

THE RELATION OF THE CONCEPTUAL SELF TO AUTOBIOGRAPHICAL MEMORY:
A COMPARISON OF YOUNG AND MIDDLE-AGED ADULTS' EARLIEST AND RECENT
MEMORIES

By

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To my Dad, Ömer Faruk Demiray, who has inspired me to become an academic

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Abstract of Dissertation Presented to the Graduate School
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By

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The current study combines life span developmental theory (e.g., Baltes, 1997) with the self-memory system model of autobiographical memory (SMS model; Conway, & Pleydell-Pearce, 2000) to examine adult age group differences in the conceptual self, and how individuals' current conceptual self guides their recall of recent and early autobiographical memories. The sample consists of 285 young (ages 19-29) and 135 middle-aged (ages 47-64) adults. Participants completed an online survey assessing their current self-attributes (e.g., autonomy) and future time perspective, and wrote narratives of two memories: their earliest childhood memory and a recent memory from the last year. They then rated the content of their memories for self-attribute themes. Findings show that young and middle-aged adults have different current conceptual selves: Although young adults have a more open-ended and positive future time perspective, they have lower levels of autonomy, environmental mastery, positive relations with others, self-acceptance and purpose in life than middle-aged adults. In addition, future time perspective acts as a suppressor in the relation between age and current self-attributes, bolstering the predictive validity of age. The study also tested the SMS model using both a basic and a more stringent test. As expected, findings showed that the link between

current self-attributes and memory content is more evident in recent memories than earliest memories. This effect is similar across young and middle-aged adults, indicating developmental stability in the relation between current self-attributes and memory content. The study contributes to the adult development literature, and extends the SMS model by providing data on different age groups, and different types of memories (i.e., earliest and recent).

CHAPTER 1 INTRODUCTION

The current study is grounded in and tests the self-memory system model of autobiographical memory (SMS model; Conway & Pleydell-Pearce, 2000). According to this model, individuals' current conceptual self guides their recall of autobiographical memories. Little research has tested the SMS model by examining the link between the current conceptual self and retrieved autobiographical memories. Moreover, no research to date has empirically examined whether the relation of the conceptual self guides recall of distant memories such as earliest childhood memories. The earliest age from which an adult can retrieve an autobiographical memory is between 3 and 4 years (Dudycha & Dudycha, 1941; Howes, Siegel, & Brown, 1993). This represents the offset of the childhood amnesia period (i.e., adults' inability to recall personal memories from the first years of life) and the onset of autobiographical memory (Davis, Gross, & Hayne, 2008). Though explaining earliest memories is not the primary focus of the SMS model, the model does suggest that the impact of the conceptual self during retrieval should extend not only to recent but also to earliest memories. Thus, the present study fills a gap in the literature by testing the SMS model using two types of memories: recent memories that allow a basic test of the SMS model and are most likely to show an effect, and earliest memories that allow a novel and stringent test of the SMS model. In doing so, the study also contributes to the literature by investigating whether the SMS model provides a convincing explanation for why adults are able to recall their earliest memories.

Another contribution of the present study is to bring a life span development perspective to the study of autobiographical memory (Bluck & Habermas, 2000), by examining adult developmental differences or similarities in the relation between the conceptual self and the content of memories. The study examines age differences in the current conceptual self, and its

effects on recall of autobiographical memories in young adults and those in late midlife. There is a scarcity of research on middle-aged individuals' autobiographical memories in general, and particularly their earliest memories (Dixon, De Frias, & Maitland, 2001). Studies have been conducted almost exclusively with college students. Two studies have examined middle-aged individuals' earliest memories (Demiray, Gülgöz, & Bluck, 2008; Multhaup, Johnson, & Tetirick, 2005). Thus, further research is needed to gain a fuller understanding of autobiographical memory in midlife.

In short, one goal of the present study is to examine adult developmental differences in the current conceptual self (i.e., self-attributes and future time perspective) by comparing adults from two age groups. The second goal is to test the claim of the SMS model that the current conceptual self (i.e., self-attributes) guides the content of retrieved memories, considering both different age groups and different types of memories. This analysis also sheds light on whether the SMS model provides a convincing explanation concerning the retrieval of earliest memories.

Outline of the Paper

The introduction first compares three theoretical accounts that provide explanations for the retrieval of earliest memories, highlighting the self-memory system model as the theoretical framework to be adopted in this research. Next, the self-memory system is described with a focus on the *conceptual self*, identifying future time perspective and self-attributes (e.g., sense of purpose in life) as aspects of the conceptual self. Following that, the conceptual self is described in adult life span developmental terms, as being different in young adulthood and late midlife both in regards to an individual's future time perspective and in regards to certain self-attributes. Next, a further conceptual specification of the SMS model is presented which suggests that age and future time perspective shape self-attributes which in turn shape the content of both earliest and recent memories. These relations between the conceptual self and memory are tested in two

ways: a basic test with recent memories, and a more stringent test with earliest memories. The Methods section describes the sample, measures and procedure that was used to conduct the research. Next, statistical analyses and results are reported. Study findings are discussed in terms of contributions made to the adult development literature (e.g., life span development theory, Baltes, 1997), and the autobiographical memory literature with a focus on the SMS model (Conway & Pleydell-Pearce, 2000). Finally, the limitations of the study are provided as well as some overall conclusions.

Theoretical Accounts of the Onset of Earliest Memories

Researchers have developed three major explanations for the offset of childhood amnesia (i.e., onset of autobiographical memory). That is, there are three major explanations for why earliest memories are recalled throughout adulthood. The first two accounts emphasize the conditions under which earliest memories are encoded in childhood, whereas the third account (i.e., SMS model) also emphasizes the conditions under which these memories are retrieved in adulthood. According to the first two accounts, memories are not encoded and organized autobiographically during infancy due to developmental limitations. The SMS model (Conway & Pleydell-Pearce, 2000) was not designed specifically to account for childhood amnesia, but it emphasizes that the current conceptual self affects retrieval of any autobiographical memory. Failure to retrieve memories from infancy is seen as related not only to early encoding processes but to the current goals of the conceptual self. Each of these accounts is described briefly here.

The cognitive self account suggests that the emergence of a cognitive self is a necessary condition for the onset of earliest memories (Howe & Courage, 1993, 1997). At around 2 years of age, a cognitive self begins to emerge that allows infants to encode experiences in terms of self and organize them autobiographically. Therefore, adults cannot recall memories of the self in infancy because they were encoded before the self emerged. The social-interaction account

argues that parent-child memory sharing is an important activity in autobiographical memory development (Haden, Haine, & Fivush, 1997; Nelson, 1993). As children begin to use language and to share their past, they learn conventional narrative rules and forms. Co-constructed parent-child conversations provide a basis for the transition from encoding fragmented memories into encoding coherent episodic narratives (Nelson, 1993). This account, thus, suggests that adults cannot recall events that were encoded before they began to narrativize them as children. In both of these accounts, the conditions under which memories are *encoded* during early childhood (up to about age three) prohibit their recall at later stages of life.

