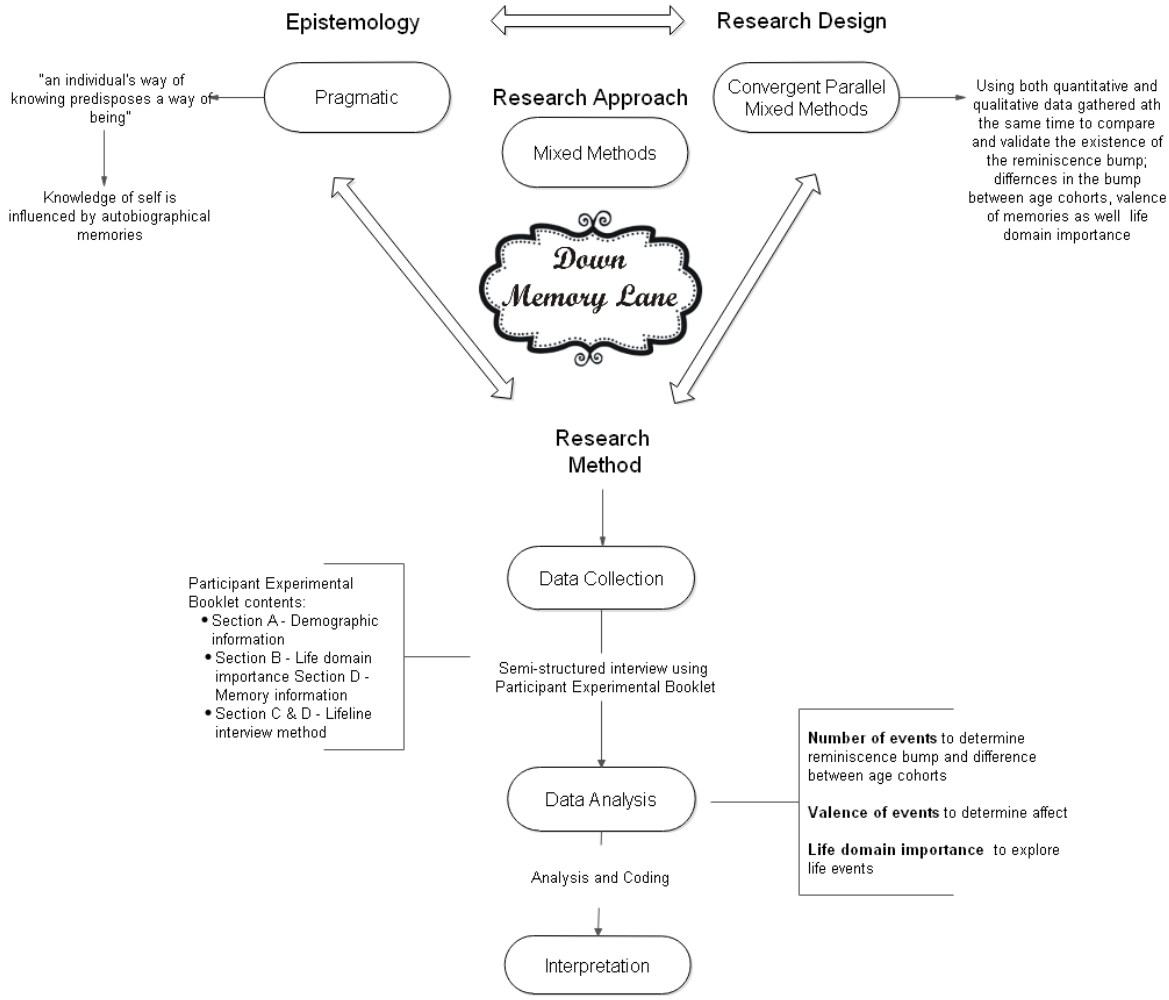

Figure 3.1 Research framework overview (Own construction, 2018)

3.4 Research design

Although mixed method research focuses on collecting, analysing and mixing quantitative and qualitative data in a research study, there are several alternative research designs that can be applied (Creswell & Plano Clark, 2011). The research design governs the way in which the data are collected, analysed and mixed.

For this study, the researcher chose a convergent parallel mixed method design, which is also called a triangulation design. This allowed the researcher to check the results, establish

validity and ensure consistency across the different approaches. Both quantitative and qualitative strands have equal emphasis (QUAN+QUAL). Therefore, this design collected quantitative and qualitative data at the same point in time from the same participants, analysed it separately and then compared and contrasted the findings to validate and triangulate (Creswell, 2014; Teddlie & Tashakkori, 2009).

To determine the temporal distribution of events the participant marked the age at which the life event occurred on the lifeline graph (QUAL) and wrote down the age in the life event description (QUAN).

The participant drew the lifeline to reflect the valence of the events. Valence was therefore measured on the lifeline graph, the vertical scale measure ranged from very negative to very positive (-2 = 'very negative'; -1= 'somewhat negative'; 0 = 'neutral'; +1 = 'somewhat positive'; and +2= 'very positive') (QUAL). By digitising the lifeline graph the researcher converted the graph to values (QUAN).

The participant reported overall life domain importance on a 5-point rating scale (1='not important; 2 = 'barely important; 3 = 'somewhat important'; 4 = 'moderately important; and 5 = 'very important') (QUAN). The researcher coded the event descriptions for life domain importance in categories and calculated the percentage of occurrence of the categories Family/Home, Work/Education and Social/Friends (QUAL).

When quantitative and qualitative results are combined for integration, it is referred to as merging the data (Creswell & Plano Clark, 2011; Leavy, 2017). In the study, the researcher merged the data by integrating the values for the quantitative data with the values for the qualitative data to reach a result. Figure 3.2 shows the detailed convergent parallel mix method research design with the procedures and products for the study.

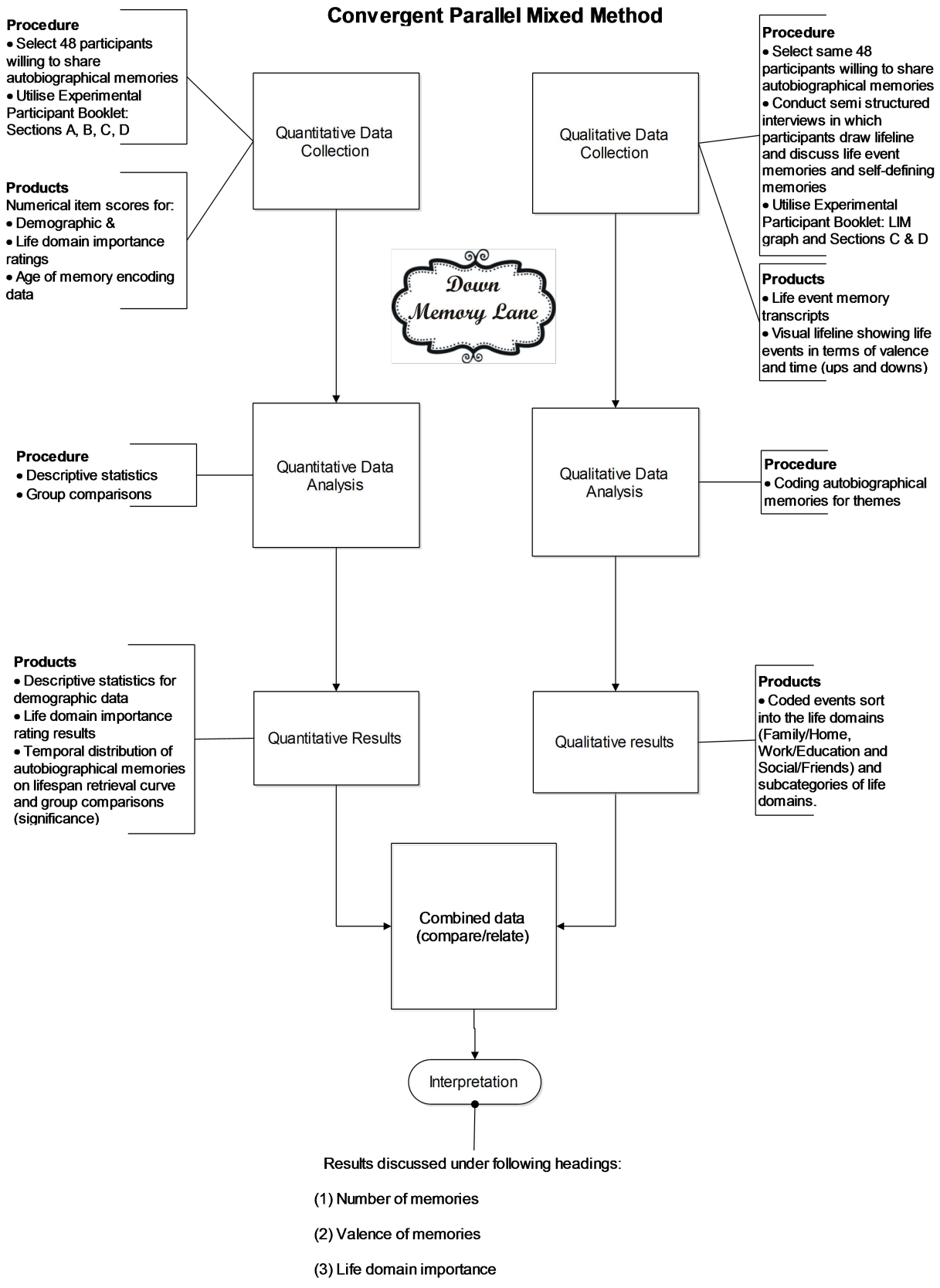

Figure 3.2 Convergent parallel mixed method research design for this study

3.5 Philosophical paradigm

The definition of a paradigm is a "set of assumptions, attitudes, concepts, values, procedures, and techniques that makes up an accepted theoretical framework within a discipline" (Zedeck, 2014, p.251). Both qualitative and quantitative research approaches use predetermined paradigms. In the mixed method approach, there are many debates and critiques about which paradigm or combination of paradigms to use (Creswell & Plano Clark, 2011). Teddlie and Tashakkoi (2003) formulated the single paradigm stance that provided a philosophical underpinning for mixed method research. Greene (2007) refined the concept and called it the alternative paradigm stance. The alternative paradigm stance promotes the view that research methods should be mixed for optimal results but mixing paradigms is not the best option (Teddlie & Tashakkori, 2009).

Pragmatism is an ideal paradigm to apply to mixed method research because it focuses on practical applications to solve a problem and its consequences rather than on the cause of the problem. This paradigm does not subscribe to a single reality or system of philosophy, but rather focuses on what works. The researcher adopted a pragmatic framework for the study, as it is ideal for using different approaches to collect and analyse data about autobiographical memory.

The concept "truth is what works at the time" (Creswell, 2014:10) concurs with the cognitive term of memory veridicality in recall and memory studies. Memories sometimes change and for the person who recalls the event the recalled version of the event is their truth at the moment that they recall it. Thus, a person's internal representation of the world might not reflect the external world (Bluck, & Levine, 1998).

3.6 Research sample

3.6.1 Sampling considerations

Sampling is the process of selecting a subset of a study population for data collection (Babbie, 2016).

South Africa is a multiethnic society and its population is one of the most complex and diverse in the world. In order for a sample to represent the South African population, it has to include participants from the four main population groups (Black, White, Coloured[5] and Indian or Asian) and their subgroups. The four major ethnic groups that represent the Black population are Nguni, Sotho, Shangaan-Tsonga and Venda. Within the Nguni group there are Zulu, Xhosa, Ndebele and Swazi subgroups (Stewart & Zaaiman, 2018). South Africa's population of 55.6 million people is dispersed over an area of 1,221,037 km2 (471,445 sq mi). Another challenge to communication in research is the 11 official languages of South Africa (StatsSA, 2012). Due to the complex logistics involved, the researcher had to restrict the study to a single study setting. The implication of this is that the small sample does not represent or generalise to the overall population.

3.6.2 Research setting and interview contexts

The study took place in the city of George, in the Western Cape province of South Africa. George is the administrative, commercial hub and the capital city of the Garden Route. The Garden Route is a 300-kilometre (190 mi) stretch of land along the south-western coast of South Africa. In terms of the population, George is the area with the third largest population in the Western Cape. The city lies between Cape Town and Nelson Mandela Bay (George Municipality, 2018).

[5] The tem “Coloured” refers to the persons of mixed race

Figure 3.3[6] shows George in relation to South Africa and the African continent.

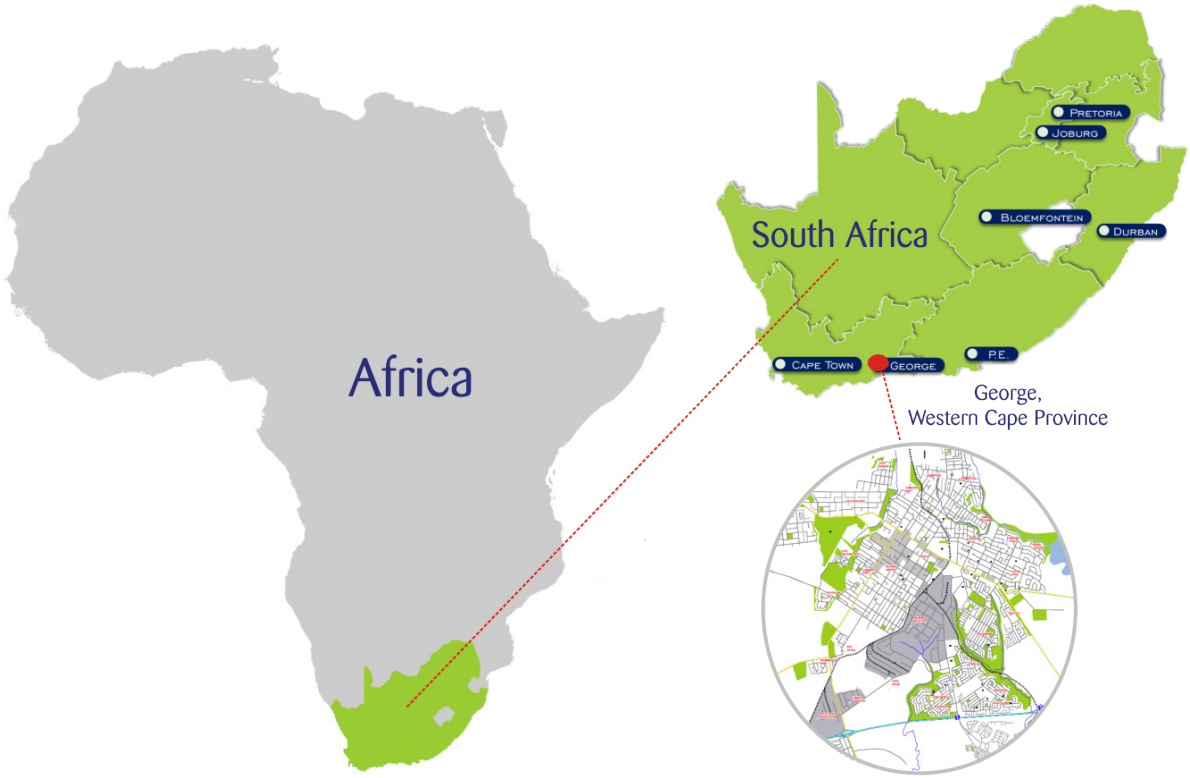

Figure 3.3 Info graphic showing the location of George (South Africa Map, 2018)

In contrast to the composition of the population demographics of South Africa, the regional demographics reflect a different reality. Table 3.1 shows the differences per population group between the total South African population and the population of George.

Table 3.1
Breakdown per ethnicity of South African population (StatsSA, 2012).

	South Africa		George	
Population group	Number of people	% of population	Number of people	% of population
Black	44 891 603	80.7%	54615	28.2%
Coloured	4 869 526	8.7%	97610	50.4%

[6] Info graphic was created using an image found at https://www.kisspng.com/free/south-africa-map-11.html

White	4 516 691	8.1%	38155	19.7%
Other	1 375 834	2.5%	3292	1.7%
Total:	55 653 654		193672	

Adults aged 40-79 years residing in George formed the population from which the sample was recruited. Table 3.2 shows the breakdown for age groups 40-59 years and 60-79 years, for the different ethnic groups in the population of George.

Table 3.2
Breakdown of age groups 40-59 years and 60-79 years in the George population (StatsSA, 2012).

	40-59 years		60-79 years	
Population group	Number of people	% of total population	Number of people	% of total population
Black	10142	5.20%	2327	1.20%
Coloured	22044	11.40%	5963	3.07%
White	11035	5.70%	8228	4.25%

The rationale for using this location and population to obtain the sample stemmed from a pragmatic consideration, which involved logistics and time constraints.

3.6.3 Sampling process

The researcher used the two-dimensional mixed method sampling model designed by Onwuebuzie and Collins (2007) for determining the sampling process. In selecting the sampling design, the researcher considered two criteria, namely time orientation, and the relationship between quantitative and qualitative samples, to decide about the sampling scheme and size.

In this study, the timing of the qualitative and quantitative phases is concurrent and there is an identical relationship as the same sample members take part in both the quantitative and qualitative phases. A non-probability purposive sampling scheme with non-proportional quota sampling was used. This allowed the researcher to specify the number of participants in each category to assure that smaller groups were represented equally in the sample in both ethnicity and gender (Lohr, 2010). Figure 3.4 shows a visual representation of the two-dimensional mixed method sampling process.