The account based on the SMS model emphasizes conditions during *retrieval*. The difference between this account and those previously described is that it considers not only the developmental conditions of the child during encoding but also that of the adult doing the remembering. The SMS model suggests that autobiographical memories, including earliest memories, are constructed during retrieval in line with the current goals and needs of the self (Conway & Pleydell-Pearce, 2000). Accordingly, childhood amnesia occurs due to the discrepancy between the content and organization of goals that were active during the encoding of memories in infancy as compared to the goals that are active during retrieval in adulthood (Conway & Pleydell-Pearce, 2000; Schachtel, 1947). Memories in infancy tend to be encoded in line with basic needs that may have little overlap with one's goals in adulthood. If there is a lack of correspondence between the self's goals at encoding and retrieval, effective retrieval cannot occur and specific memories will not be recalled (Conway & Pleydell-Pearce, 2000). Thus, earliest memories represent the first encoded events of infancy *that fit with one's current self-conceptions*.

Most studies of earliest memories to date are based on the two accounts that highlight developmental conditions during encoding in infancy. For example, researchers argue that adults recall their earliest memories in qualitatively different ways and from different ages because as children they grew up in different narrative environments and developed different self-construals (Leichtman, Wang, & Pillemer, 2003). Although childhood cognitive development and social context may be important, the current research embraces the SMS account because it includes the current adult self that is ‘doing the remembering’ of the earliest memory. If the SMS model is correct, one’s current conceptual self (e.g., self-attributes) should affect the memories one recalls of recently experienced events but also of earliest events. This study examines that basic tenet of the SMS model, by examining recent memories but also investigating whether earliest memories show a match with one’s current conceptual self. The next section provides a brief description of the SMS model including its portrayal of how the conceptual self affects remembering not only of earliest memories but of memories more generally.

The Self-Memory System: Effect of the Conceptual Self on Autobiographical Memories

According to the SMS model (Conway & Pleydell-Pearce, 2000) the current conceptual self influences retrieval. Autobiographical memories are patterns of activation across the three components of the Self-Memory System: the episodic memory system, the working self and the long-term self (see Figure 1-1). Episodic memories are event specific composites of sensory-perceptual-cognitive-affective detail that invoke visual imagery and the experience of mentally reliving an event (Conway, Singer, & Tagini, 2004). The working self includes control processes that coordinate and modulate cognition, affect and behavior through prioritizing the individual’s complex hierarchy of goals (Conway & Pleydell-Pearce, 2000). Finally, the long-term self includes both the conceptual self and the autobiographical knowledge base. The conceptual self is of greatest interest in terms of the SMS claim that recalled memories are shaped at retrieval

and in terms of the account of earliest memories. The conceptual self contains information that one ‘knows’ about one’s self such as self-attributes, beliefs and attitudes. In contrast, the autobiographical knowledge base includes temporal knowledge of experienced events that is ‘remembered’. It is composed of the hierarchically organized life story schema (Bluck & Habermas, 2000), lifetime periods (i.e., chapters in the life story such as ‘When I was in graduate school’) and general events (Conway et al., 2004).

The present study examines the relation of the conceptual self to autobiographical memories. The conceptual self contains abstract knowledge that one ‘knows’ about one’s self. For example, it includes self-attributes, personality characteristics, attitudes, beliefs, personal motives and possible selves. The conceptual self influences the working self by shaping its current goals, and thereby influencing the retrieval (i.e., construction) of memories. For example, if one’s conceptual self includes a negative attitude towards smoking, one is more likely to have anti-smoking goals, and is more likely to recall negative memories related to smoking.

There is some previous research concerning how particular aspects of the conceptual self affect the construction of autobiographical memories. Woike and her colleagues (Woike, 1994a, 1994b; Woike, Lavezzary, & Barsky, 2001; Woike, McLeod, & Goggin, 2003) have shown that individuals with agentic motives at a personality level also retrieve memories that are thematically more agentic, whereas individuals with communal motives retrieve more communal memories (Woike & Polo, 2001). In keeping with the SMS model, Wilson and Ross (2003) also argue that there is a bi-directional relation between autobiographical memory and the conceptual self. They have shown how individuals reconstruct their past according to how they would like to perceive themselves currently: as different from the past self (Conway & Ross, 1984), superior to the past self (Wilson & Ross, 2001) or distant from a negative past self (Ross & Wilson, 2002).

In sum, there is a small body of research, based on the SMS model, which shows that particular aspects of the conceptual self influence the content of autobiographical memories.

None of these studies, however, examine the effect of the conceptual self particularly on earliest memories, and none have taken an adult developmental perspective. The current study suggests that adults from different age groups (e.g., young versus late middle-aged adults) should have different conceptual selves. Furthermore, none of the previous studies examine future time perspective and self-attributes as unique aspects of the conceptual self (see Figure 1-1). The current study suggests that both future time perspective and self-attributes are important aspects of the conceptual self that should show developmental variation. The next section describes these two aspects of the conceptual self in developmental context.

Adult Development and the Conceptual Self: Future Time Perspective and Self-Attributes

Though not included in the original SMS model, from a life span developmental perspective it seems clear that the conceptual self should be shaped by one's current age. The current study focuses on two aspects of the conceptual self that, based on previous theory and research, are likely to be affected by age: future time perspective and self-attributes.

Future Time Perspective: Defining Midlife

Across adulthood, individuals have different perspectives on how much time is left in their life. Future time perspective is especially meaningful in midlife, and is embedded in theoretical descriptions of midlife. For example, midlife is described as governed mostly by an internal social clock that reminds individuals that they are 'in the middle' (Neugarten, 1996). Although life span developmental theory accepts midlife as the period between 40 and 60 with flexible boundaries (Baltes, Staudinger, & Lindenberger, 1999), there is no clearly agreed-upon demarcation of midlife. It is a complex developmental stage that is a time of challenge and potential stress due to multiple roles, responsibilities and potential declines, as well as a time of

achievement, maturity, and generativity. This complexity makes midlife difficult to assess in terms of chronological age, particularly as age norms are quite flexible in midlife (Lachman & Bertrand, 2001): adults of the same chronological age are in different life stages in terms of career, family and social roles. The limited value of chronological age in defining midlife puts emphasis on alternative conceptions such as future time perspective for defining this stage of life in relation to young adulthood (Staudinger & Bluck, 2001).

Future time perspective refers to where individuals place themselves in the life span in relation to time left to live (i.e., close to death vs. far away from death) and how they perceive their future (i.e., open-ended and positive vs. limited and lacking opportunities). Age is an important predictor of future time perspective: young individuals tend to perceive the future as open-ended, whereas older individuals accept it as more limited with higher awareness of declines and death (Fung & Carstensen, 2006).

Some researchers suggest that midlife is composed of two phases: early-midlife (40-50 years) and late-midlife (50-60 years; Helson, Soto, & Cate, 2006; Staudinger & Bluck, 2001). The current study embraces this two-phase perspective and suggests that the shift in future time perspective is most clear in late-midlife. The early and late phases of midlife lead to quite different experiences, as one is first leaving young adulthood and then preparing to enter old age. The early phase may include continued growth and multiple roles, whereas one may begin to experience some losses or declines in the latter phase or at least to envision them on the horizon. For example, Cate and John (2007) compared women in their 20s, 40s and 50s in terms of their focus on opportunities for or limitations in the future. They found that women in their 20s focused more on opportunities than both midlife groups who did not differ. The late-midlife group, however, focused more on limitations and losses than both the young and early-midlife

women. These findings were replicated in a longitudinal study showing that women did not change from the age of 43 to 61 in terms of their focus on opportunities, however their focus on limitations and losses significantly increased in late-midlife (Cate & John, 2007).

In sum, the transition from an open-ended and positive future time perspective to a more limited time perspective in which one begins to acknowledge that life has an ending tends to occur in late-midlife. This is one major developmental shift that should be represented as part of the conceptual self. That is, one's conceptual self changes across adulthood in terms of beliefs and expectations about how much time the self has left to live. The next section discusses developmental shifts in another aspect of the conceptual self, self-attributes.

Self-Attributes of Young and Late Middle-Aged Adults

Self-attributes are another aspect of the conceptual self that demonstrates developmental change. The current study compares young and late middle-aged adults' self-attributes, and how these influence the content of their memories. Self-attributes have been conceptualized as psychological well-being by Ryff (1989a) who integrated concepts from personality and clinical psychology (Allport, 1961; Maslow, 1968; Rogers, 1961), as well as life span developmental psychology (e.g., Erikson, 1959; Neugarten, 1973) to create a parsimonious set of six self-attributes that have been validated in several studies (Ryff & Singer, 2006). *Self-acceptance*, is a central component of self-actualization (Maslow, 1968), optimal functioning (Rogers, 1961) and maturity (Allport, 1961). High scorers accept both their good and bad self characteristics.

Positive relations with others refers to feeling empathy and affection for others (Maslow, 1968), being capable of loving, and forming deep friendships (Erikson, 1959). *Autonomy* refers to making decisions independently and regulating behaviors and emotions from within.

Autonomous individuals evaluate themselves by personal standards rather than others' approval.

Environmental mastery is the ability to choose or create environments compatible with one's

physical and psychological needs, including the ability to make use of social opportunities.

Purpose in life refers to having goals and a sense of direction. Finally, *personal growth* is the need for continued development and realization of one's potential. Viewing these attributes as part of the conceptual self is novel, but is in line with other researchers who refer to these attributes as aspects of personality (Fleeson & Heckhausen, 1997).

Previous research shows adult age differences in some but not all of these self-attributes. For example, both young (18-29 years) and middle-aged adults (30-64 years) express more personal growth and score higher on purpose in life than older adults (over 64 years; Ryff, 1989b; Ryff, 1991; Ryff & Keyes, 1995). Young adults report significantly less environmental mastery than both middle-aged and older adults who do not differ (Ryff, 1989b; Ryff, 1991; Ryff & Keyes, 1995). Middle-aged adults report more autonomy than both young and old adults, although the difference from old adults is not significant (Ryff, 1989b; Ryff, 1991; Ryff & Keyes, 1995).

There are inconsistent results regarding two self-attributes, positive relations and self-acceptance. In terms of positive relations, some studies find no age differences (Ryff, 1989b; Ryff, 1991) and others show older adults report greater positive relations than both young and middle-aged adults (Ryff & Keyes, 1995). This is in line with socioemotional selectivity theory that argues that as people get older, they shift their attention to emotionally meaningful goals and enhancing intimate relationships (Carstensen, 1995). In some studies, older adults report greater self-acceptance than both middle-aged and young adults, although the significant difference is between the old and the young group (Ryff, 1991). Other studies have found a constant level of self-acceptance across the life span (Ryff, 1989b; Ryff & Keyes, 1995).

The studies reviewed here did not use the two-phase perspective of midlife, but instead used samples with a wide midlife age range (30- 64). Therefore, their findings may be unclear regarding distinctions between the young, midlife, and older groups due to their operationalization of midlife. For example, they showed that young and middle-aged adults do not differ in personal growth, self-acceptance or positive relations, whereas old adults score lower in personal growth, and higher in self-acceptance and positive relations than both groups (Ryff, 1989b; Ryff, 1991; Ryff & Keyes, 1995). It is unclear whether this pattern of results would have been obtained if they had separately examined the two phases of midlife. Conceptualizing midlife as having two distinct phases and focusing on late-midlife adds precision to conceptualizing the experience of midlife, and may prevent inconsistent results in examining self-attributes. Thus, the present study compares young adults with late middle-aged adults, and expects to see clear distinctions between these groups in self-attributes that have shown inconsistent results in the past (e.g., positive relations and self-acceptance). The present study predicts that late middle-aged adults should be more similar to older adults and will express greater levels of positive relations and self-acceptance, but less personal growth and purpose in life than young adults.

In sum, research shows that two aspects of the conceptual self, future time perspective and self-attributes, are likely to show meaningful developmental variation in adulthood. The next section combines these two age effects with the SMS model by introducing a comprehensive conceptual model (see Figure 1-2) showing future time perspective as a mediator between age group and current self-attributes (i.e., one's age group predicts future time perspective which influences one's self-attributes). The conceptual model also shows how the conceptual self at different points in adulthood shape the content of retrieved autobiographical memories.

The Role of Age and Future Time Perspective in Self-Memory Relations

The current study is based on a new conceptual model that extends the SMS model and links four major constructs (i.e., age, future time perspective, current self-attributes and autobiographical memory content). As shown in the model (see Figure 1-2), future time perspective is expected to mediate the relation between age group and self-attributes. That is, adults have different self-attributes not only because they are of different chronological ages, but because they have different perspectives of future time due to their age. How adults perceive time left to live may be just as meaningful as their chronological age (i.e., time since birth) in shaping their self-attributes. For example, future time perspective is the central tenet of socioemotional selectivity theory which suggests that the amount of time people perceive they have left ahead of them is associated with the extent to which they hold emotional versus future-oriented goals (Carstensen, 1995; Fung & Carstensen, 2006).