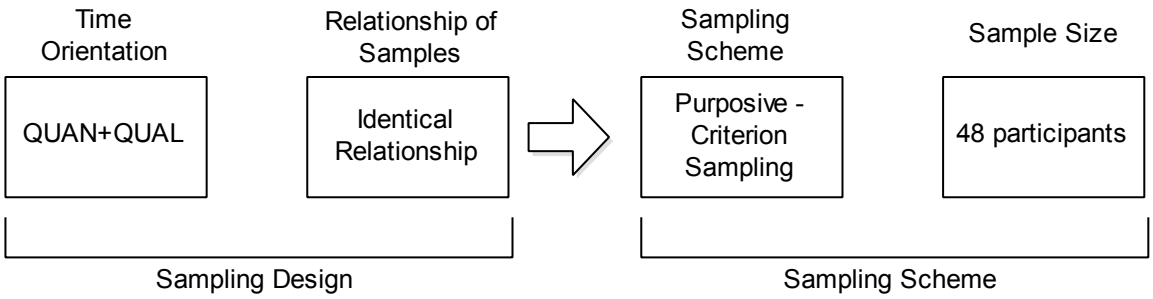

Figure 3.4 Two dimensional mixed method-sampling process

3.6.4 Sample selection

The researcher chose the age criteria of 40-79 years for the sample because the RB occurs in people over the age of 40 years (Rubin, Wetzler & Nebes, 1986). As mentioned above, a non-proportional quota sampling was used to form the two subgroups of the sample.

Criteria for inclusion in the sample included:

- population group (Black, Coloured, and White);
- gender (male, female);
- age cohort (40-59 years, 60-79 years);

- basic English language proficiency.

The researcher invited members of social clubs, retirement homes, retirement villages and the public to take part in the research. The researcher received enquiries from 131 people. The researcher wanted to include participants with different backgrounds and life experiences; therefore, an equal number of participants were selected from the three ethnic groups. The sample comprised of two groups, middle-aged adults (40-59 years) and older adults (60-79 years) with a total sample size of 48 participants. Prior to the testing, participants indicated that none suffered, nor were they diagnosed with any form of neurological condition. They also indicated that they had no hearing impairment or any visual problems and that they were in good to excellent health. Figure 3.5 is an overview of the sample and shows the equal representation per age cohort, gender and ethnicity.

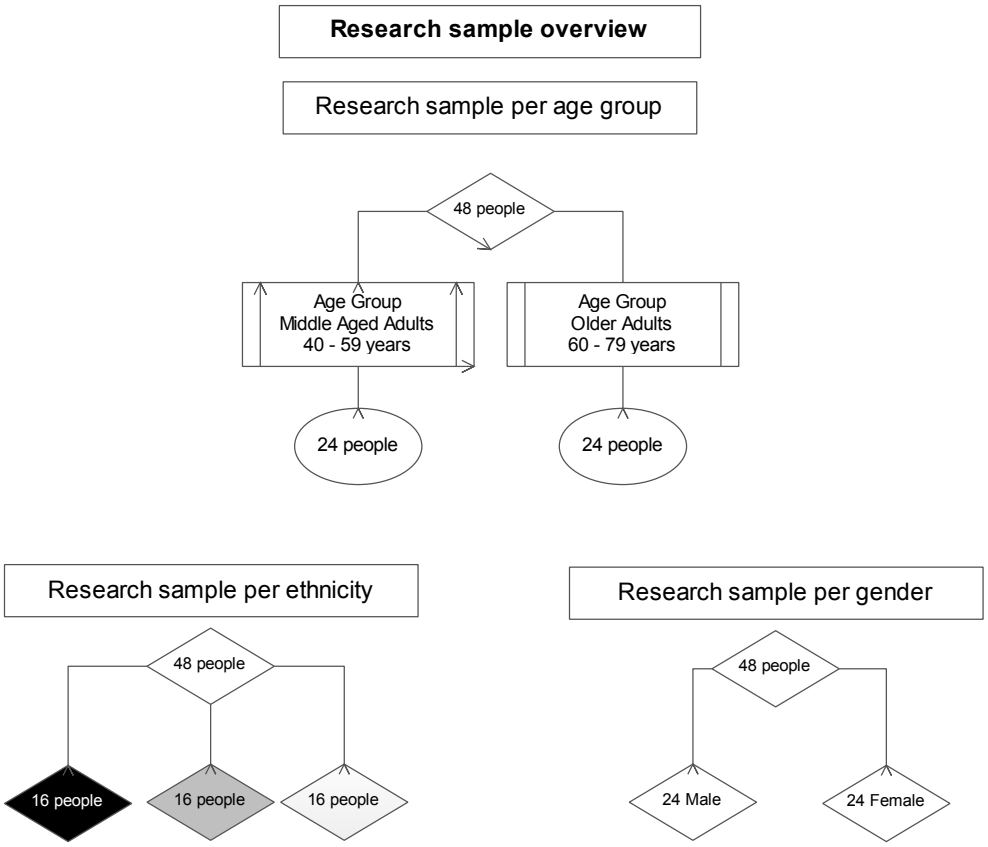

Figure 3.5 Research sample overview

3.7 Data collection procedures and instruments

Research methods are types of data collection, analysis and interpretation in accordance with the research design (Creswell, 2014). In this study, the researcher used the LIM in a semi-structured interview format to gather data.

3.7.1 Lifeline interview method

The LIM combines quantitative and qualitative approaches to gather autobiographical data in an efficient and systematic manner (Assink, & Schroots, 2010). First, participants draw a lifeline graph to depict the subjective course of their life from birth to current age. The lifeline graphically represents the positive and negative events they experienced. Participants then recall and mark important life events along the lifeline and label them with their age at the time and a description of the event. In the second part of the process, participants recall the details of the memory of each event. The method has been developed and used successfully to study the participants' subjective perception of self-organization of past and future behaviour over the course of life. The current study utilised only the retrospective lifeline.

Semi-structured interviews are the most common type of interview used in qualitative research to elicit specific information (Dawson, 2007). The information from one participant can be compared and contrasted with information collected in other interviews. To be comparable, the same questions need to be asked in each interview in the same manner (Dawson, 2007). In order to be consistent the researcher developed specific instruments such as an interview schedule. Each participant's semi-structured interview was recorded with his or her consent (see section 3.9).

For the audio recordings a Livescribe 3 Smartpen Bluetooth 2GB[7] was used. The Smartpen was designed to record audio while it writes like a ballpoint pen, on a special paper. It uses bluetooth technology to send the information recorded to a tablet, from where it was stored securely on a stand-alone computer. The advantage of using the Smartpen was that, during the course of the interviews, simple observations could be made and noted in the form of a single word. Afterwards, the researcher could go back to the notes, click on the word and the conversation at that point could be heard. Using the Smartpen assisted the researcher to reduce bias, by using more than one method of accurate data collection.

3.7.2 Development and field-testing of research instruments

After the initial development of the participant experimental booklet, the researcher field-tested them with six participants, representative of research sample. The participants who field-tested the instrument were not included in the research sample.

Field or pilot testing is important, as it reduces problems and mistakes in the study due to the instrument, and shows the researcher how effectively the interview guide and the booklet will work in practice (Dawson, 2007; Zohrabi, 2013). Feedback from piloting the study showed that the wording of a question in Section B had to be clarified and a rating scale in Section B had to be changed. Participants struggled with the lifeline graph. The researcher initially used the lifeline graph format as prescribed by Assink and Schroots (2010).

Subsequently, changes were made to the questions. The lifeline graph was redrawn to include a five-point scale (-2 = 'very negative'; -1 = 'somewhat negative'; 0 = 'neutral'; '+1 = somewhat positive'; and +2 = 'very positive'), with a solid horizontal line to represent neutral affect on the vertical axis. The line was placed at the midpoint ('neutral'= 0) of the vertical

[7] Livescribe 3 Smartpen Black Edition, APX-00020. Released 2015. Livescribe, Inc. Oakland, California.

axis. Dashed vertical lines to represent age, in 2-year increments, were added. Lastly, a scale was added to represent 'age in years' at the top and bottom of the graph space.

The interview schedule was adjusted to improve the logical flow of the interview. The participant experimental booklet and interview schedule were field tested for a second time with another six participants. The second time feedback was positive and no change was required.

3.7.3 Participant experimental booklet

The researcher developed a participant experimental booklet[8] to combine the quantitative data (questionnaires) and qualitative data (LIM graph) for collection in accordance with the research design.

The format of the booklet was A3 pages, folded to A4 size, and printed double sided which made it convenient and efficient for the participant and the researcher to handle.

The final participant experimental booklet consisted of four sections:

- Section A contained demographics questions.
- Section B contained domain importance questions regarding three domains of life, namely family/home, education /work, and social/friends
- Section C contained the lifeline graph.
- Section D. contained the lifeline interview method instrument

The sections about demographics information and life domain importance contained closed-ended questions and rating scales to provide additional information about the participant.

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[8] Appendix C contains a copy of the participant experimental booklet.

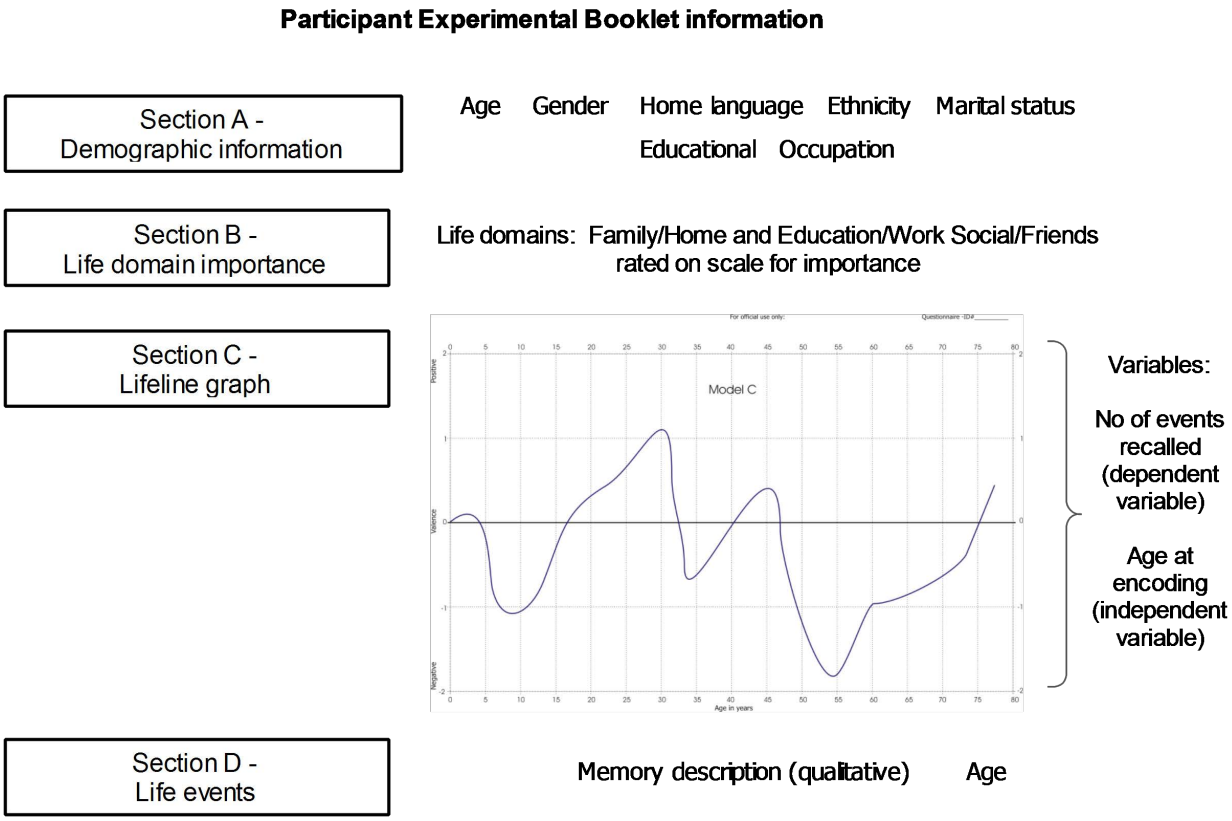

Figure 3.6 Variables as coded per section of the participant experimental booklet

Each section of the booklet was designed to provide data for a specific purpose of application, (see Table 3.3).

Table 3.3
Application of data generated in participant experimental booklet

Application of the data	*Section in booklet*	*Type of data*
Demographic data of participants	Section A	QUAN
Research Question RQ1	Section C & D	QUAN
Research Question RQ2	Section C	QUAL
Research Question RQ3	Section B & D	QUAN+QUAL

3.7.4 Interview schedule

If structured questionnaires and semi-structured interviews are used together in a mixed method study, problems in aligning data from the two different method can easily arise. This often happens because questionnaires and interviews have different strengths and weaknesses in data collection procedures (Harris & Brown, 2010). In order to facilitate a better alignment the researcher developed an interview schedule to facilitate a more fluent process in data collection. The interview schedule approach allowed for an efficient and comprehensive interviewing of the participants.

3.7.5 Interview process and context

The data collection took place between June 2017 and September 2017. Initial contact with interested participants was made telephonically to arrange for individual face-to-face interviews with each participant. The initial meeting took place at the participant's choice of location. The participant received a research information pack. This included a letter of invitation, an information sheet that provided information about the study, and a map with directions to the researcher's office with contact information. The researcher discussed the information sheet and consent form with the participant and questions the participant had to answer. An interview date was set.

The semi-structured interviews took place in the office that the researcher had set up to keep the environment consistent. The office was furnished with an office desk and two comfortable chairs. It was a comfortable place with plants and the sound of a fountain that put participants at ease to allow them to feel more relaxed and to facilitate the sharing of their life event experiences. The researcher set up the office in the same manner for each participant with the participant experimental booklet, the audio recording device and a tablet set out on the desk. The process gave the participant a chance to relax in the surrounding and

gave the researcher an opportunity to build rapport.

The researcher briefly reiterated the information in the information sheet and confirmed the consent for the interview to be audio recorded. The participant gave consent to take part through reading and signing the informed consent form.

The recording equipment was activated and the interview script was read to the participant with detailed instructions about the process. The participant was directed, section by section, on completing the participant booklet. Next, the lifeline graph and process was used to gather autobiographical memories. The participant first marked his/her current age and current positive or negative experience rating on the paper. Then he/she drew a lifeline from left to right, depicting the course of their life from birth to current age, by drawing peaks and troughs for positive and negative experience, respectively, described the memory or life event they remembered, their age when the memory happened. On the conclusion of the interview the researcher answered any questions that the participant had. The researcher thanked the participant and a date for the follow-up appointment was made.

After analysis of the LIM data the information elicited were taken back to each of the participants. The follow-up interview involved a participant or member check process. The participant was given a copy of the transcriptions of their memories. He/she was asked to read it for accuracy. The researcher then validated the coded life domain importance with them. Upon completion of the interview the participant was debriefed and thanked.

3.8 Data analysis procedures

Data analysis allows the researcher to make sense of the collected data. In the convergent parallel mixed method design, quantitative and qualitative data are analysed separately before it is merged in the interpretation process (Creswell, 2014). In the current study, quantitative and qualitative data were analysed separately to validate and explain the

differences (if any) in the RB between age cohorts, the valence of events as well as the life domain importance of events.

3.8.1 Quantitative data analysis

The researcher constructed a codebook for the research instrument to guide quantitative analysis (see Table 3.4).

Table 3.4

Codebook for quantitative analysis

#	Variable	Description	Scale	Levels	Variable level 1	Variable level 2
0	Questionnaire ID	ID	Nominal			
1	Age	Age in years	Ratio			
2	Group membership	Age group	Nominal	2	40-59	60-79
3	Gender	Gender	Nominal	2	Male	Female

SECTION A – DEMOGRAPHIC INFORMATION

#	Variable	Scale	Levels	Variable level 1	Variable level 2	Variable level 3	Variable level 4	Variable level 5
A1	Language	Nominal	4	Afrikaans	English	isiXhosa	Other	
A2	Bilingual	Nominal	2	Yes	No			
A3	Ethnicity	Nominal	3	Black	Coloured	White		
A4	Marital status	Nominal	4	Single	Divorced	Married	Widowed	
A5	Education	Nominal	5	Grade 11 / Std 9 or lower	Grade 12 / Std 10 (Matric)	Post-Matric Diploma or Certificate	Baccalaureate Degree(s)	Post-Graduate Degree(s)
A6	Occupation	Text						

SECTION B – LIFE DOMAIN IMPORTANCE

#	Variable	Scale	Levels	Variable level 1	Variable level 2	Variable level 3	Variable level 4	Variable level 5
C1	Family/ Home	Interval	5	Not important	Barely important	Somewhat important	Moderately important	Very important
C2	Work/ Education	Interval	5	Not important	Barely important	Somewhat important	Moderately important	Very important

C3	Friends/ Social	Interval	5	Not important	Barely important	Somewhat important	Moderately important	Very important
SECTION C – LIFELINE GRAPH								
SECTION D – LIFE EVENTS								
#	Variable	Scale	Levels	Variable level 1	Variable level 2	Variable level 3	Variable level 4	Variable level 5
D1	Event	Text	Quantitative coding					
D2	Age of event	Ratio						

Data were reviewed to ensure the reasonable authenticity of the responses. The process involved cleaning and preparing the data prior to analyses. This consisted of reviewing paper copies of the completed participant experimental booklet. Data were captured in an Excel spreadsheet, and converted into IBM SPSS Statistics for Windows, Version 22.0 [9] for analysis. The quantitative data were subjected to statistical analysis. Descriptive statistics were generated per age group and extensive explorative analysis was conducted.

3.8.2 Qualitative data analysis

Qualitative data analyses involved two different processes, namely coding of events and digitisation of the values of the lifeline graph.

The life event was the basic unit of analysis for the LIM. Qualitative data analysis of the life event descriptions generated by the LIM was handled in the following sequence. The life event descriptions were prepared for analysis by transcribing the descriptions per participant and organising them chronologically to reflect the lifeline graph. Each life event was read to identify the key life event themes or categories. Descriptions were coded based

[9] IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp

on similar categories to represent life domains.

Each lifeline graph showed life events in chronological order.

In order to extract these values of life events and make them usable for integration in analysis, the values of the lifeline graph were digitized using WebPlotDigitiser[10]. Lifeline graphs were analysed through digitizing the horizontal and vertical coordinates for each life event to produce 'x' and 'y' coordinates. The 'x' coordinate referred to the 'age at the time of the life event' and the 'y' referred to the 'valence value'. Coordinates were tabulated for statistical analysis.

3.8.3 Data analysis per heading

This section briefly summarises the specific analysis as carried out for each subsection of the result chapter.

3.8.3.1 Sample demographics. Analysis was conducted on demographic data provided by participants in section A of the experimental participant booklet. Descriptive statistics were generated with means and standard deviations according to the characteristics of the participants by age, gender, and ethnicity (see Figure 3.7)

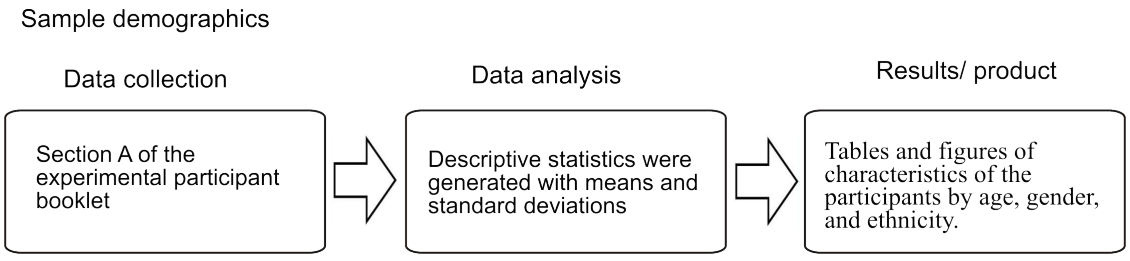

Figure 3.7 Data collection and analysis procedure for sample demographics

3.8.3.2 Temporal distribution of events. In order to determine the temporal

[10] WebPlotDigitizer computer software (Rohatgi, 2011)

distribution of events, events in the RB (10-30 years) and outside the RB (0-9 years and 31 years to current age), was analysed first. The number of events for RB_{in} and RB_{out} was calculated for each participant and per group. A temporal distribution profile was created for each participant based on the number of events per 5-year bin. Further analysis included a frequency distribution per group. A lifespan retrieval curve for each group based on both 5-year bin and 10-year bin was generated. The lifespan retrieval curve showed the correspondence between the variables at age of encoding and number of events. A t-test was conducted to statistically compare the distributions of the two groups. Figure 3.8 depicts an overview of the procedure.

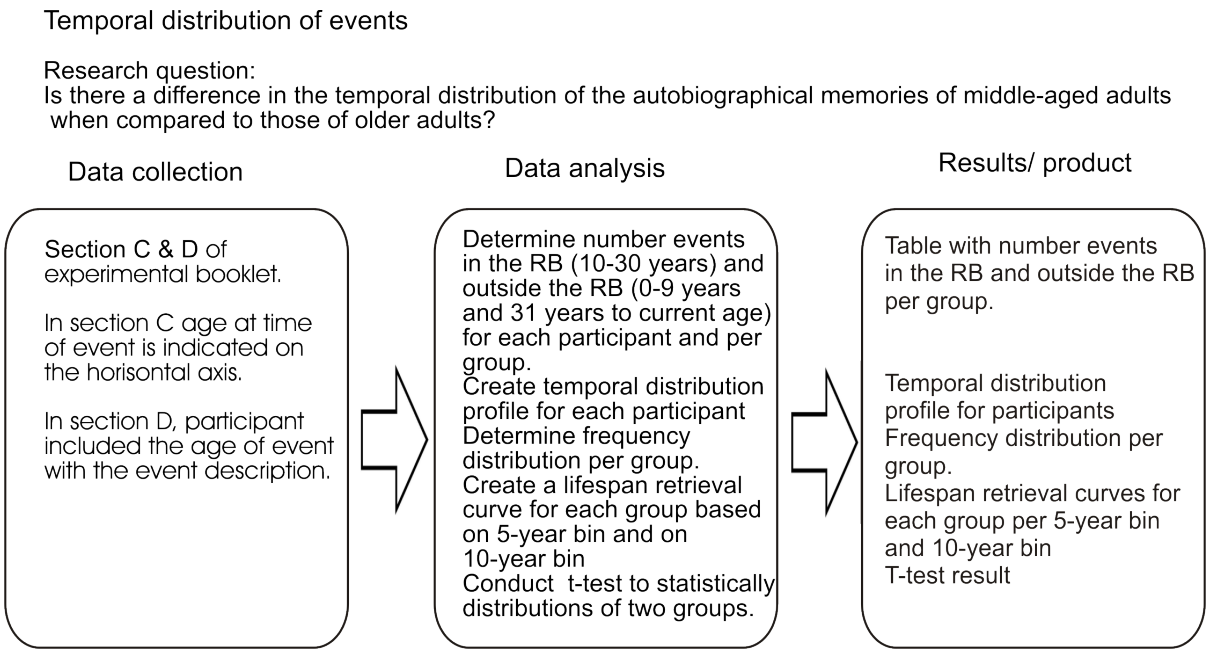

Figure 3.8 Data collection and analysis procedure for temporal distribution of events

3.8.3.3 Valence of events. Analysis was conducted to determine the valence ratings per group during the RB of middle-aged and older adults. The illustrated valence findings on the life line graphs were digitised as described in section 3.8.2. The values of the valence ratings scale were tabulated. Figure 3.9 depicts an overview of the procedure.

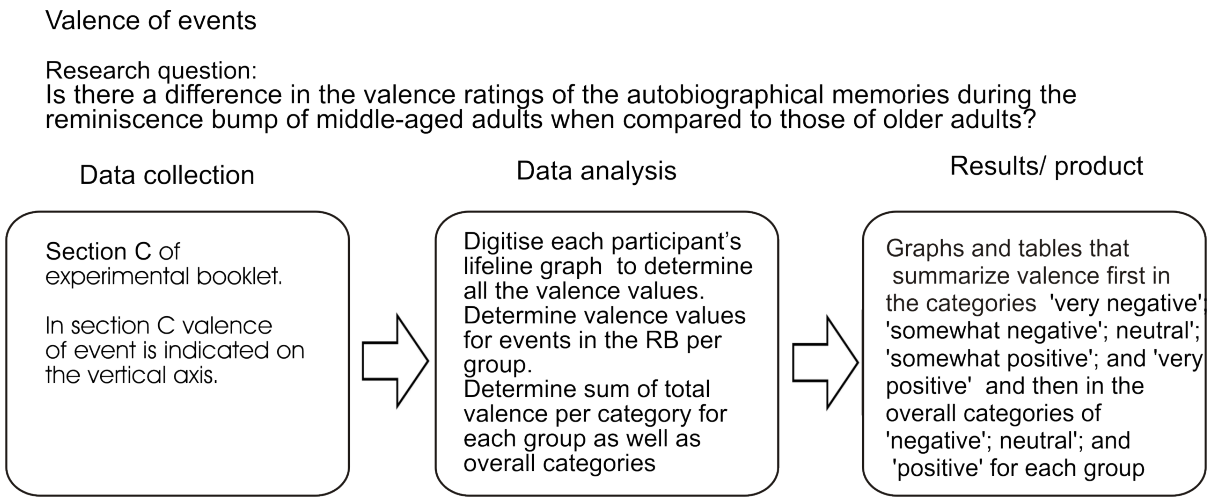

Figure 3.9 Data collection and analysis procedure for valence of events

3.8.3.4 Life domain importance of events. The contents of events were analysed to determine life domain importance per group during the RB of middle-aged and older adults. The QUAL data from the recalled memories in the RB per participant were coded and analysed manually to determine the frequency of life domains reported. The QUAN data from the life domain rating scale were tabulated.

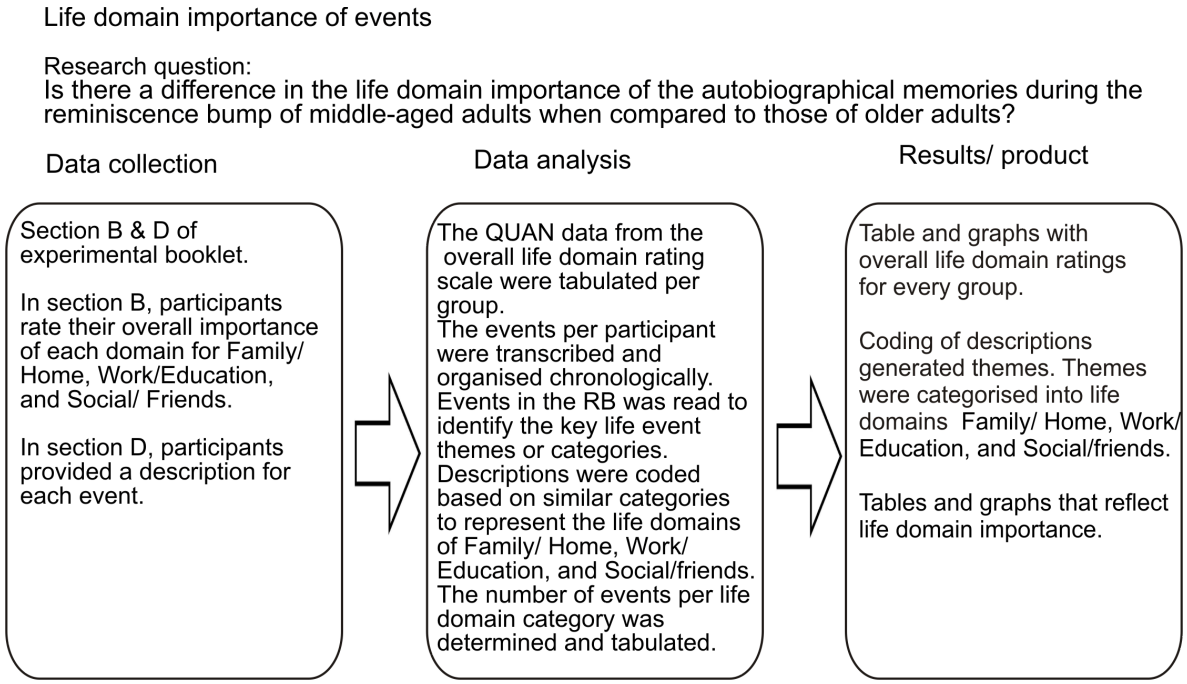

Figure 3.10 Data collection and analysis procedure for life domain importance of events

3.8.4 Issues of trustworthiness

Issues of validity and reliability are important in order to ensure that a high standard in research is maintained (Dawson, 2007). The measurement in research, particularly the instruments, has to be stable and consistent to ensure that there are no errors or bias present, either from the participants or from the researcher. In this study the participant experimental booklet (instrument) and a semi-structured interview (method) were used to collect data.

Reliability in research is defined as the stability or consistency of an instrument to yield the same results on different occasions. This is important as it influences the reliability of the findings in future studies if the current study is replicated (Babbie, 2016; Zedeck, 2014). Validity is defined as the degree to which an instrument measures what it claims to measure. Validity of an instrument can be affected by different factors such as the wording of the questions, a poor sequencing of questions or confusing structure or design of the questionnaire (Vogt, Vogt, Gardner, & Haeffele, 2014).

Measures followed in this study to ensure a high standard of research include rigorous and structured data collection through the layout and sequencing of the instrument to reduce the risk of bias. In the development of the instruments and interview schedule, leading questions, loaded words, absolute words, and strong, emotionally charged verbs were avoided.

Accuracy was checked in the discussions with participants after the field testing. The same process was followed with each participant to ensure consistency. Member or participant checks were done to verify the correctness and interpretation of data. Lastly, a variety of data collection instruments (quantitative and qualitative) was used to be able to triangulate the finding in the research.

According to Assink and Schroots (2010, p.19) the "inherent structure of the LIM has a validity of its own since it represents the facts of an individual's life as he or she sees it and

it is the subjective truth of his life". This research has face validity, as the research instrument assess autobiographical memory. As the lifeline interview method provide for targeted life event recall, there are provisions for assessment of memory accuracy through family and friends, but the memory accuracy is still limited by the integrity and accuracy of the collaborating source (Robinson-Riegler & Robinson-Riegler, 2008).

Data for the RB in AM has proven reliable, as the phenomenon of the RB has been replicated in numerous laboratories, globally over three decades, using well-documented testing procedures (Conway & Rubin, 1993; Rubin, Schulkind & Rahhal, 1999).

3.9 Ethical considerations

The Ethics Committee of the Department of Psychology at the University of South Africa provided ethical clearance[11] for the study.

This research project posed no risks. Since the 1980s, researchers such as J.M. Fitzgerald, M.A. Conway and D.C. Rubin have done research on the RB with no negative effects or risks to participants (Conway & Rubin, 1993; Fitzgerald & Lawrence, 1984; Wetzler & Nebes, 1986).

Giving information about research is interleaved with the process of getting the participant's consent to take part in the study (De Vos, Strydom, Fouché & Delport, 2011). Therefore, the researcher briefed each participant on the aim, the purpose and the time requirement of the research to enable the participant to make an informed decision about participating. The participant received an information sheet and signed a consent form on which there was an information overlap. This was done with the purpose to ensure that the participant was fully aware of all the aspects of the study. Participants received an

[11] Appendix D contains a copy of the ethical approval form.

information sheet[12] in the form of a small brochure that addressed issues and concerns about the research project. It also explained that the study was confidential and voluntary, the right to withdraw from the research project and highlighted the researcher's availability to give additional clarification or explanation to the participant as needed.

Each participant read and signed an informed consent form[13]. The informed consent form validates the ethical norms of voluntary participation and no harm to participants (Babbie, 2016; De Vos et al., 2011). This form stated the purpose of research, that the participant had read the information sheet, and understood all aspects pertaining to his/her participation, the right to confidentiality and that he/she can withdraw from the study at any point without having to provide a reason, and contained the participant's signature and the date. Participants consented to the recording of the semi-structured interviews.

Only the researcher has access to the original data. Non-disclosure of identities in any reporting protects the confidentiality of participants. After data collection, the researcher removed all identifying information from the audio-recorded information. Data is being stored for five years after the finalisation of the project and the researcher takes reasonable care to ensure that no one gain access to the data. None of the participants withdrew from the study. The ethical measures taken in the study satisfied all participants. The researcher, at all times, adhered to the fundamental ethical principle of respect for participants.

3.10 Summary

This chapter provided a review of the research framework. The convergent parallel mixed method research design was discussed and motivated as being the ideal approach to

[12] Appendix E contains a copy of the participant information sheet
[13] Appendix F contains a copy of the informed consent form

compare qualitative and quantitative data in the LIM . Pragmatism was explained as being a paradigm that allowed the researcher to apply practical solutions to challenges in the study without compromising the integrity of the study. Sampling considerations, selection and process were discussed. The method employed was the LIM in a semi-structured interview. An interview schedule and experimental participant booklet were developed to facilitate the collection of data. The lifeline graph, included in the experimental participant booklet, was modified after piloting the instrument. The data collecting and analysis were discussed and the chapter concluded with issues of trustworthiness and ethical consideration. The following chapter will discuss the results of the study.

Chapter 4. Results

4.1 Overview

This chapter presents the results of the quantitative and the qualitative analyses of the dynamics of the AM during the RB. This chapter is divided into four sections. The first section contains the results of the demographic information of participants collected through section A of the experimental participant booklet.

The following three sections present the results of the secondary research questions about the dynamics in AM. In the results of the temporal distribution of events, analysis included a frequency distribution for each group, a lifespan retrieval curve for each group based on both 5-year bins and 10-year bins, and a t-test to statistically compare the distributions of the two groups.

In the results of valence of events, analysis included digitising the values from the life graph for each participant before combining the values per group. Values for the two groups were tabulated and compared.

Life domain importance was reported in two ways. Overall life domain importance per group was obtained by analysing the rating scale. Event descriptions per coded category are included to show the content of events that were reported. Life domain importance values for coded life domain importance categories were tabulated and compared.

For quantitative analysis the IBM SPSS Statistics for Windows, Version 22.0 was used. Qualitative data were manually coded and analysed. A total of 48 semi-structured interviews were conducted and the participants completed and answered all the questions in the participant experimental booklet, thus the response rate was 100%.