The model suggests that future time perspective will function as a mediator for all but two self-attributes (i.e., autonomy and environmental mastery). These two self-attributes are expected to be directly shaped by one's age. Ryff and her colleagues show the most consistent results for these two self-attributes such that middle-aged adults always score higher than young adults (Ryff, 1989b; Ryff, 1991; Ryff & Keyes, 1995). The fact that these two self-attributes show more consistent and stronger links with age than other self-attributes may suggest that these links are not mediated by future time perspective. Furthermore, theoretically both autonomy and environmental mastery are expected to be gained through adult development and life experiences. That is, independent of one's future time perspective, the process of gaining experience as one masters life challenges and new environments across adulthood provides one with a chance to develop autonomy and environmental mastery. In sum, the current study is based on a newly developed model which argues that one's age has direct effects on both future

time perspective and self-attributes, but that it also has an indirect effect on four self-attributes through future time perspective as a mediator. The proposed model is an elaboration of the basic SMS model: age group and future time perspective shape self-attributes (i.e., the conceptual self), which in turn shape the content of autobiographical memories. The next section focuses on the effect of self-attributes on young and late middle-aged adults' earliest and recent memories.

Testing the SMS Model: Effects of Self-Attributes on Earliest and Recent Memory Content

According to the conceptual model used in the current study, age and future time perspective shape self-attributes, which in turn influence autobiographical memories. As discussed above, individuals in different stages of adulthood have different self-attributes. Differences in the conceptual self, through working self goals, lead to differences in the content of autobiographical memories. For example, Alea and Bluck (2003) argue that individuals' age, gender and personality have an impact on the goals of their working selves and hence on their memories. Thus, the present study tests the SMS model by examining whether self-attributes across different age groups are reflected in the content of autobiographical memories (i.e., earliest and recent memories).

According to the SMS model, self-attributes, as part of the conceptual self, shape autobiographical memory content regardless of memory type. If earliest memories are the first memories that fit with the current self, they too should have content that matches with current self-attributes. For example, an individual who is currently high on personal growth should be more likely to recall an earliest memory that has a personal growth theme than an individual with low personal growth. No research to date has examined this relation between current self-attributes and earliest memories. Conway and Pleydell-Pearce's (2000) model did not particularly focus on earliest memories, but simply refers to all autobiographical memories. As such, testing the impact of current self-attributes on the content of earliest memories will be a

stringent test of the SMS model. That is, it should be more difficult to provide support for the SMS model using earliest memories because it is more difficult to show that current self-attributes have an impact on such distant memories.

The current study tests the relation of self-attributes to memories by examining earliest memories in relation to a more recent memory for comparative purposes. In addition to earliest memories, participants will be asked to retrieve a memory from the period between a year ago and three months ago. The last three months are excluded in order to avoid recall of very trivial events (e.g., yesterday's breakfast) that would not be comparable to earliest memories, and to avoid recency effects (e.g., remembering what you did just before beginning the study). The effect of self-attributes is expected to be more evident on recent memories, because one is likely to have had the same self-attributes at the time of the event as currently, at the time of retrieval. That is, as these memories have been encoded and are being retrieved in the same developmental stage, there should be a strong match between their content and one's current self-attributes. In contrast, the fit between one's self-attributes and one's earliest memory content should be less evident because these memories were encoded in a very different developmental stage (i.e., childhood) than the stage in which they are being retrieved.

In conclusion, earliest memories are theorized to be retrieved because they are the first memories that match one's current self-attributes. The current study tests this and thereby, investigates whether the SMS model provides a convincing explanation for the recall of earliest memories. In opposition to earliest memories, recent memories should show an even closer match between current self-attributes and memory content. As the SMS model does not have a developmental focus, it does not make predictions about whether this relation between the current conceptual self and memory content will be different in different adult age groups. The

current study predicts that there will be no differences between the two age groups. Although there are changes in the current conceptual self across development, the relation between current conceptual self and memory content should always be evident. That is, one's conceptual self in any developmental stage should guide the recall of their memories. In sum, in testing the relation of the conceptual self to memory content, the current study provides a new test of the SMS model (i.e., examining earliest memories), as well as one that has been used by a small number of researchers (e.g., examining recent memories; Conway & Holmes, 2004), and also examines whether this relation is stable across the adult life span.

Specific Aims and Hypotheses

The goals of the study were outlined in the literature review. They are summarized here in terms of the specific aims and hypotheses of the study. The first study aim is to examine whether young adults and late middle-aged adults have different conceptual selves (i.e., different sense of future time perspective and self-attributes). The second aim is to examine whether any obtained age differences in self-attributes across the two age groups (as per aim 1, hypothesis 2) are driven by chronological age or are mediated by an individual's sense of future time perspective.

Hypothesis 1: Late middle-aged adults are expected to have a less open-ended future time perspective with a perception of future as limited and lacking opportunities as compared to young adults.

Hypothesis 2: Late middle-aged adults are expected to have higher levels of positive relations, self-acceptance, autonomy and environmental mastery than young adults, whereas young adults are expected to show higher purpose in life and personal growth than late middle-aged adults.

Hypothesis 3: Future time perspective is expected to be a mediator between age and four self-attributes: purpose in life, personal growth, positive relations and self-acceptance. Future

time perspective is not expected to mediate the relation between age and the remaining two self-attributes: autonomy and environmental mastery. These attributes should be directly linked to chronological age group.

The third study aim is to provide a test of the SMS model by examining whether differences in self-attributes are reflected in differences in memory content overall. This also includes a stringent and novel test of the model which examines the link between the current conceptual self and earliest childhood memories. According to the SMS model, these relations should occur regardless of age group. These findings will also elucidate whether the SMS model provides a convincing explanation for the retrieval of earliest memories.

Hypothesis 4: Individuals with higher levels (as compared to lower levels) of a particular self-attribute are more likely to rate their memories as including higher levels of the content of that attribute. For example, those who are currently high in autonomy are more likely to rate their memories as including autonomy content than those who are low in autonomy. This is expected for all six self-attributes and for both age groups, but the effect should be less evident on earliest memories than recent memories. That is, though both earliest and recent memories should reflect self-attributes, earliest memories are expected to be weaker representatives of self-attributes than recent memories. For example, in a person with high environmental mastery, that mastery should be more clearly represented as content in their recent than in their earliest memory.