4.2 Sample demographics

A non-proportional quota sampling method was used to obtain the sample. The sample consisted of two groups with a total sample size of 48 participants. The two groups are a middle-aged group with participants between the ages of 40 and 59 years (N = 24, M = 47.12, SD = 5.63), and an older adult group with participants between the ages of 60 and 79 years (N = 24, M = 68.29, SD = 5.68). The age distributions of participants within the groups are presented in Figure 4.1

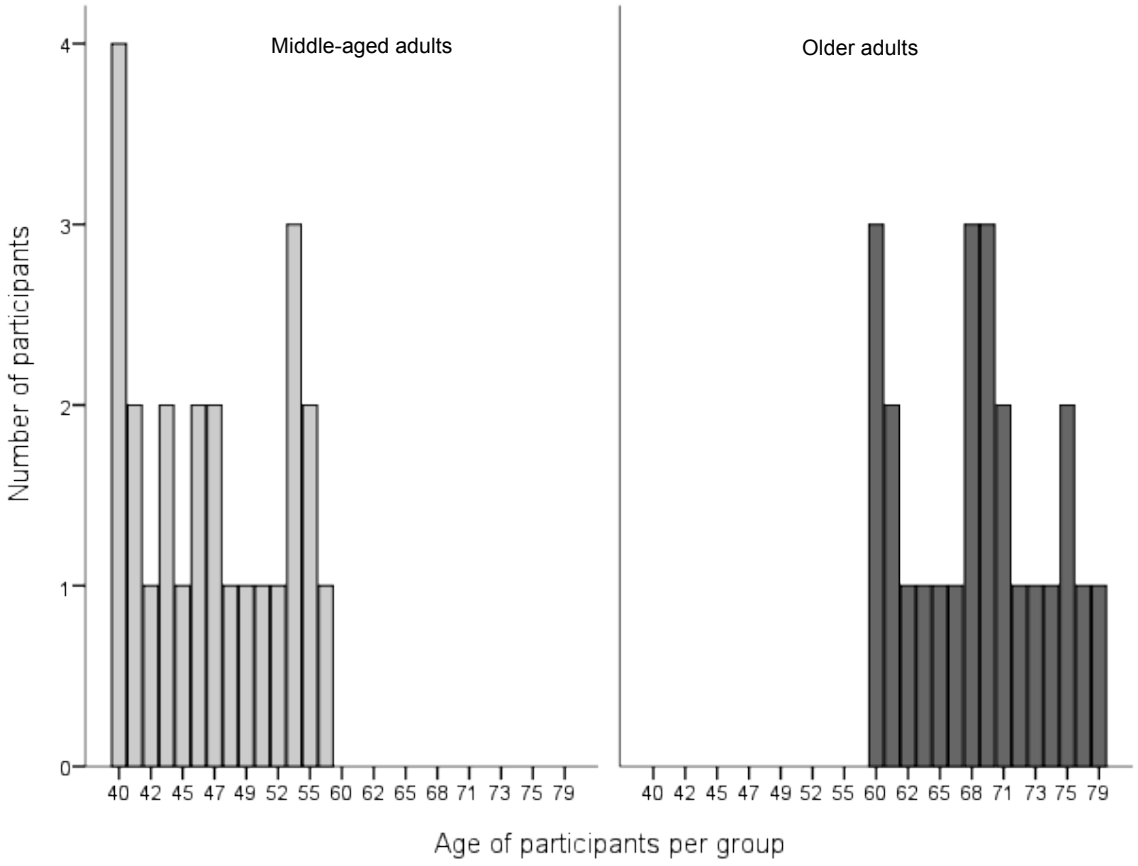

Figure 4.1 Age distribution of participants per group

The composition of each group consisted of an equal number of participants per ethnic group, namely 8 black participants, 8 coloured participants, and 8 white participants. The

gender composition per group was 12 male participants and 12 female participants. Figure 4.2 displays the composition of the group per ethnicity and gender characteristics, as well as the age and occupation of each participant.

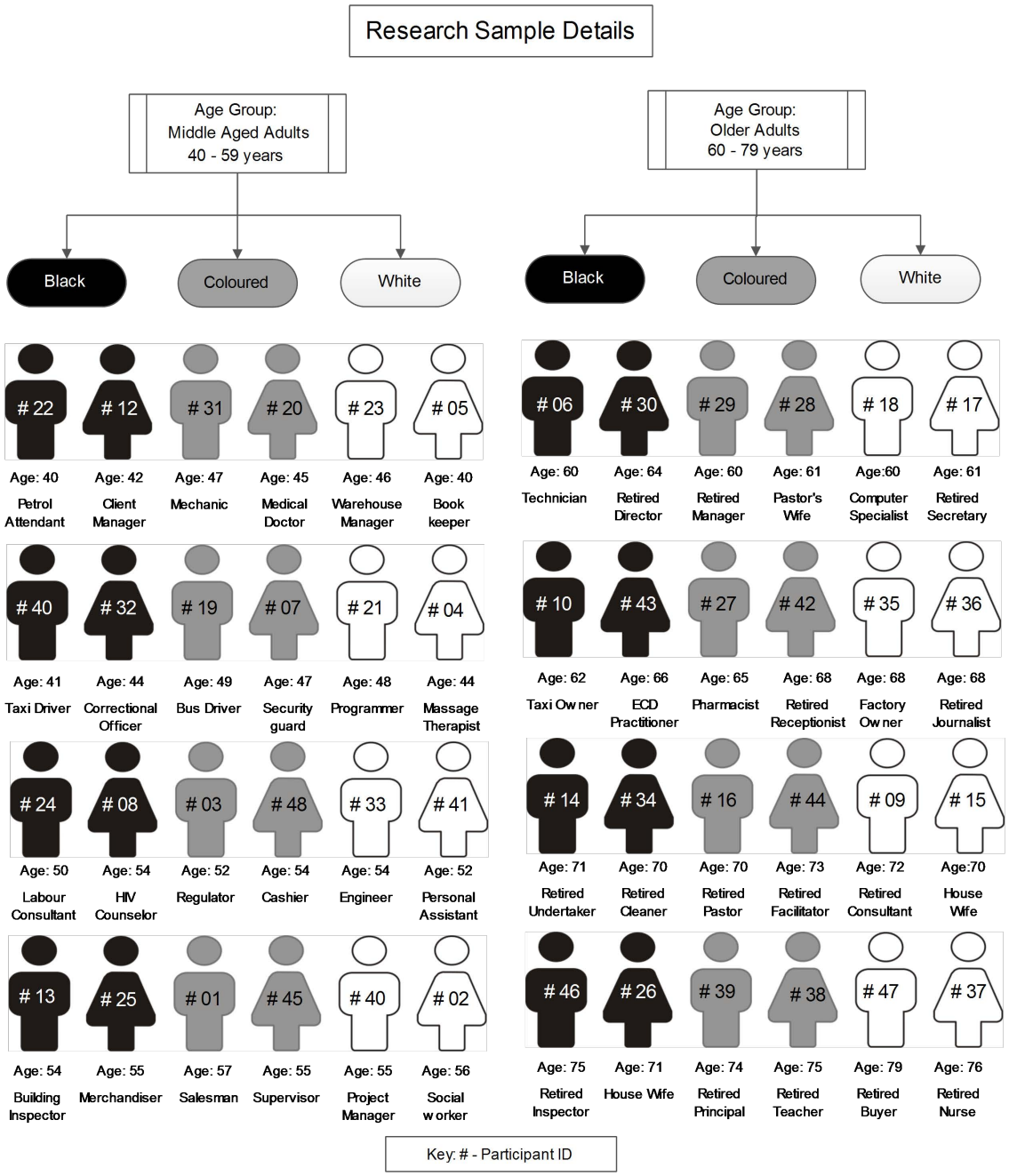

Figure 4.2 Characteristics of participants in the sample

In the total sample Afrikaans is the home language of 48% of participants, 32% of the participants have isiXhosa as their mother tongue, and 20% of the participants are English

speaking. Language per ethnic group (see Table 4.1) shows that 94% of black participants speak isiXhosa, 75% of coloured participants speak Afrikaans, and 68% of white participants speak Afrikaans as their home language.

Table 4.1

Home language per ethnic group

	Black		Coloured		White	
Language	Number of participants	Percent	Number of participants	Percent	Number of participants	Percent
Afrikaans	0	0%	12	75%	11	68%
English	1	6%	4	25%	5	32%
isiXhosa	15	94%	0	0%	0	0%

The home language breakdown per group is reflected in Figure 4.3. For the middle-aged adult group, 54% speak Afrikaans, 33% speak isiXhosa and 13% speak English. While in the older adult group, 42% speak Afrikaans, 29 % speak isiXhosa and 29 % speak English.

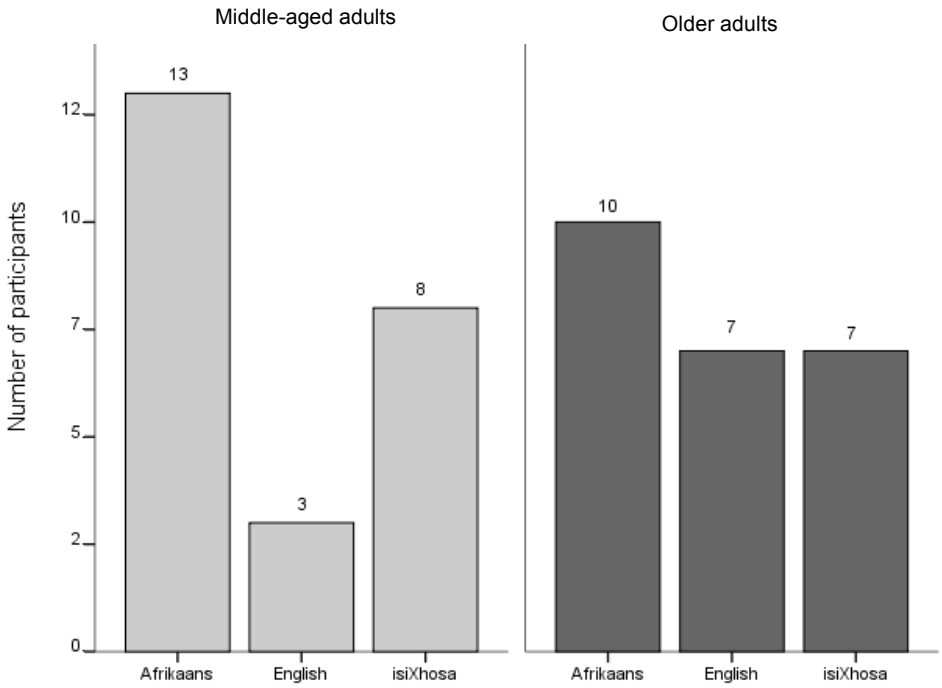

Figure 4.3 Home language per age group

Participants reported their marital status as follows. In the total sample, 6% of participants are single, 52% of participants are married, 27% of participants are divorced, and 15% of participants are widowed.

The marital status per group is reflected (Figure 4.4). For the middle-aged adult group, 13% of participants are single, 50% of participants are married, 33% of participants are divorced and 4% of participants are widowed. While in the older adult group 54% of participants are married, 21% of participants are divorced and 25% of participants are widowed.

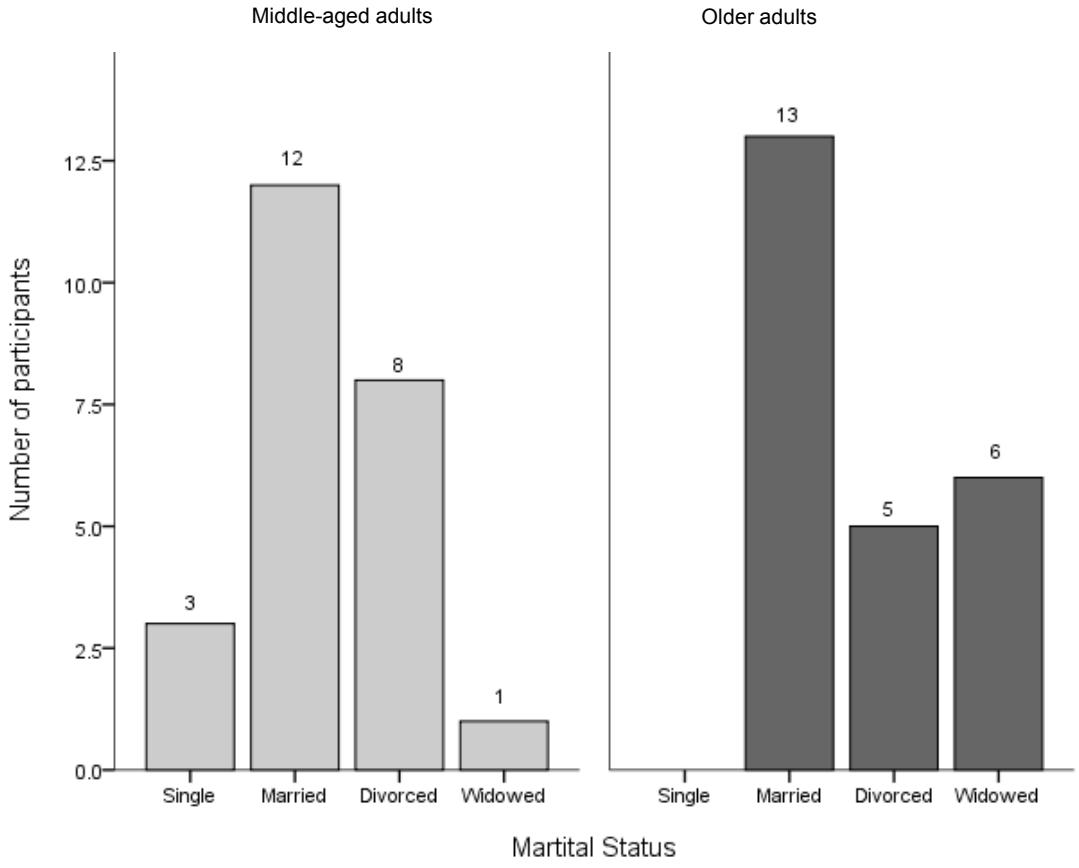

Figure 4.4 Marital statuses per age group

Participants reported their highest educational qualification as follows.

In the middle-aged adult group, 17% completed Grade 11 or lower; 29% had only a Grade 12 qualification; 25% were in the possession of a Post-Matric Diploma or Certificate; and 29% had a Baccalaureate Degree. None of the adults in this group had a Graduate Degree. In the older adult group, 17% completed Grade 11 or lower; 12.5% had only a Grade 12 qualification, 25% had a Post-Matric Diploma or Certificate, 33% had a Baccalaureate Degree and 12.5% earned a Postgraduate Degree (see Figure 4.5).

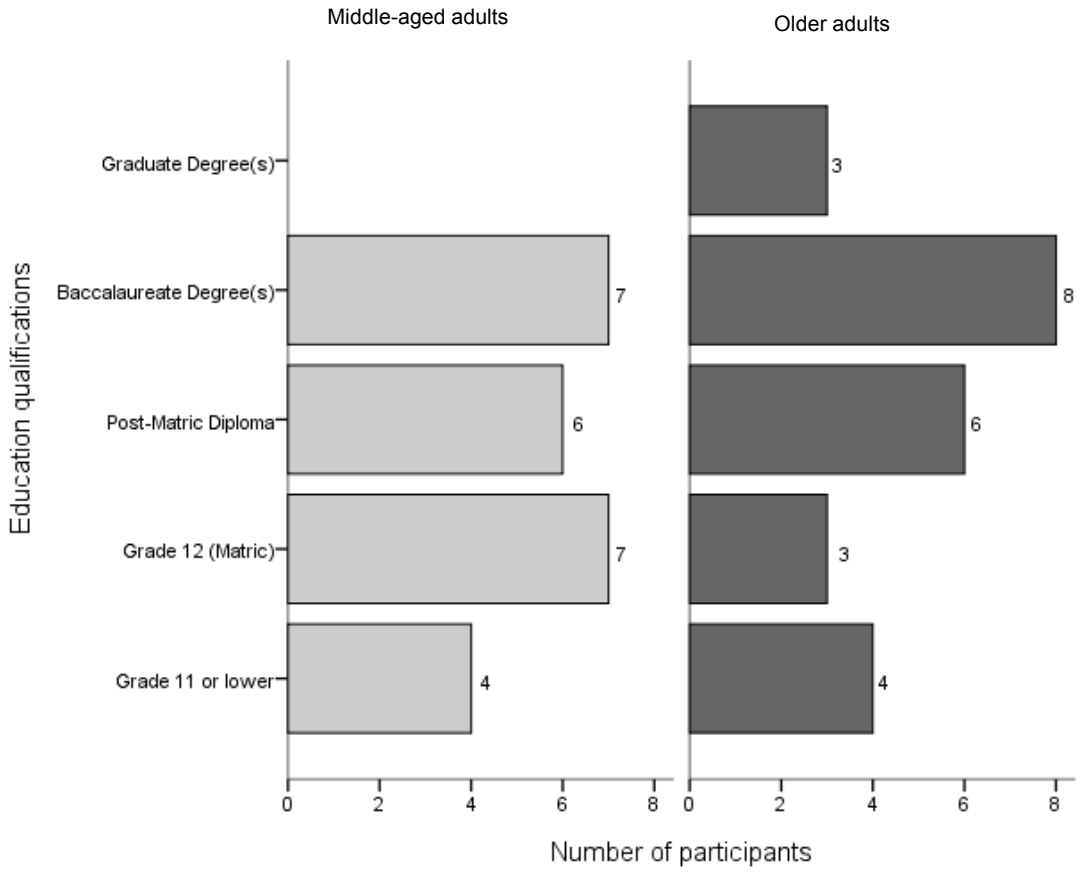

Figure 4.5 Education level per age group

4.3 Temporal distribution of events

The research question pertaining to temporal distribution of events was:

- Is there a difference in the temporal distribution of the autobiographical memories of middle-aged adults when compared to those of older adults?

A distribution profile generated for each participant shows the correspondence between the variables, age of encoding and number of memories. To demonstrate the variability between participants the first six profiles are included in Figure 4.6.

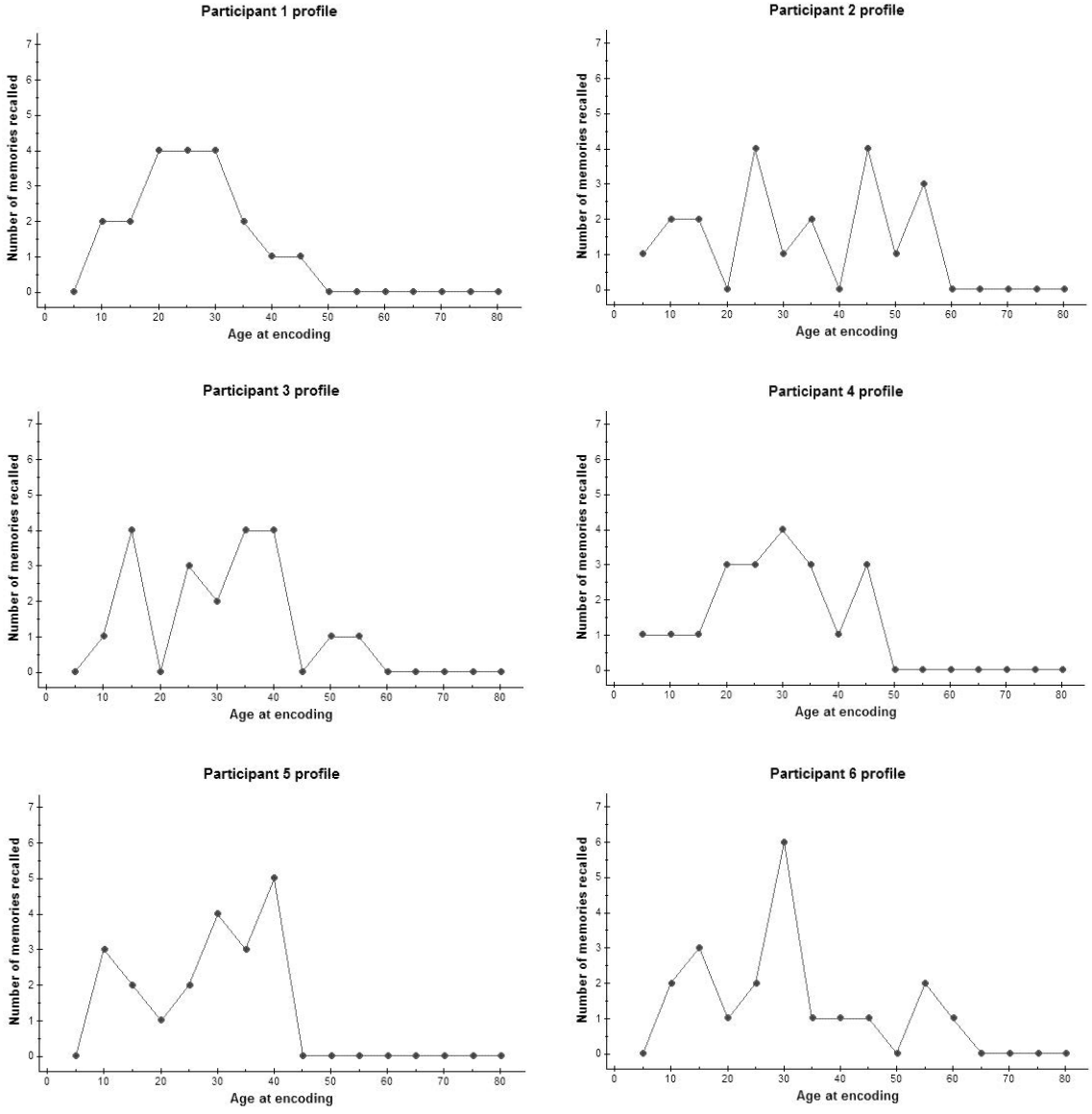

Figure 4.6 Participant profiles of distribution of events

For each age group a frequency distribution was generated that shows the distribution of life events over decades of life. In order to examine the temporal distributions of the two groups the recalled memories were divided into 5-year bins and a frequency distribution was generated for middle-aged adults (40-59 years) (see Figure 4.7), and for older adults (60-79 years) (see Figure 4.8).

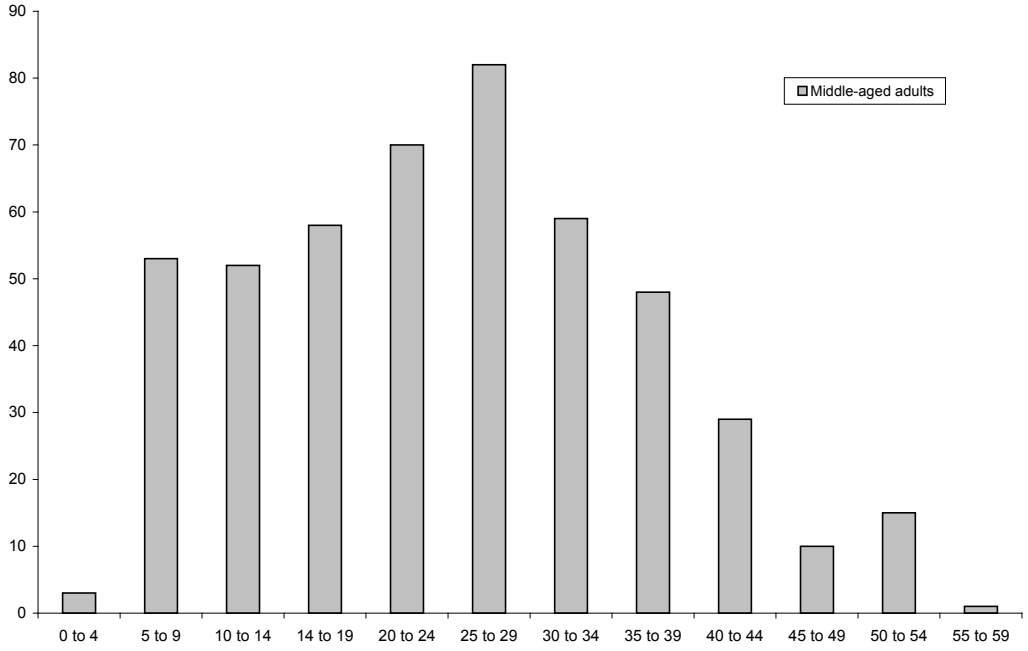

Figure 4.7 Distribution of recalled memories of middle-aged adults (40-59 years)

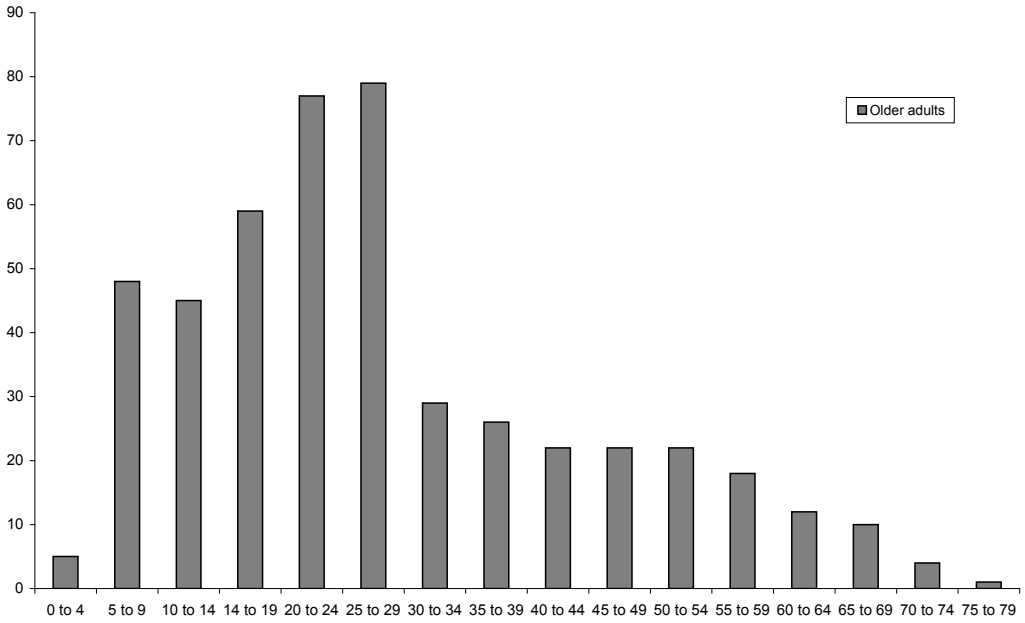

Figure 4.8 Distribution of recalled memories of older adults (60-79 years)

Lifespan retrieval curves were generated for both middle-aged adults and older adults using 5-year bins(see Figure 4.9) and 10-year bins (see Figure 4.10) respectively.

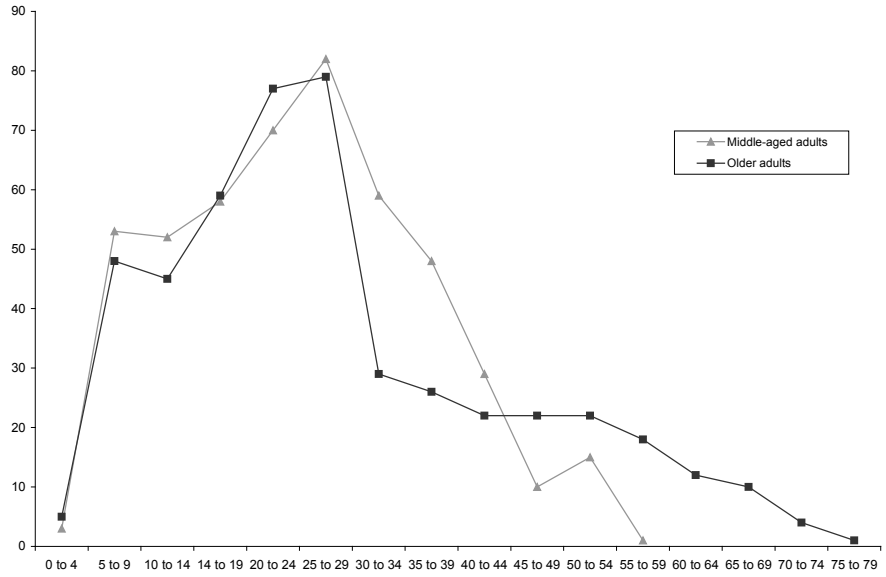

Figure 4.9 Lifespan retrieval curves for both groups using 5-year bins

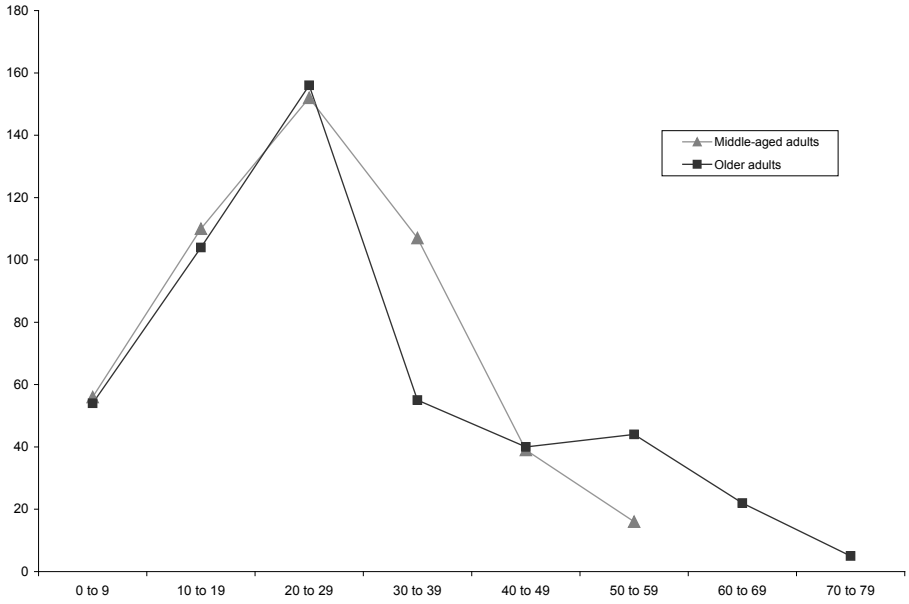

Figure 4.10 Lifespan retrieval curves for both groups using 10-year bins

The RB is clearly visible in both graphs between the ages of 10 years and 30 years. However, the graph with the 5-year bins shows an additional small bump between the ages of 5 years and 9 years for both age groups and a third bump between the ages of 45 and 59 years.

To determine if there is a difference in the temporal distribution between the two groups, a t-test was conducted. The null hypothesis relating to this t-test states that there is no difference in distribution of recalled memories between middle-aged adults and older adults in the RB. The means and standard deviations for the number of recalled memories are presented in Table 4.3. The results suggest that the middle-aged adults recalled more memories within the RB period than the older adults.

Table 4.2

Descriptive statistics for number of recalled memories in the RB

Age group	*N*	Mean	Std. Deviation	Std. Error Mean
Middle-aged adults	24	10.91	2.44	.499
Older adults	24	10.83	1.94	.397

Results of an independent-samples t-test, presented in Table 4.4, indicated that there was no significant difference between the middle-aged and older adults in terms of the number of life events recalled in the RB, $t(46) = .130$, $p = 0.897$.

Table 4.3

Results of independent-samples t-test for the number of recalled memories in the RB

t-test for Equality of Means	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Number of life events recalled in the RB	0.130	46	.897	.083	.638

As the rest of the study focussed on the period during the RB, the number of events in the RB and the number of events that took place outside the RB was calculated.

Each participant produced 20 memories of life events, resulting in 480 life events per age group, and a total of 960 life events. The number of events in the RB and the number of

events that took place outside the RB are reflected in Table 4.2. Middle-aged adults recalled 57.5 % of their total memories within the period of the RB, while older adults recalled 55.2 % of the total memories within the RB. Therefore, middle-aged adults recalled more events during the RB than older adults. It is important to note that the period outside the RB for middle-aged adults was a maximum of four decades, while for older adults it was a time range of up to six decades.

Table 4.4

Number of events in vs out the RB

Group	RB_{in}		RB_{out}	
	Number of life events	% life events	Number of life events	% life events
Middle-aged adults	276	57.5	204	42.5
Older adults	265	55.2	215	44.8

4.4 Valence of events

The research question pertaining to valence was:

- Is there a difference in the valence ratings of the autobiographical memories during the reminiscence bump of middle-aged adults when compared to those of older adults?

Data generated from digitising the lifelines were converted to ratings for valence in the RB. In both groups, participants reported more than double the number of very positive events in comparison to very negative events (Figure 4.11). In middle-aged adults, only two participants marked a neutral rating, while in older adults only one participant marked a neutral rating.

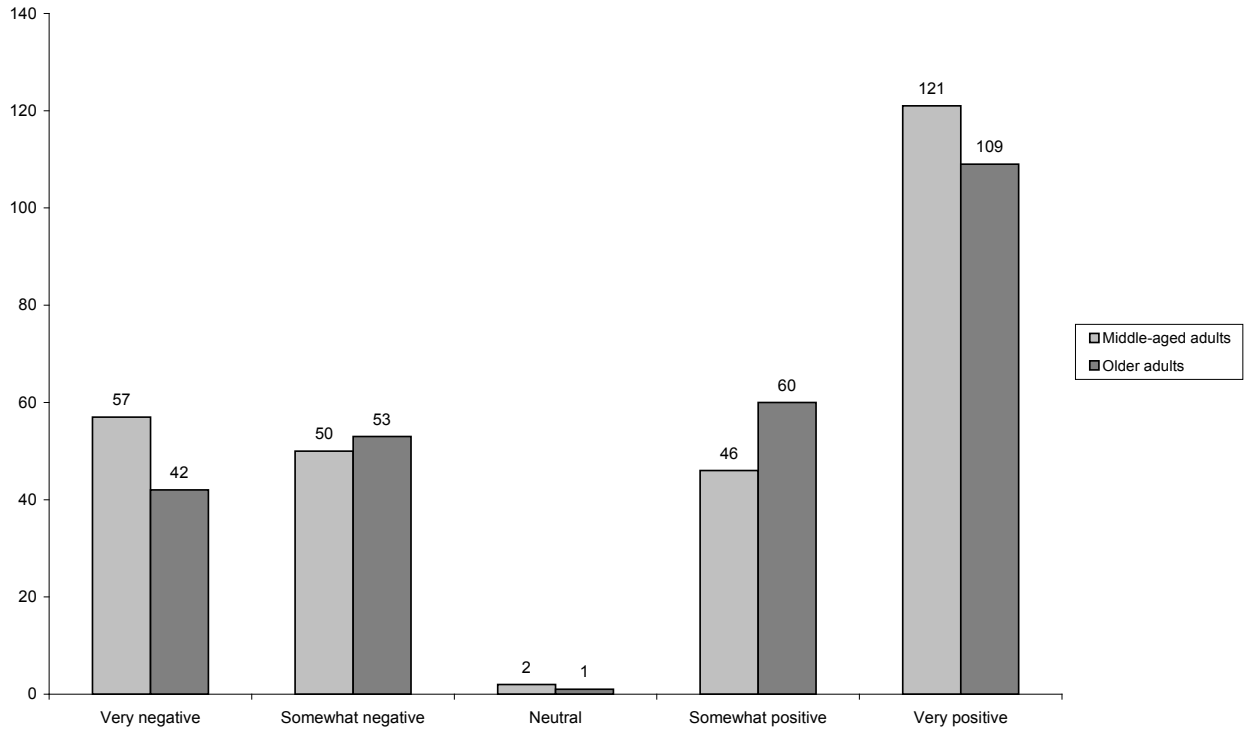

Figure 4.11 Number of events reported per valence category

In middle-aged adults, the percentage of very positive events and very negative events is higher than the percentage reported by older adults. Similarly, for the categories, somewhat positive events and somewhat negative events, the older adults reported higher percentages than the middle-aged adults (see Table 4.5).

Table 4.5

Memory valence reported in five categories

	Memory valence				
Age group	Very negative	Somewhat negative	Neutral	Somewhat positive	Very positive
Middle-aged adults	20.7% (57)	18.1% (50)	0.7% (2)	16.7% (46)	43.8% (121)
Older adults	15.8% (42)	20.0% (53)	0.4% (1)	22.6% (60)	41.1% (109)

Overall, older adults reported slightly greater percentage for positive life events (63.8%) than the for percentage positive life events (60.5%) reported by middle-aged adults. The middle-aged adults reported a slightly greater percentage for negative life events (38.8%) than the percentage for negative life events (35.8%) reported by older adults (Figure 4.12).