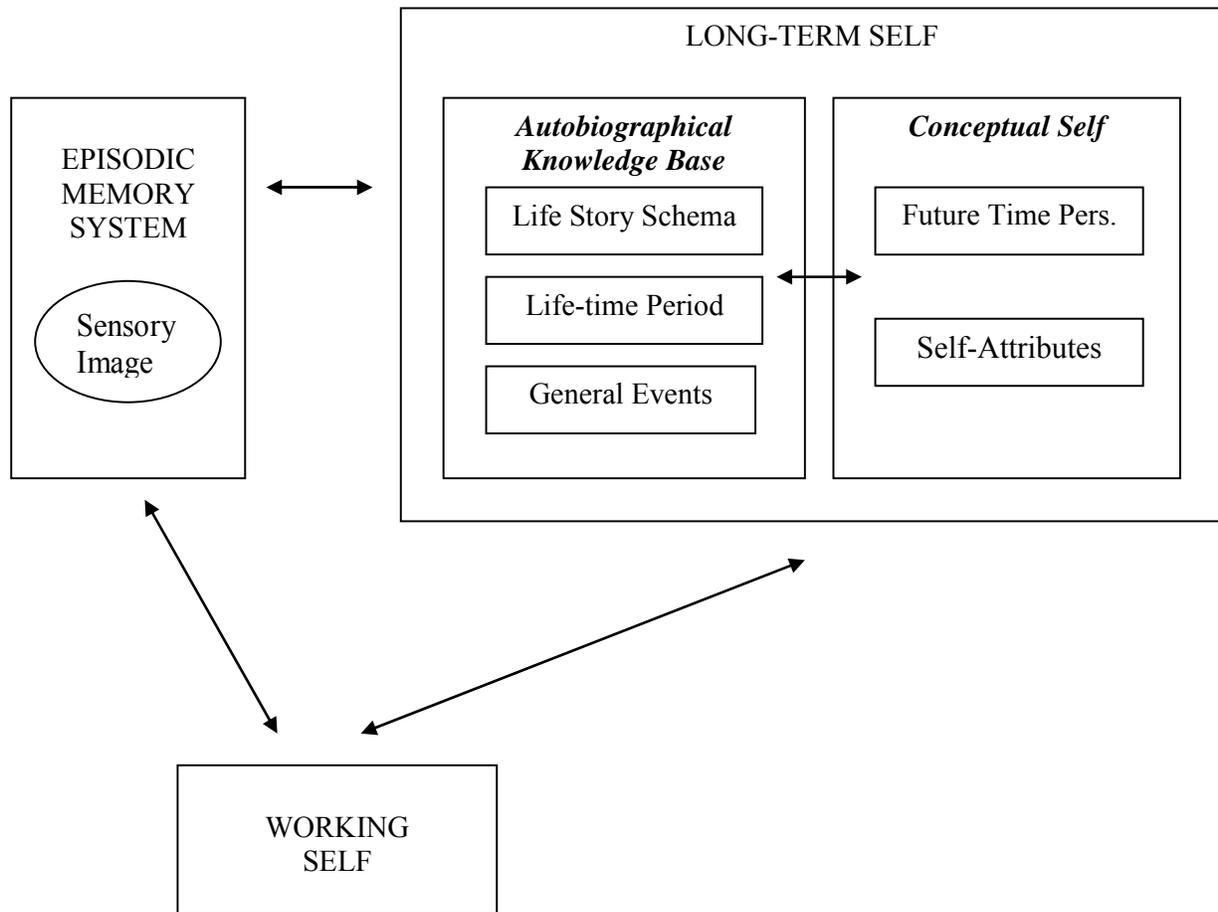


Figure 1-1. The self-memory system with self-attributes and future time perspective shown as aspects of the conceptual self.

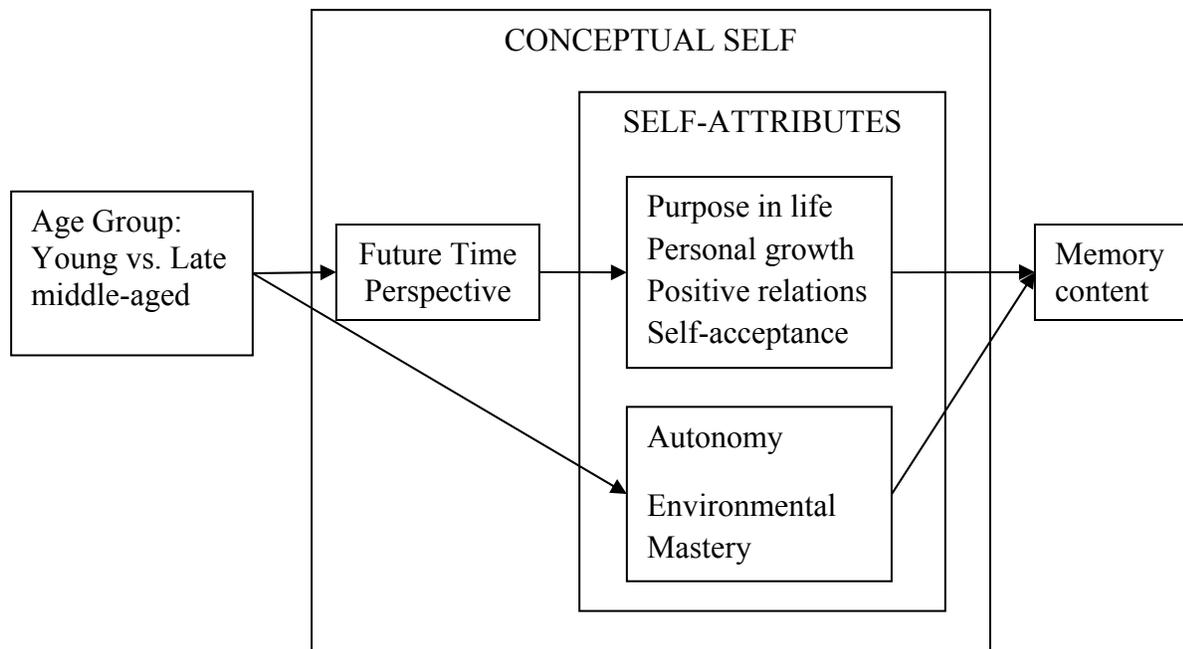


Figure 1-2. The effect of self-attributes on autobiographical memory content as predicted by age group and future time perspective.

CHAPTER 2 METHODS

Participants

The sample consists of 285 young adults (108 men, 177 women) and 135 middle-aged adults (55 men, 80 women). Young adults ranged from 19 to 29 years old ($M = 21.13$, $SD = 1.18$) and late middle-aged adults ranged from 47 to 64 years old ($M = 55.67$, $SD = 5.99$). The young age range represents the young adulthood life phase. The age range of the midlife sample represents late-midlife (not early-midlife) as differentiated in life span developmental theory (Staudinger & Bluck, 2001). Focusing on late midlife adds precision to conceptualizing the experience of midlife in terms of both future time perspective and self-attributes: Individuals in late midlife are likely to be distinct from younger adults on both of these constructs. Of participants who reported ethnicity, 64% of the young adults were Caucasian, 15.2% were Hispanic, 6.4% were Asian, 7.8% were African American, and 6.7% reported his or her race as 'other'. All of the young sample had completed high school and were enrolled in university: There were 142 sophomores, 93 juniors and 49 seniors. Of the late middle-aged adults, 87% were Caucasian, 8.3% were Hispanic, 1.5% were Asian, and 3% were African American. Ten percent of the late middle-aged adults had a Ph.D. degree, 27.3% had a Master's degree, 37.3% had a Bachelor's degree, 9.4% had an Associate's degree and 15.6% had a high school degree.