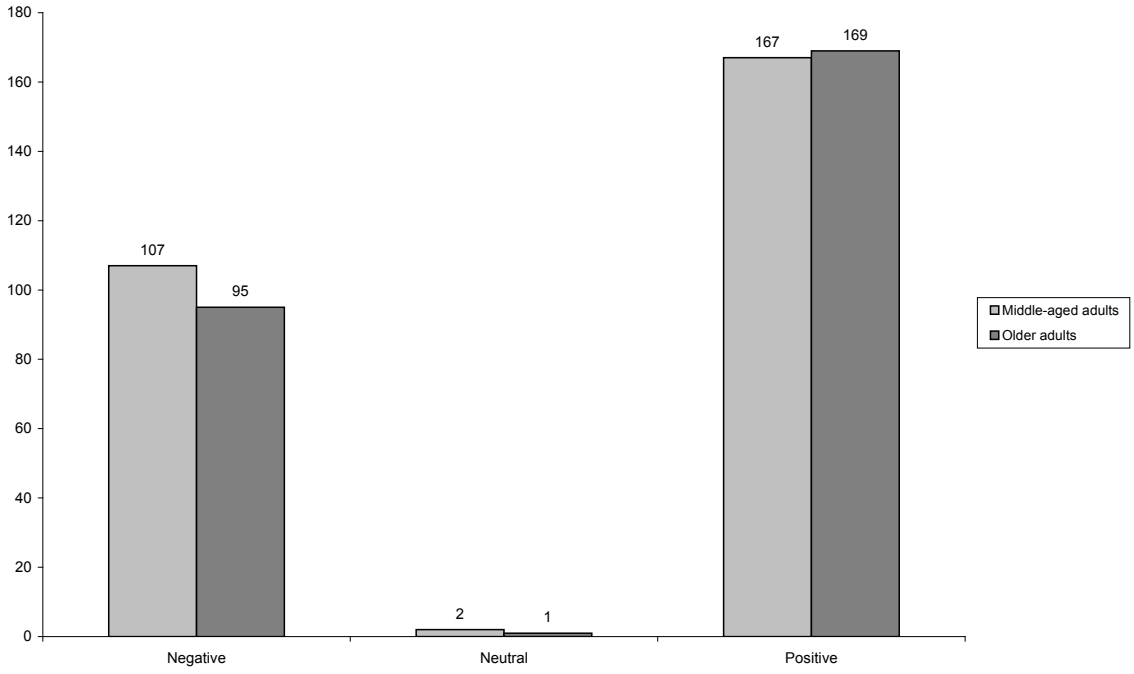

Figure 4.12 Overall memory valence reported per group

4.5 Life domain importance of events

The research question pertaining to life domain importance:

- Is there a difference in the life domain importance of the autobiographical memories during the reminiscence bump of middle-aged adults when compared to those of older adults?

Participants were asked to rate the overall life domain importance of Family/Home, Work/Education and Social/Friends on a 5-point rating scale. Older adults reported Family/Home as overall the most important domain (Figure 4.13). The Work/Education

domain is rated 'most important' by 62.5% of middle-aged adults, while only 20.8% of older adults consider it to be 'most important' (Figure 4.14). Older adult's ratings vary from 'most important' to 'not important'. Both groups rate the domain of Social/Friends as moderately important (Figure 4.15). Both groups participate in social activities. The social activities can range from singing in the church choir to being involved in a service organisation such as Rotary International.

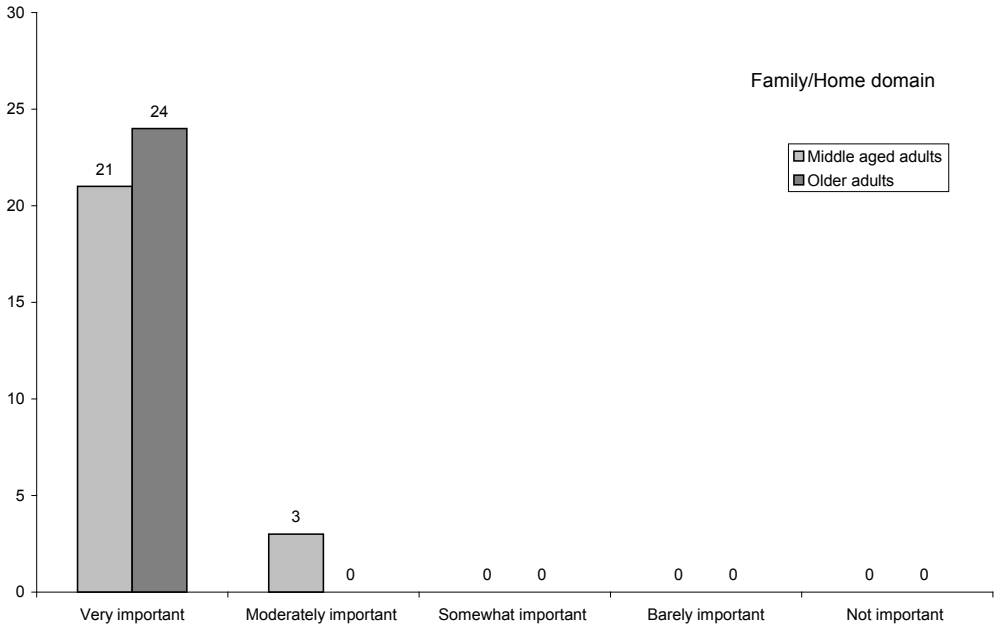

Figure 4.13 Overall importance rating of the Family/Home domain

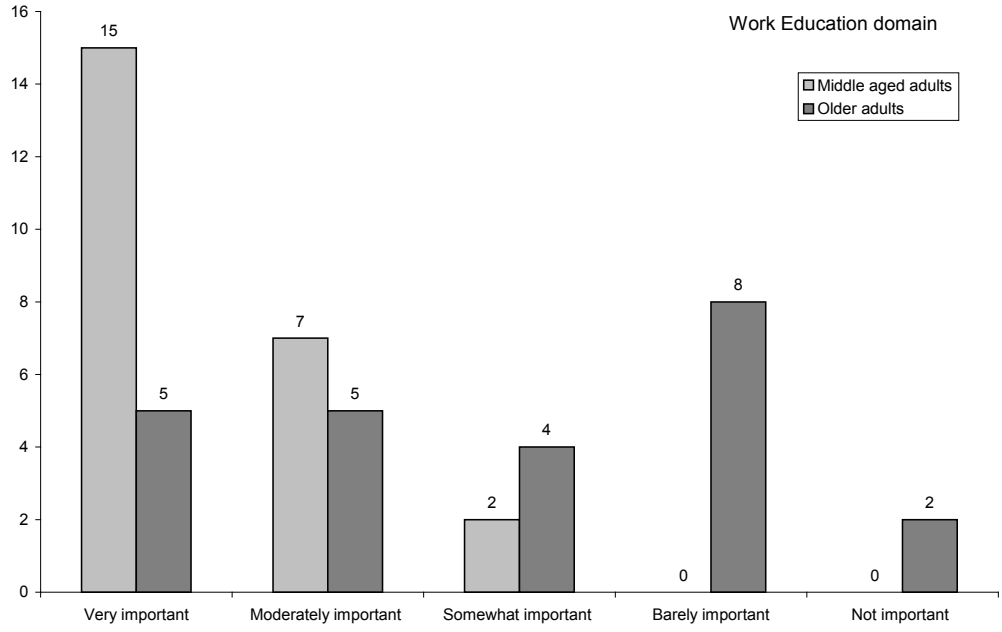

Figure 4.14 Overall importance rating of the Work/Education domain

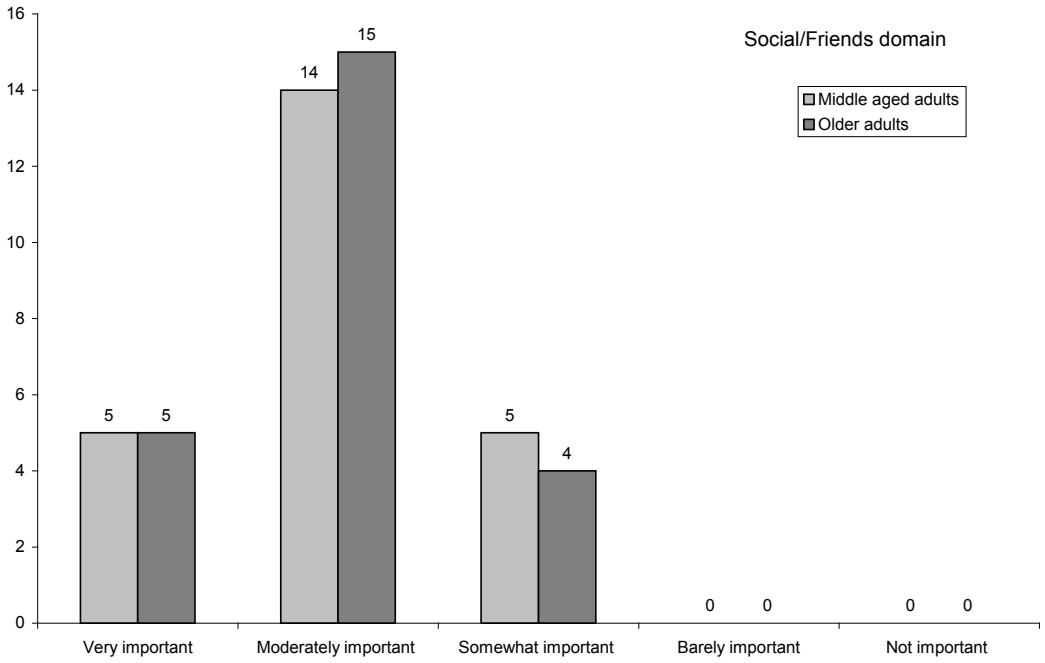

Figure 4.15 Overall importance rating of the Social/Friends domain

The contents of events were coded, analysed, and sorted into three life domains Family/Home, Work/Education and Social/ Friends. Family/Home represented family relationships, love and marriage, parenting, home, self, and health. Each of the subcategories represented different components.

Family relationships represent all events that contain parents, grandparents, siblings, and extended family (birth, death, celebrations or just simple interactions). Love and marriage contained events ranging from falling in love (beginning relationships) to marriage as well as separation, divorce, or the loss of a spouse (death). Parenting contained all events involving children such as birth, interactions with the child, death of a child, occasions involving a child. Home contained events ranging from buying a home, fixing up a home to losing a home. The self encapsulates events that relate to self-growth or emotions, and experiences; while health involves illness and accidents. Table 4.6 list some examples of event descriptions from participants involving the Family/Home domain.

Table 4.6

List of event descriptions from Family/Home domain

Age	Life domain	Event description
4	Family/Home	I was alone and scared at home
5	Family/Home	I got a hiding for stealing sugar
6	Family/Home	I was molested by my stepfather, I was scared
6	Family/Home	My mother dumps me at my grandmother
6	Family/Home	I fell in the fire and got severely burned
6	Family/Home	I went to fetch water from the river. The water wizard grabbed me and today I still have that scar on my face
6	Family/Home	I remember hiding under the table while the bomb sirens went of during WW2
7	Family/Home	My mother died due to cancer
7	Family/Home	I lived with my Gogo in the Transkei
7	Family/Home	Living on street, scared and cold
7	Family/Home	Save my youngest sister from drowning in bathtub
7	Family/Home	Chasing my brother with a knife because he teased me
8	Family/Home	I landed in hospital with polio complications
8	Family/Home	I wished I could attend school, but I had no home and I was hungry and begging in order to survive
9	Family/Home	I saw the sea for the first time
11	Family/Home	We painted my room in Jeffreys Bay purple and pink
12	Family/Home	I caught a snake, burned it and got a hiding
14	Family/Home	I wrote a poem for my girlfriend and gave it to her
18	Family/Home	Birth of my son with my girlfriend
19	Family/Home	My husband paid 10 cows as lobola
20	Family/Home	My boyfriend leaves me when he finds out I was pregnant
20	Family/Home	My marriage negotiations took place
22	Family/Home	I got engaged after my wife said yes, the 5th time I asked her
24	Family/Home	I land in jail because of assault
25	Family/Home	I paid R20000 lobola
25	Family/Home	I learned that I could not have kids
26	Family/Home	My son is sick with colic

26	Family/Home	I was baptised
26	Family/Home	I spend two weeks in hospital when I nearly died after being stabbed
27	Family/Home	All my hair fell out from cancer
27	Family/Home	I had a miscarriage
28	Family/Home	Lost my house in a fire
29	Family/Home	I visited London and took a photograph of Canterbury Cathedral
29	Family/Home	Breastfeeding my second son - a moment of joy
29	Family/Home	I went through a traditional fertility ritual
30	Family/Home	I had to get permission from my mother to get married because my older sister was not married yet
32	Family/Home	I got divorced
32	Family/Home	I adopted a dog
32	Family/Home	Taking my daughter to school on the first day, me crying
32	Family/Home	I decided to change my life and accept God as my saviour
33	Family/Home	I told my wife that I was gay
36	Family/Home	I bought my own home
36	Family/Home	Mother has a relapse with cancer
40	Family/Home	I was diagnosed with a brain tumour
40	Family/Home	I had major problems with my adopted daughter
41	Family/Home	Graduation of my son from university
42	Family/Home	I found out my husband had an affair
42	Family/Home	My daughter is chosen as head girl
45	Family/Home	My son matriculated and left for university
46	Family/Home	My adopted daughter dropped out of school
47	Family/Home	I had a nervous breakdown
50	Family/Home	I had a 50th birthday surprise party
52	Family/Home	My son joins the army after matric
52	Family/Home	I lost my husband in an accident
52	Family/Home	My daughter married a Muslim
54	Family/Home	I got my own house

Work/Education domain covers all aspects including schooling, education and training as well as career and occupation. Schooling involves events related to primary school, secondary school and tertiary education. The work environment involves events from looking for work, starting work, situations in the workplace, promotion at work, losing a job and retirement. Table 4.7 list some examples of event descriptions from participants involving the Work/Education domain.

Table 4.7

List of event descriptions from Work/Education domain

Age	Life domain	Event description
6	Work Education	I went to school feeling very lost
7	Work Education	I went to school for the first time
7	Work Education	I was sent to an English school and hated it
7	Work Education	I walked 10 km to school between river and railway line and I was freezing during winter
9	Work Education	I won first place at athletic race at school
9	Work Education	Being naughty in class - sticking kids with pins
9	Work Education	I struggle in school in grade 3
10	Work Education	I get praised by my teacher in school
10	Work Education	I was working in a garden for two Rand
11	Work Education	Children at school bullied me because of my crutches
12	Work Education	I was not a prefect in Std 5
12	Work Education	I was struggling at school
13	Work Education	I left school because I had to work
13	Work Education	I was chosen as a prefect in Grade 7
13	Work Education	I left school
13	Work Education	I got the first prize at school
13	Work Education	I had to walk 15 km to school. One day I was 5 minutes late and I was punished for being late.
14	Work Education	Maths teacher humiliated me in grade 8
14	Work Education	I start working on a farm in Groot Brak
14	Work Education	Getting paid R350 a month in my first job

15	Work Education	I left school because I was pregnant
16	Work Education	I started working in weekends
16	Work Education	I was a rebel in class during high school
18	Work Education	I was not asked for the matric dance
18	Work Education	I passed matric with distinction
18	Work Education	In std 9 I wanted to dance and upset the principal
18	Work Education	I went to university and stayed in a hostel
19	Work Education	I finished matric
19	Work Education	I started work as a cashier
19	Work Education	Getting my exam results and fail my first year
19	Work Education	I took the train to Olifantsfontein to be trained as a telephone technician
19	Work Education	Enrolled as theological student - my mother was very proud
20	Work Education	I went to college in Durban with my sister
21	Work Education	I completed my diploma course
21	Work Education	I received a work visa to come to South Africa after 3 rejections because of my olive skin colour
22	Work Education	I got my PdP and driver's licence
22	Work Education	I went for police training but my mother refuse to let me work as a policewomen
22	Work Education	Start career as journalist, was appointed reporter on well-known newspaper
23	Work Education	Getting my Honours degree
23	Work Education	I graduated from university
24	Work Education	It was my first day working for the police
24	Work Education	Attend the State president's annual tea party
25	Work Education	I am working two jobs and studied part time
27	Work Education	I started work at Agri
27	Work Education	I failed my final exams and joined the army
28	Work Education	I started working for Defy
29	Work Education	I got promoted with a very good salary
31	Work Education	Working on the Joshua project
31	Work Education	I finished my matric in prison
32	Work Education	I started work in a bank in George

34	Work Education	I started work in the taxi industry
35	Work Education	I did a course in counselling
35	Work Education	I retired from Johannesburg municipality
35	Work Education	I got a MBA degree
36	Work Education	I find work as a security guard
36	Work Education	I became a labour consultant and start my own business
40	Work Education	I was promoted to client manager
43	Work Education	I got a job promotion
44	Work Education	I start studying at Unisa
45	Work Education	I received an accolade at work
45	Work Education	Getting a major promotion - head of IT
46	Work Education	I start working as student social worker
50	Work Education	Graduate with social work degree
50	Work Education	Started working for George Link
55	Work Education	I retired and the work gave me a watch
56	Work Education	I started my own business

The domain Social/ Friends includes community relations such as church and service organisations, friendships as well as close friends. Table 4.8 list some examples of event descriptions from participants involving the Work/Education domain.

Table 4.8

List of event descriptions from Social/Friends domain

Age	Life domain	Event description
5	Social/Friends	Sitting with best friend on Father Christmas' lap
8	Social/Friends	I met my best friend Nicolene
9	Social/Friends	I went sea fishing with a friend, fell on the rocks and got a hiding at home
10	Social/Friends	I got initiated into a gang with a friend
11	Social/Friends	I got gang tattoos with my friends
12	Social/Friends	When I was walking down the street people scared me and I flee

		into houses to be safe
12	Social/Friends	I cut open my left buttocks on a "sinkplaat" on a dare from a friend
13	Social/Friends	Went swimming in the sea with friends I felt humiliated when my bikini top got loose
14	Social/Friends	I played ball in street with friends, was reported and police took me home to my parents
17	Social/Friends	I went to a disco with a friend and got caught
17	Social/Friends	I was nearly caught selling drugs, but my friends rescued me.
18	Social/Friends	I started singing in the church choir
20	Social/Friends	I met my future husband
20	Social/Friends	I travelled with the church choir
33	Social/Friends	Climbing Kilimanjaro
40	Social/Friends	Went to Cape Town to see family and they planned a surprise party for me
47	Social/Friends	I became an elder in my church

The analysis of life domain importance yielded by the content analysis shows that the majority of the life events that participants recalled are from the Family/Home domain (see Figure 4.16). In both groups, the Family/Home domain yielded twice as many events as the Work/Education domain did (Table 4.8).

Table 4.9

Life domain importance per group

Age group	Family/Home	Work/Education	Social/ Friends
Middle-aged adults	53.8 % (148)	32.7 % (90)	13.5 %(37)
Older adults	57.0 % (151)	31.3 % (83)	11.9 % (31)

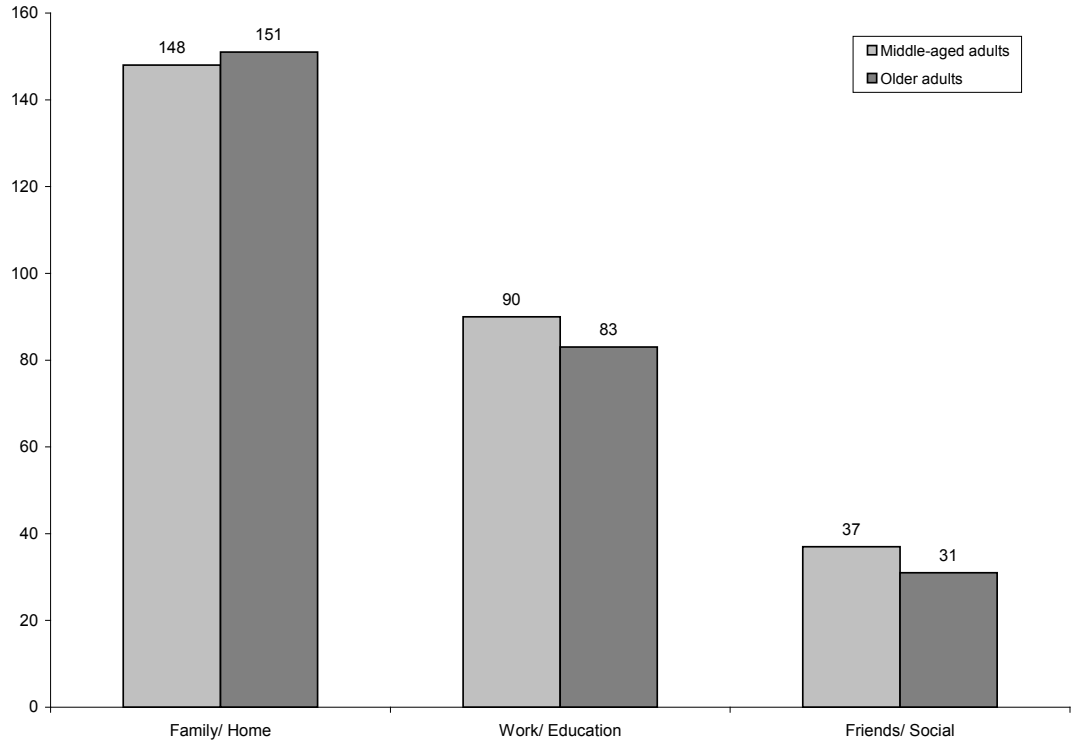

Figure 4.16 Number of life events reported in the different domains per group

Chapter 5. Discussion

5.1 Overview

The aim of the study was to investigate if there is a difference in the dynamics of AM (autobiographical memory) during the RB (reminiscence bump) between middle-aged (40-59 years) and older adults (60-79 years) in a South African sample. A convergent parallel mixed method was used for the study. A pragmatic approach allowed the researcher to incorporate the LIM in a semi-structured interview process to collect the data. Quantitative and qualitative data were collected, analysed, and the results were integrated.

The primary research question was underpinned by three secondary research questions that also represented the dynamics of AM through the temporal distribution of events, the valence of events and the life domain importance of events. The RB was the focus period of the study. The study aimed to determine if there was a difference between middle-aged and older adults' experience of life events during the RB. This chapter provides a discussion of the findings and some limitations of this research study and indicating recommendations that can be addressed in future research.

5.2 Discussion of sample

The sample consisted of middle-aged adults (40-59 years) and older adults (60-79 years). With the diverse cultures in the South African population, the researcher wanted to have equal representation of the three main ethnic groups residing in George, South Africa. AM is about life experiences and the three different ethnic groups represented diverse cultures, traditions, worldviews and languages.

The composition of the groups mirrored each other in gender and ethnicity. The participants in the middle-aged adult group were all economically active but most of the

participants in the older adult group were retired. With the exception of two white English-speaking older adults, all participants were bilingual with English as their second language. The older adults reported a higher level of education than the middle-aged adults did. However, the educational opportunities for the older adults were perceived by these participants as more limited, than those available to middle-aged adults. The two age groups of participants were well matched in terms of their social, economic and cultural backgrounds.

5.3 Temporal distribution of events

The RB is characterised by an increased recall of life events during adolescence and early adulthood. When studying the distribution profiles of individual participants, no discernible RB's were obvious. However, in the lifespan retrieval curve the cumulated life events form a clear RB for each age group.

There is a marked difference between the lifespan retrieval curves generated from the 5-year bins and 10-year bins. The 5-year bins graph show considerably more detail and displays multiple bumps for both groups. The third bump on the lifespan retrieval curve of middle-aged adults is in line with the recency period originally described by Rubin, Wetzler, and Nebes (1986). The additional small bump between the ages of 5 years and 9 years for both age groups is an interesting phenomenon.

Two of the reviewed studies, Kawasaki, Janssen, and Inoue (2011) and Alea, Ali and Marcano (2014) reported RBs at early ages. In the study by Kawasaki, Janssen, and Inoue (2011), young adults showed a RB for the ages between 5 years and 13 years, and middle-aged adults showed a RB for the ages between 6 years and 15 years, in response to 10 cue words. Alea, Ali and Marcano (2014) reported RBs, in a sample from Trinidad, for the ages between 6 years and 15 years as well as 26 years and 30 years for both positive and negative memories.

As the bump in the current study shows a slight decline before the start of the RB it is possible that this bump is because of the LIM. In the process of drawing the lifeline, participants start drawing at 0 years or birth, with the result that it is obvious that they will recall events between birth and ten years. As most participants do not recall events from before their fifth birthday (period of childhood amnesia), it is logical that events between the ages of 5 years and 9 years will be present.

In a study by Conway and Haque (1999) with participants from Bangladesh, a second bump was found that corresponded with a period of national conflict just before the formation of an independent Bangladesh. Despite the fact that South Africa, experience political turmoil and a change of government in 1994, no bump corresponds with this time and none of the participants included any personal events with political content or context.

The finding of this study reflects that both middle-aged and older adults showed an increased recall of life events during the period between 10 - 30 years. The 20-year period of the RB contained 54% of the total memories of both groups.

This finding corresponds closer with the finding by Koppel and Berntsen (2015) that free recall studies produced a RB between the ages of 15,1 to 37,9 years. However, it differs from Assink and Schroots (2010) who found that with the use of the LIM, the RB falls between the ages of 20 to 30 years. In comparing the temporal distribution of life events of middle-aged adults and older adults, the findings did not reveal any significant difference between the groups.

5.4 Valence of events

Participants reported valence by drawing the lifeline graph and indicated the life event as positive or negative. The scale of the graph allowed them to depict the life event as (-2 = 'very negative'; -1 = 'somewhat negative'; '0 = neutral'; '+1 = somewhat positive'; and +2 =

'very positive').

The findings show that the valence ratings reported by both groups were similar. Both middle-aged and older adults reported the majority of their life events during the RB as positive. This corresponds with the research of Rubin and Berntsen (2003) who found that positive life events are recalled more frequently than negative life events.

The only real difference between middle-aged adults and older adults is that middle-aged adults scored higher on very negative and very positive categories, while older adults scored higher on somewhat negative and somewhat positive categories. Only 3 out of 960 events were reported as neutral. This number is barely negligible. This is interesting as on a rating scale people often choose the middle rating by default. In this study, participants clearly chose events that had definite affective characteristics.

5.5 Life domain importance of events

The overall life domain importance ratings show that Family /Home domain is the most important for both groups.

The contents of events were transcribed, coded, analysed, and sorted into three life domains Family/Home, Work/Education and Social/ Friends. The Family/Home domain contains events that represent family relationships, love and marriage, parenting, home, self, and health. Work/Education domain covers all aspects of schooling, education and training as well as career and occupation. The domain Social/ Friends includes community relations such as church and service organisations, friendships as well as close friends.

For both groups, the majority of events recalled fall under the Family/Home domain. Work/Education domain ranks second and Social/ Friends domain is least important.

5.6 The reminiscence bump in the dynamics of autobiographical memory

For the purpose of this study, the RB was positioned in the dynamics of AM. From the findings, the researcher concludes the following. There is a RB in the South African sample. The RB is between the ages of 10 and 30 years for middle-aged adults and older adults. However, there is a not a significant difference between the middle-aged and older adults. Valence rating were similar for both groups. Most life events recalled were positive and the life domain that was most important to both groups was Family/ Home.

In order to answer the primary question:

- Is there a difference in the dynamics of AM during the RBs of middle-aged adults (40–59 years) when compared to those of older adults (60–79 years)?

The researcher has to concur that there is not a significant difference in the dynamics of AM during the RBs of middle-aged adults and older adults.

5.7 Limitations

The main limitation is this study was the sample size (n = 48). In the study by Assink and Schroots (2010), 98 participants took part in the first wave, 88 participants in the second wave and 77 participants took part in the last wave. In the 32 studies included in the literature review the smallest sample size, for face-to-face studies were 12 participants and the largest sample size were 659 participants. In this study, a larger sample would have provided results that are more representative of the South African population, but the logistical arrangements for including more participant interviews was not feasible at this time. The results from this sample can therefore not be generalised to the general South African population due to the complexity of the South African geographical area, ethnic and cultural groups.

In any study with participants of different cultures, cultural taboos can limit the information obtained from participants. It is often not acceptable to share details of customs

and rituals with 'outsiders'. Although participants in this study were forthcoming with details of events that centered around important transitions in their cultures, they could easily have avoided all mention of those events.

Language may be another limitation. Although all participants were comfortable to converse in English the fact has to be considered that English is a second language for many of the participants. For 87% of the middle-aged adults in the sample, English is their second language, while 71% of older adults also have a different home language than English. Not being fluent or comfortable in the language used in the interview could inhibit the participant in sharing details and events.

5.8 Recommendations

The LIM (lifeline interview method) proved to be a valuable and efficient mixed method instrument. Participants responded enthusiastically to draw the lifeline and share autobiographical memories. Future studies in RB could benefit from the use of the LIM. A longitudinal study as conducted by Assink and Schroots (2010) conducted with a large South African sample would yield valuable data to determine patterns of change and stability in autobiographical memories over a lifespan. The South African population would also be an ideal audience in which to study the life script account, as many of the life events recalled by the participants could be classified as specific to the individual cultures and transitional events.

5.9 Conclusion

This study investigated the temporal dynamics of autobiographical memory in a sample involving two different age groups of adult South Africa participants. The main objective of the research was to explore the participants' memories for salient events and to determine whether these memories exhibit the typical reminiscence bump that has been found

in autobiographical memory research. The results confirmed that such reminiscence bumps are reflected in the memories of both age groups, and furthermore that these reminiscence bumps also exist for the different cultural groups within each age group.

In the research field of memory research, any data that we add to the information pool enhances our collective knowledge. The data generated by this study contributed to this pool by showing that autobiographical memories may demonstrate a lifespan retrieval curve that is invariant across different cultures. Potential future contribution includes analysis of patterns of memories, and particularly the semantic and affective aspects of these autobiographical memories can be researched in more depth.

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Appendix A - List of RB studies included for review

Authors	Study
Sehulster (1996)	In my era: Evidence for the perception of a special period of the past.
Holbrook & Schindler (1998)	Some exploratory findings on the development of musical tastes.
Holmes & Conway (1999) (Experiment 2)	Generation identity and the reminiscence bump: Memory for public and private events.
Janssen, Chessa, & Murre (2007)	Temporal distribution of favourite books, movies, and records: Differential encoding and re-sampling.
Janssen, Rubin, & Conway (2012)	The reminiscence bump in the temporal distribution of the best football players of all time: Pelé, Cruijff or Maradona?
Schubert (2016)	Does recall of a past music event invoke a reminiscence bump in young adults?
Tekcan, Boduroglu, Mutlutürk, & Erciyes (2017)	Life-span retrieval of public events: Reminiscence bump for high-impact events, recency for others.
Fitzgerald (1988)	Vivid memories and the reminiscence phenomenon: The role of a self narrative.
Holmes & Conway (1999) (Experiment 1)	Generation identity and the reminiscence bump: Memory for public and private events.
Conway, Wang, Hanyu, & Haque (2005)	A cross-cultural investigation of autobiographical memory on the universality and cultural variation of the reminiscence bump.
Rathbone, Moulin, & Conway (2008)	Self-centered memories: The reminiscence bump and the self.
Cappeliez (2008)	An explanation of the reminiscence bump in the dreams of older adults in terms of life goals and identity.
Haque & Hasking (2010)	Life scripts for emotionally charged autobiographical memories: A cultural explanation of the reminiscence bump.
Bohn & Berntsen (2011)	The reminiscence bump reconsidered: Children's prospective life stories show a bump in young adulthood.
Kawasaki, Janssen, & Inoue (2011)	Temporal distribution of autobiographical memory: Uncovering the reminiscence bump in Japanese young and middle-aged adults.
Tekcan, Kaya-Kızılöz & Odaman (2012)	Life scripts across age groups: A comparison of adolescents, young adults, and older adults.
Alea, Ali & Marcano (2014)	The bumps in Trinidadian life: Reminiscence bumps for positive and negative life events.
Ottsen & Berntsen (2014)	The cultural life script of Qatar and across cultures: Effects of gender and religion.
Janssen, Uemiya & Naka (2014)	Age and gender effects in the cultural life script of Japanese adults.

Janssen (2015)	Is there a cultural life script for public events?
Schrauf & Rubin (1998)	Bilingual autobiographical memory in older adult immigrants: A test of cognitive explanations of the reminiscence bump and the linguistic encoding of memories.
Conway & Haque (1999)	Overshadowing the reminiscence bump: Memories of a struggle for independence.
Berntsen & Rubin (2002)	Emotionally charged autobiographical memories across the lifespan: The recall of happy, sad, traumatic, and involuntary memories.
Rubin, Rahhal & Poon (1998)	Things learned in early adulthood are remembered best.
Janssen & Murre (2008)	Reminiscence bump in autobiographical memory: Unexplained by novelty, emotionality, valence, or importance of personal events.
Janssen, Kristo, Rouw, Murre (2015)	The relation between verbal and visuospatial memory and autobiographical memory.
Schroots, van Dijkum, & Assink (2004)	Autobiographical memory from a lifespan perspective.
Gluck & Bluck (2007)	Looking back across the lifespan: A life story account of the reminiscence bump.
Thomsen & Berntsen (2008)	The cultural life script and life story chapters contribute to the reminiscence bump.
Demiray, Gülgöz & Bluck (2009)	Examining the life story account of the reminiscence bump: Why we remember more from young adulthood.
Steiner, Pillemer, Thomsen & Minigan (2014)	The reminiscence bump in older adults' life story transitions.
Zimprich & Wolf (2016)	How can individual differences in autobiographical memory distributions of older adults be explained?