Invitations to complete the online survey that was composed of two parts were sent by email to 398 young and 501 late middle-aged adults. Among those, 346 young adults (87%) and 212 late middle-aged adults (42%) started the survey, and 309 young adults (78%) and 148 late middle-aged adults (30%) completed it (i.e., there were 37 young and 64 late middle-aged adults who did not complete both parts of the survey). To ensure data quality in those who did complete the entire survey, participants who did not follow the survey instructions and those who

answered at least two of the data quality foil items incorrectly were excluded (twelve individuals). Twenty five individuals were excluded because their reported age was not within the appropriate age ranges for the current study. Thus, the final sample consisted of 420 individuals.

The young adult sample was recruited from the Psychology Department's participant pool and two other psychology courses. Students received course credit for participation. The late-midlife participants were accessed through the young adult sample. Before beginning the survey, young adults were asked whether they would like to receive two extra course credits by providing the researcher with names and contact information of two middle-aged individuals. These middle-aged individuals could be family members, friends or neighbors who the student felt might be willing to participate in the study. The students were told that they would receive extra credit whether the middle-aged individuals agreed to participate or not but that they must provide valid names, email addresses and telephone numbers for each referred individual. These potential middle-aged participants were sent an email explaining how they had been contacted and inviting them to participate in the study. The email included a link to the online survey. These middle-aged adults were also asked if they would like to provide the researcher with the contact information of other friends or relatives who might be interested in participating in the study. All middle-aged participants were compensated in two ways. First, after completing the survey, they were directed to a research-based informative 'handout' on midlife development created by the researchers. Second, a \$1.00 donation was made to one of the following developmentally-relevant and reputable charity organizations of the participants' choosing: the American Association of Retired Persons (\$ 22.00) or the Children's Health Fund (\$ 119.00).

Procedure

The online survey (SurveyMonkey.com) was composed of two parts. Young adults and late middle-aged adults were sent an email including the link to the first part of the survey and inviting them to participate. The email briefly explained the focus of the study and signified that participants had one week to complete the first survey. They were told that when they were finished with the first survey, they would be sent the second survey link in 48 hours. Participants were free to complete the surveys anywhere that had access to the internet. They were, however, asked to choose a quiet location and told that they needed to complete each survey in one sitting.

The study consisted of two sessions with a minimum 48-hour and a maximum 72-hour interval in between. The first survey included the informed consent form, the current self-attributes measure (Ryff, 1989a) and the demographics and health items presented in that order. In the second survey, individuals were prompted to share two memories and to rate the memory content of each (see description of memory-sharing below). They then completed the two future time perspective measures: the Rappaport Time Line and the Future Time Perspective Scale. Participants wrote their memory narratives and completed the memory content ratings before completing the future time perspective measures to prevent their memory recall from being confounded by having been prompted to think about future time. Having two separate surveys with a 48-hour time lag prevented dependency between the current self-attributes measure (Session 1) and the memory-sharing and memory content ratings (Session 2). Spreading the measures across two sessions also helped to prevent participants from becoming bored or exhausted while completing the survey. The first survey took about 10 minutes, and the second survey took about 20-30 minutes to complete.

Through counterbalancing (within age and gender), half of the participants retrieved their earliest childhood memory first, followed by a recent memory from the last year but excluding

the most recent three months. The other half of the sample retrieved the recent memory first, followed by their earliest memory. Participants completed the first memory narrative and then the memory content ratings for that particular memory. They then proceeded to the second memory narrative and completed the same memory content ratings for the second memory.

The instructions for producing the memory narratives were designed to elicit two *specific* memories from the participants' lives (see Appendix A). Specific memories were defined to them as any event/experience that occurred at a particular place and time (i.e., it may have lasted minutes or hours, but the event itself was not longer than one day). Participants were told that their memories may be quite unique experiences or just everyday events, but what is important is that they should be specific events (i.e., not general life periods) that 'say something about them as a person'. They were asked to report memories that 'say something about them as a person' so as to collect memories that are associated with the self as per the self-memory system model (Conway & Pleydell-Pearce, 2000). For both memories, participants were presented with a standard text box in which they were required to type approximately 800 characters. The number of characters required was determined through pilot-testing for common length of memory narratives produced.

The earliest memory instructions were to take a moment to think back to their childhood and to then try to recall the very earliest event/experience that reveals something about who they are as a person and to describe it in writing as thoroughly as possible. They were instructed to write down everything they were doing, thinking and feeling at the time of that event. Instructions emphasized that the memory should be their own recollection from earliest childhood, not an episode that they had only seen in a picture or heard about from someone else, and that it should be the very earliest memory that they could recall. Recent memory instructions

were to take a moment to think back over the last year and to recall something memorable from the period between three months ago and a year ago and write about it. The most recent three months were excluded to avoid a recency effect in recall. That is, to prevent participants from reporting very recent memories (e.g., things that had happened that same day) that may be about trivial events. Participants were reminded that this recent memory should be one that says something about who they are as a person and were instructed to write everything they were doing, thinking and feeling at the time of that event. Thus, the instructions were the same for both memories except for the focus on earliest versus recent events. Examples of both earliest and recent memory narratives are presented in Appendix B.

Measures

The first survey included the current self-attributes measure and the background measures including demographics and health status. In the second survey, individuals shared two memories and completed self-rated memory content ratings. They then completed the two future time perspective measures.

Self-Attributes Measure

This 54-item scale (Ryff, 1989a) consists of subscales designed to measure six different self-attributes. The subscales are: (1) self-acceptance, (2) positive relations with others, (3) autonomy, (4) environmental mastery, (5) purpose in life, and (6) personal growth. The short form, consisting of nine items in each subscale, was used (see Appendix C). Internal consistency for the total score in the current study was very high with a Cronbach's alpha of .95 and the six subscales showed moderate to high consistencies with Cronbach's alphas between .75 and .90. Participants were instructed to focus on their current selves while answering the questions, and rated the items using a scale ranging from 1 (strongly disagree) to 8 (strongly agree). Scoring

consisted of summing the nine items in each subscale after reversing negatively phrased items. Higher scores are indicative of higher levels of that particular self-attribute.

Memory Content Ratings

This measure consists of 24 Likert-type items based on the 54-item version of the Ryff scales (1989a; see Appendix D). The measure was developed for the current study to assess the extent to which participants' self-attributes (i.e., autonomy, environmental mastery, purpose in life, personal growth, self-acceptance and positive relations with others) are reflected in the content of their autobiographical memory narratives. Content related to each self-attribute is measured with four self-report items, two of which are reversed. These items were selected from the larger scale because they were applicable (with minor modification) to rating in relation to memory content, and they had high loadings on the relevant self-attribute factor suggesting that they were representative items for that factor (Abbott et al., 2006).