Appendix B - Autobiographical memory domain matrix of studies

Authors	Domain						
	AM organisation	AM content	AM retrieval	AM distribution	AM functions	AM & emotion	AM & socio-cultural
Tekcan, Boduroglu, Mutlutürk, & Erciyes (2017)	●		●	●			
Schubert (2016)	●		●	●			
Zimprich & Wolf(2016)		●		●		●	
Janssen (2015)	●			●		●	●
Janssen, Kristo, Rouw, Murre (2015)	●	●	●	●			
Alea, Ali & Marcano (2014)		●		●		●	●
Ottsen and Berntsen (2014)		●		●		●	●
Janssen, Uemiya and Naka (2014)		●		●		●	●
Steiner, Pillemer, Thomsen & Minigan (2014)		●	●	●			
Janssen, Rubin, & Conway (2012)	●		●	●			
Tekcan, Kaya-Kızılöz and Odaman (2012)		●		●		●	●
Bohn and Berntsen (2011)	●	●		●			●
Kawasaki, Janssen, & Inoue (2011)		●		●			●
Haque & Hasking (2010)		●	●			●	●
Demiray, Gülgöz & Bluck (2009)		●		●		●	
Rathbone, Moulin, & Conway (2008)		●		●	●	●	
Cappeliez (2008)	●	●		●			
Janssen & Murre (2008)		●		●		●	
Thomsen & Berntsen (2008)		●		●		●	●
Janssen, Chessa, & Murre (2007)	●		●	●			
Gluck & Bluck (2007)		●		●		●	
Conway, Wang, Hanyu, & Haque (2005)		●		●	●		●
Schroots, van Dijkum, & Assink (2004)		●		●		●	
Berntsen & Rubin (2002)		●	●	●		●	
Holmes & Conway (1999) Experiment 2	●		●	●			
Holmes & Conway (1999) Experiment 1		●		●	●		
Conway & Haque (1999)		●	●	●	●		
Holbrook & Schindler (1998)	●		●	●			
Schrauf & Rubin (1998)	●	●	●	●			
Rubin, Rahhal & Poon (1998)	●		●	●			
Sehulster (1996)	●		●	●			
Fitzgerald (1988)		●	●	●		●	

Appendix C - Participant experimental booklet

UNISA university of south africa

MASTERS RESEARCH

A Mixed Method Investigation of the Reminiscence Bump in the Dynamics of Autobiographical Memory

2017

Participant experimental booklet

Compiled by: Anelien Venter

Student no: 07107307

Down Memory Lane: A Mixed Method Investigation of the Reminiscence Bump in the Dynamics of Autobiographical Memory

For official use only: ***Questionnaire -ID#_____***

Date: | | | *2017* *Age:* | | | *Gender:* *Male* ☐ *Female* ☐

ETHICAL CLEARANCE - Ref. No: PERC-16044

INFORMED CONSENT

Thank you for your willingness to participate in this research on the reminiscence bump in autobiographical memory.

I have signed an informed consent form to participate in this research study. Yes ☐ No ☐

Down Memory Lane: A Mixed Method Investigation of the Reminiscence Bump in the Dynamics of Autobiographical Memory

SECTION A – DEMOGRAPHIC INFORMATION

This section of the questionnaire refers to background or biographical information. Although we are aware of the sensitivity of the questions in this section, the information will allow us to compare groups of participants.

A1.	Home language:	Afrikaans ☐	English ☐	isiXhosa ☐	Other ☐
A2.	Are you bilingual?	Yes ☐	No ☐		
A3.	Ethnicity:	Black ☐	Coloured ☐	White ☐	
A4.	Marital status:	Single ☐	Divorced ☐	Married ☐	Widowed ☐
A5.	Highest educational qualification:			Grade 11 / Std 9 or lower ☐	
				Grade 12 / Std 10 (Matric) ☐	
				Post-Matric Diploma or Certificate ☐	
				Baccalaureate Degree(s) ☐	
				Post-Graduate Degree(s) ☐	
A6.	Occupation:	_____			

SECTION B – LIFE DOMAIN IMPORTANCE

This section of the questionnaire refers to information about your life domain importance.

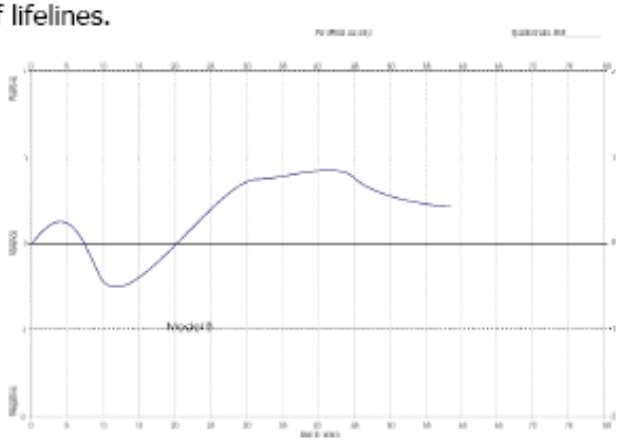
		Not important 1	Barely important 2	Somewhat important 3	Moderately important 4	Very important 5
B1.	How important is your family and home life to your life overall?	☐	☐	☐	☐	☐
B2.	How important is your education and work life to your life overall?	☐	☐	☐	☐	☐
B3.	How important is your social life with friends to your life overall?	☐	☐	☐	☐	☐

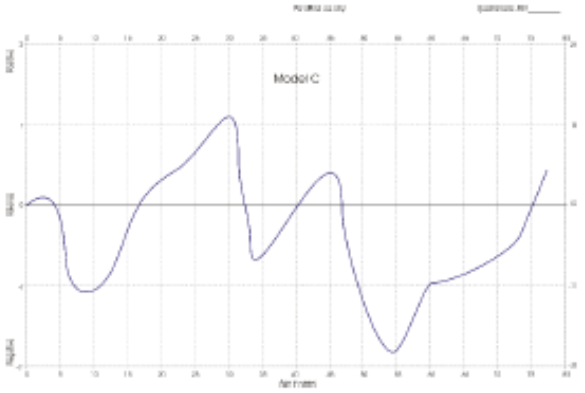
SECTION C – LIFELINE

On the previous page is a lifeline graph. On the lifeline graph is two axis. The horizontal axis represent years of age and the vertical axis represent valence ranging from "very negative" to "neutral" to "very positive".

First, please mark your age.

Study the examples of lifelines.





Now draw your own lifeline, with all its highs and lows. There are no right or wrong lifelines. Just draw your lifeline as it comes to you.

If you study your lifeline please list the high and low points by explaining to me how old were you then, the valence of the event and briefly share details of the event.

Once you have identified all highs and lows you will be asked to choose the five most important events that has contributed to you as the person you are today. When you have chosen the 5 events, briefly describe the event to me in your own words.

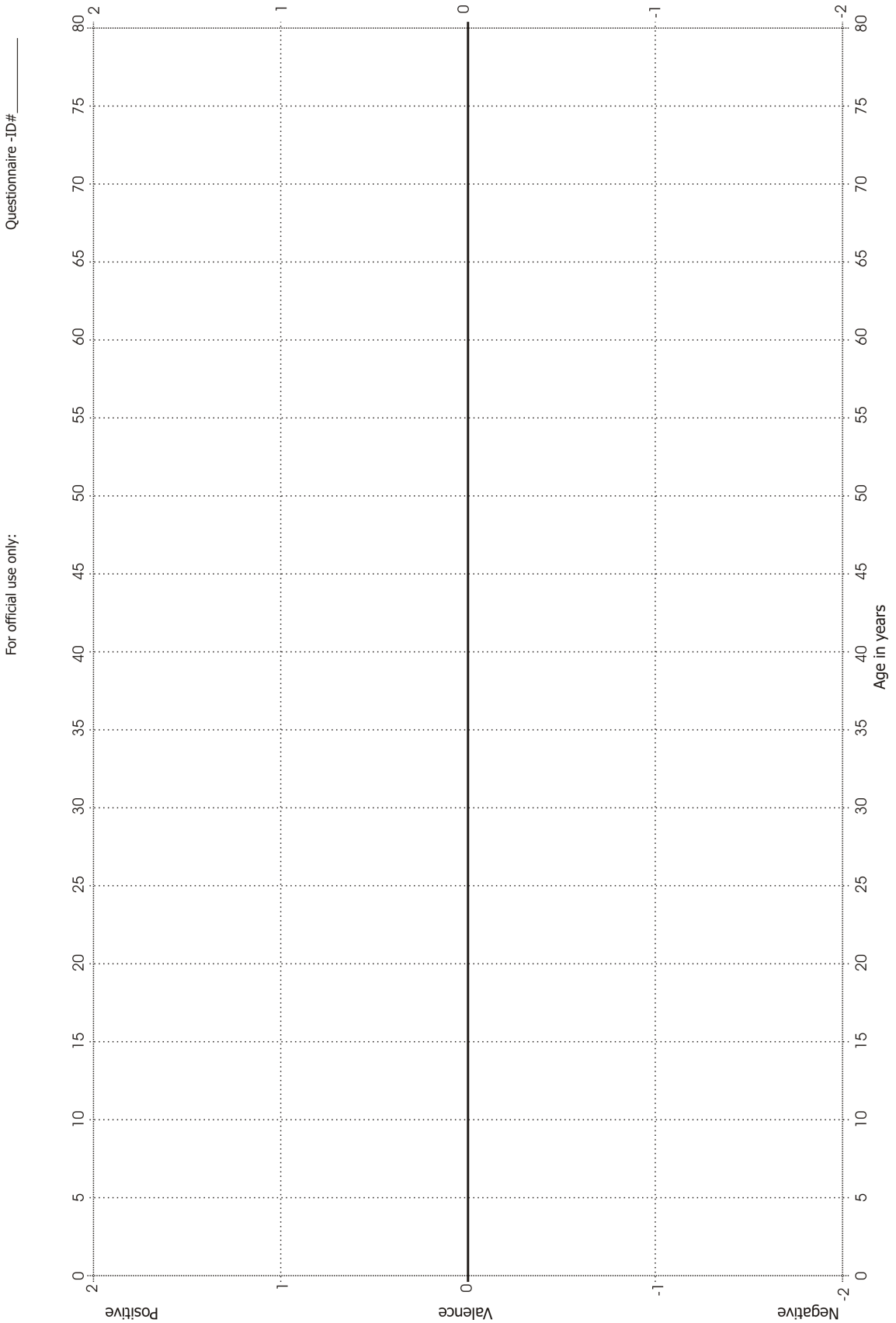
For each event please include where you were at the time, what you were doing, who was there, how you felt, and any other details that come to mind.

Down Memory Lane: A Mixed Method Investigation of the Reminiscence Bump in the Dynamics of Autobiographical Memory

MEMORY Lane

Questionnaire -ID#_____

For official use only:



SECTION D – LIFELINE EVENTS

DA1 **EVENT 1** _____

DA2 At what age did this event take place? _____ years of age

DB1. **EVENT 2** _____

DB2. At what age did this event take place? _____ years of age

DC1. **EVENT 3** _____

DC2. At what age did this event take place? _____ years of age

DD1. **EVENT 4** _____

DD2 At what age did this event take place? _____ years of age

DE1 **EVENT 5** _____

DE2. At what age did this event take place? _____ years of age

DF1. **EVENT 6**

DF2. At what age did this event take place? years of age

DG1. **EVENT 7**

DG2. At what age did this event take place? years of age

DH1. **EVENT 8**

DH2. At what age did this event take place? years of age

DI1. **EVENT 9**

DI2. At what age did this event take place? years of age

DJ1. **EVENT 10**

DJ2. At what age did this event take place? years of age

DK1. **EVENT 11**

DK2. At what age did this event take place? years of age

DL1. **EVENT 12**

DL2. At what age did this event take place? years of age

DM1. **EVENT 13**

DM2. At what age did this event take place? years of age

DN1. **EVENT 14**

DN2. At what age did this event take place? years of age

DO1. **EVENT 15**

DO2. At what age did this event take place? years of age

DP1. **EVENT 16**

DP2. At what age did this event take place? years of age

DQ1. **EVENT 17**

DQ2. At what age did this event take place? years of age

DR1. **EVENT 18**

DR2. At what age did this event take place? years of age

DS1. **EVENT 19**

DS2. At what age did this event take place? years of age

DT1. **EVENT 20**

DT2. At what age did this event take place? years of age

Down Memory Lane: A Mixed Method Investigation of the Reminiscence Bump in the Dynamics of Autobiographical Memory

For official use only:

FOLLOW UP INTERVIEW

Participant was available for the follow up interview.	*Yes* ☐	*No* ☐
Participant read through the transcription of the memories recalled in the first interview.	*Yes* ☐	*No* ☐
Participant agreed that the memories were transcribed correctly.	*Yes* ☐	*No* ☐
Participant agreed with coding of memories in life domains.	*Yes* ☐	*No* ☐
Participant had additional questions or comments.	*Yes* ☐	*No* ☐

Participant was debriefed.	*Yes* ☐	*No* ☐
Participant was thanked for his or her participation in the study.	*Yes* ☐	*No* ☐

Appendix D - Ethical approval form

Ref. No: PERC-16044

UNISA university of south africa
Department of Psychology

Ethical Clearance for M/D students: Research on human participants

The Ethics Committee of the Department of Psychology at Unisa has evaluated this research proposal for a Higher Degree in Psychology in light of appropriate ethical requirements, with special reference to the requirements of the Code of Conduct for Psychologists of the HPCSA and the Unisa Policy on Research Ethics.

Student Name: Anelien Venter **Student no.** 07107307

Supervisor: Prof. H C Janeke **Affiliation:** Department of Psychology, Unisa

Title of project:

Down Memory Lane: Investigating the Reminiscence Bump in Autobiographical Memory in the South African Context

The proposal was evaluated for adherence to appropriate ethical standards as required by the Psychology Department of Unisa. The application was approved by the departmental Ethics Committee of the Department of Psychology without further conditions.

Signed:

Prof P Kruger
[For the Ethics Committee]
[Department of Psychology, Unisa]

Date: 12 October 2016

Appendix E - Participant information sheet

About me

My name is Anelien Venter.
I am currently doing research for my Master of Arts in Psychology at the University of South Africa.

My supervisor is Prof. C H Janeke, professor in the Department of Psychology at University of South Africa.

About the research project

Title

Down Memory Lane: Investigating the Reminiscence Bump in Autobiographical Memory in the South African Context.

What is the purpose of the study?

Autobiographical memories are the memories about ourselves, and our personal experiences. They define who we are. As we age the reminiscence bump is an increased tendency for us to remember events that occurred during our adolescence and early adulthood.

Research about the phenomena of the reminiscence bump in autobiographical memory has extensively been conducted overseas. I am conducting this research to find out the extent to which the reminiscence bump manifests in the South African context.

Why am I being invited to participate?

You have showed an interest in the study and a willingness to participate. A minimum of 48 people will form part of this study.

> *Sometimes a short walk down memory lane is all it takes to appreciate where you are today.*
>
> ~ Susan Gale ~

Feedback

As I am only interested in group trends, and have no way of linking any individual's identity to a particular questionnaire, I will not be able to give you individual feedback. Feedback in the form of a two-page summary sheet will be available on request in September 2017.

Thank you for considering to take part in my research project.

CONTACT INFORMATION

Anelien Venter
Box 2936
George
6530

Phone: 044 874 4416
Cell phone: 082 700 5050
E-mail: anelienv@telkomsa.net

UNISA university of south africa

MASTERS RESEARCH

Down Memory Lane

Investigating the Reminiscence Bump in Autobiographical Memory in the South African Context.

2017

PARTICIPANT INFORMATION SHEET

Dear Prospective Participant

What is the nature of your participation in the study?

The study involves gathering data through an interview that is guided by the completion of an experimental booklet. If you prefer the interview can be audio taped and transcribed at a later stage.

You will be asked to sign an informed consent form before the study begins. In the experimental booklet you will provide demographic information, complete "I am" statements and rate four areas in your life on a scale of importance. A number of words will be presented to you and you will jot down the first memory that comes to mind and then rate the memory.

In the last part of the study you will graph the course of your life from birth to your current age, by drawing peaks and troughs for positive and negative experiences, respectively. The lifeline will then be discussed with you.

Can I withdraw from this study even after having agreed to participate?

Your participation in this study is voluntary and you are under no obligation to consent to participate. If you do decide to take part, you will be given an information sheet to keep and be asked to sign a written consent form. You do not relinquish any of your legal rights by participating in this research study. You are free to withdraw at any time.

Are there any negative consequences for me if I participate in the research study?

There are no risks involved in your participation in this research study.

Will the information that I convey and my identity be kept confidential?

Your name will not be recorded anywhere and no one, apart from the researcher, will know about your involvement in this research study and therefore no one will be able to connect you to the answers you give.

Your experimental booklet will be given a code number and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings.

The demographic questionnaire, interview and experimental booklet are not designed to gather any form of identifying information. No personal or identifying information will appear when the results of this study are presented or published.

The experimental booklet may be reviewed by people responsible for making sure that research is done properly, including the supervisor, and members of the Research Ethics Review Committee, but as it will only contain a code number and not your name you will not be identifiable.

How will the data be secured?

Hard copies of your answers will be stored by the researcher for a period of five years in a locked cupboard for future research, or academic purposes; electronic information will be stored on a password protected computer.

After five years hard copies will be shredded or electronic copies will be permanently deleted from the hard drive of the computer through the use of a relevant software programme.

Has the study received ethics approval?

This study has received written approval from the Research Ethics Review Committee of the School of Human Sciences at the University of South Africa. A copy of the approval letter can be obtained from the researcher if you so wish.

How will I be informed of the results of the research?

If you have any further questions or require feedback on the progress of the research, please feel free to contact me. My contact details appear on the reverse of the page.

Should you have concerns about the way in which the research has been conducted, you may contact Prof. C H Janeke on 012 429 8218.

MEMORY Lane

Appendix F - Informed consent form

CONSENT TO PARTICIPATE IN RESEARCH PROJECT

Ethics clearance reference number: PERC- 16044

I, _____ (participant name), confirm that *Anelien Venter*, the person asking my consent to take part in the research project, titled "*Down Memory Lane: Investigating the Reminiscence Bump in Autobiographical Memory in the South African Context*", has told me about the nature, procedure, potential benefits and anticipated time requirements of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time.

I am aware that the findings of this study will be processed into a dissertation, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the audio recording of the interview if I choose not to fill in the experimental booklet.

I have received a copy of the informed consent agreement.

Participant Name & Surname _____ (please print)

Participant Signature _____ Date_____

Researcher's Name & Surname ___Anelien Venter__ (please print)

Researcher's signature_____ Date_____

For official use only: 1 Form -ID#_____