Internal consistencies were calculated separately for earliest memory and recent memory content ratings overall (Cronbach's alpha = .91 for both). Internal consistencies for environmental mastery, self-acceptance and positive relations were high in both memories (Cronbach's alphas between .82 and .87). Internal consistencies for purpose in life, personal growth and autonomy, however, were low in both memories. Therefore, one item from each of these three subscales was excluded to increase inter-item reliability. When the item "In this memory, I was living each day and not thinking about the future" was excluded from the purpose in life subscale, Cronbach's alpha increased from .46 to .63 for the recent memory, and from .50 to .58 for the earliest memory. When the item "In this memory, I was not trying to make improvements or changes" was excluded from the personal growth subscale, Cronbach's alpha increased from .56 to .62 for the recent memory, and from .64 to .68 for the earliest memory. Finally, when the item "In this memory, I was influenced by strong others" was excluded from

the autonomy subscale, Cronbach's alpha increased from .46 to .48 in the recent memory, and stayed at .51 in the earliest memory. New composite scores were calculated for these three subscales, with three items in each subscale, and the mean score for each subscale was used in the analyses.

Participants responded to each item in relation to both their recent and their earliest memory on a scale ranging from 1 (strongly disagree) to 8 (strongly agree). The possibility of dependency in responses across the current self-attributes measure (Ryff, 1989a) and the memory content ratings was clearly an issue and several things were done to prevent it. The two measures were administered with a minimum 48-hour time lag between them to reduce recall of previous responses, and foil items were distributed among the items of both measures. In addition, there were clear instructional set differences between the two measures. Ryff's (1989a) measure of current self attributes instructed participants to focus on themselves in general and in the present, whereas the memory content ratings instructed them to focus on each specific reported memory while answering the questions. While the time lag and the instructional set differences should take care of any dependency issues, additional precautions were taken. Both the content and the order of foil items were different in the two measures to reduce ability to remember how one had previously responded. The exact wording of the items measuring the same self-attribute (e.g., autonomy) across the two measures was slightly different, again so that participants were unlikely to recall earlier responses to the items. Aside from the memory content ratings, participants reported the date of each of their memories to the closest month and year, as well as reporting their chronological age during each remembered event.

Future Time Perspective Measures

Two future time perspective measures were used to assess different aspects of this construct. The first is a modified version of the Rappaport Time Line (Rappaport, Enrich, &

Wilson, 1985) in which participants receive a horizontal line representing their life starting from birth and ending at death. They respond by clicking a ‘now’ point on the line to indicate where they subjectively feel they are in their life at this time. Distance from death marked on the line was represented numerically between 16 (birth) and 1 (death). Higher scores indicate a longer future time perspective.

Carstensen and Lang’s (1996) Future Time Perspective Scale was also used (see Appendix E). Participants provided ratings on a scale from 1 (very untrue) to 7 (very true) indicating the degree to which they agreed with each of ten items. A sample item is “Many opportunities await me in the future”. The total score for each participant is the mean across all items. Higher scores indicate a more open-ended and positive future, whereas lower scores indicate a more limited and pessimistic future time perspective. Internal consistency is very high with a Cronbach’s alpha of .89.

The correlation between these two future time perspective measures was moderate, as they assess slightly different aspects of future time perspective, $r(417) = .53, p < .05$. The Rappaport Time Line is a straightforward measure of time perspective that represents one’s subjective sense of their position in the life span. The Future Time Perspective Scale assesses subjective time left (similar to Rappaport Time Line), but also includes one’s feelings about what the future may hold. Particularly, those who receive higher scores indicate optimistic views of the future and believe that the future holds opportunities for them. Given this conceptual distinction and the moderate correlation, these two measures are treated separately rather than collapsed into one composite score.

Both future time perspective scales were administered after participants had provided narratives of their earliest and recent memories in a counterbalanced order. A multivariate

analysis of variance (MANOVA) showed that this order manipulation did not have an impact on how participants responded to the Rappaport Time Line or the Future Time Perspective Scale, $F(2, 414) = 0.24, p > .05$.

Background Measures

The background measures include demographics (see Appendix F) and a current health status question, assessed for potential use in analyses as covariates. Current health status was assessed due to its potential to differ across age groups and also to affect one's sense of future time perspective. Individuals completed a single item rating their health on a 6-point scale ranging from 1 (very poor) to 6 (very good): "Compared to other people my age, I believe my health to be..." (Zelinski, Burnight, & Lane, 2001).

Use of Online Data Collection: Considerations

Data was collected through an online survey created at SurveyMonkey.com. Internet-based data collection is an increasingly popular method of conducting psychological research. Previous research on the quality of internet-based data collection shows no differences between traditional paper and pencil surveys and online surveys in assessing such things as student ratings of quality of instruction or reporting of sexual behaviors, in terms of internal consistency, criterion-related validity, factor loadings and mean scores (Chang, 2005; Chuah, Drasgow, & Roberts, 2006; Epstein, Klinkenberg, Wiley, & McKinley, 2001; King & Miles, 1995; Lonsdale, Hodge, & Rose, 2006). Furthermore, missing data are often more common in the paper and pencil format compared to both supervised and unsupervised online surveys (Lonsdale et al., 2006; Wood, Nosko, Desmarais, Ross, & Irvine, 2006). For open-ended questions such as the memory narratives in the present research, studies show that online survey responses are either longer or of the same length as mail responses (Fricker & Schonlau, 2002). Online surveys also lead to higher and faster response rates than surveys distributed via postal mail (Cobanoglu, Warde, &

Moreo, 2001; Lonsdale et al., 2006). Using undergraduates at the University of Florida as participants, Pealer, Weiler, Pigg, Miller, and Dorman (2001) found that online surveys showed the same response rates as mail surveys. Furthermore, online surveys encourage collecting larger samples as they have the potential to eliminate costs and labor-intensive fielding tasks such as survey package preparation, mailing and data entry (Fricker & Schonlau, 2002). The literature suggests that using an online survey can be advantageous in terms of data collection speed and quality. In addition, adults in midlife are notoriously difficult to recruit due to their busy lives. Use of an online survey is a good tool for reaching this sample of adults (Nosek, Banaji, & Greenwald, 2002).

The use of an online survey might also have disadvantages. First, internet samples may under-represent populations that have low levels of access to the internet, however the challenges for internet research are similar to the challenges of all experimental research in this regard (Nosek et al., 2002). The current sample of young adults and individuals in late midlife however were highly likely to have internet access either at home, at work, or both. Thus, the online format was not expected to create undue bias in this sample. Second, participants can involuntarily end participation in the case of a computer or server crash, a broken internet connection, a program error or even a power outage (Nosek et al., 2002). This problem was prevented by asking the participants to report such cases to the experimenter so that their missing data could be labeled 'involuntary' in contrast to those who decided to end participation voluntarily. One participant in the current sample involuntarily exited the survey and was allowed to begin again.

In this study, various measures were taken to increase data quality in the online format. First, the survey was broken up into multiple pages with a small number of questions on each

page to make it clearer for participants as well as preventing technical problems such as pages not loading due to their length. Second, there were foil items embedded in the survey that checked if the participants were really reading the items (e.g., items that simply give an instruction such as “Answer ‘Strongly agree’ for this item”). Third, to control for narrative length in providing their memory narratives, participants were given a standard text box in which they were required to type a certain number of characters before they could move on to the next item. Fourth, participants were timed, and those who spent less than a certain amount of time and those who spent too much time on the survey were excluded from the study. Finally, they were given one week to complete the survey as Fricker and Schonlau (2002) suggested that researchers should leave a survey in the field for about ten days to achieve 70-80 % response rates.

CHAPTER 3 RESULTS

The results are divided into two major sections. The first section reports preliminary analyses. The second section reports findings related to the study hypotheses using univariate and multivariate analyses of variance, bootstrapping for testing mediation, and hierarchical regression analyses.

Preliminary Analyses

Four sets of preliminary analyses were necessary. First, any potential differences in health and demographic variables, or the order of reporting the memories were examined to identify potential covariates that may need to be included in major analyses. Second, the dependence between young and middle-aged participants due to the referral-based recruitment method was tested. Third, sample selectivity issues between participants who completed the entire survey and those who dropped out were examined. Finally, a manipulation check was conducted analyzing young and late middle-aged adults' age during their earliest and recent memories.

Potential Covariates

Current health status was considered as a possible covariate. A 2 x 2 ANOVA showed that there were no age or gender differences in current health, F ranges from 0.86 – 2.44, all $p > .05$.¹ One concern was that health status might drive individuals' views of time left to live. Current health was not, however, correlated with the Rappaport Time Line, and had a weak correlation with the Future Time Perspective Scale, $r(415) = .20, p < .05$. Thus, current health was not entered as a covariate in further analyses.

¹ The sample sizes in the analyses vary due to missing data on some of the criterion variables.

Preliminary analyses also examined potential differences by race and gender in the major study variables. In order to test whether there were differences in the two future time perspective measures, current self-attributes, earliest memory content ratings, or recent memory content ratings, four MANOVAs were run with race and gender entered as the two independent variables. Results showed that race had no significant main effect on any of the dependent variables, F ranges from 0.30 – 2.02, all $p > .05$. In contrast, sex had a main effect on current self-attributes, $F(6, 326) = 3.22, p < .05$. Results showed that women had higher levels of personal growth, positive relations, purpose in life and self-acceptance than men, t ranges from 2.11 – 4.44, all $p < .05$. As sex had a significant effect on an important variable (i.e., current self-attributes), it was entered as an independent variable (i.e., to test interactions) or as a covariate in all of the major analyses.

Finally, in order to test whether the order of recalling the two memories (i.e., earliest memory first vs. recent memory first) had an effect on the content of the memories, two MANOVAs were conducted. The first MANOVA included earliest memory content ratings as the six dependent variables and order as the independent variable. Results showed that order had a significant main effect on earliest memory content, $F(6, 390) = 3.22, p < .05$. When earliest memories were recalled first followed by the recent memory, adults rated their earliest memories as having higher levels of all six memory content themes than when recent memories were recalled first. The second MANOVA included recent memory content ratings as the six dependent variables and order as the independent variable. Results showed that order did not have a significant main effect on recent memory content, $F(6, 369) = 1.57, p > .05$. These findings suggest that only earliest memory content was affected by the order of memory retrieval. As order showed this significant effect, it was entered as a predictor in any analyses

involving memory content (i.e., Hypothesis 4 examining the relation between current self-attributes and memory content).

Sample Dependency Issues

As reported earlier, younger adults were given the option to refer middle-aged adults to participate in this study. In order to ensure that young participants who referred middle-aged adults were not significantly different from young participants who did not refer middle-aged adults, the two groups of students were compared in terms of background measures (i.e., race, education level and health) and major study variables (i.e., current self-attributes, future time perspective and memory content ratings). Analyses of variance showed no significant differences, F ranges from 0.13 – 2.21, all $p > .05$. Similarly, late-midlife participants were also asked if they would like to refer other middle-aged people. Analyses showed that late-midlife participants who referred middle-aged adults were not significantly different from late-midlife participants who did not provide referrals, in terms of background measures or major study variables, F ranges from 0.22 – 2.01, all $p > .05$.

This method of recruitment also led to some young adults being related to the middle-aged individuals who participated in the study (e.g., a young student referred his or her middle-aged parent) and some late middle-aged adults being related to other middle-aged adults (e.g., a middle-aged person referred his or her friend). Univariate ANOVAs were conducted to examine whether these pairs of related individuals were different from single individuals who did not refer anyone. A dummy variable for “group” was created so that each group (e.g., each young-midlife referral pair, or midlife-midlife referral pair) had a distinct code, as did single individuals (i.e., those who did not refer anyone). ANOVAs were conducted with the group dummy variable entered as a random factor. ANOVAs were run for all dependent variables: current self-attributes, future time perspective measures and memory content ratings. Groups did not differ

significantly on any variables, F ranges from 0.62 – 1.26, all $p > .05$. This shows that there were no differences between young-midlife referral pairs, midlife-midlife referral pairs, and individuals who did not provide referrals, in the way they responded to any of the major study measures.

Sample Selectivity: Attrition Due to Drop-Out

To ensure that participants who dropped out after completing the first survey were not significantly different from those who completed the entire study, the two groups were compared in terms of available measures on both groups: the background measures (i.e., race, education level, sex and health) and current self-attributes. Chi-square tests showed that race was the only demographic variable that showed a significant difference between the two groups, and this was the case for only young adults: African American young adults ($n = 8$) dropped out at a higher rate than the expected value (3), $\chi^2 (N = 316, df = 4) = 11.04, p < .05$.

A MANOVA showed no differences between those who did and did not complete the entire survey in terms of current self-attributes in either age group, $F (6, 420) = 1.08, p > .05$. These findings suggest that overall there were no major differences between adults who did or did not complete the entire survey. However, young African Americans showed a higher drop-out rate.

Age at Time of Memory

In terms of age at time of earliest memory, young adults ($M = 4.53, SD = 1.51$) and late middle-aged adults ($M = 4.74, SD = 1.57$) showed no differences, $t (370) = 1.22, p > .05$. On average, people recalled memories from when they were between four and five years old. This is in line with previous research that examined the earliest memories of both young and midlife adults and found that childhood amnesia wanes around the age of 4.7 (Multhaup et al., 2005). In terms of their recent memories, both age groups correctly responded to the study task by

reporting memories that were from the previous year: On average, young adults were about 19 years old ($M = 19.31$, $SD = 2.10$), whereas late middle-aged adults were on average about 55 years old in their recent memories ($M = 54.77$, $SD = 5.50$).

Major Analyses: Testing Hypotheses

Results are provided below for each of the study hypothesis. Hypotheses were addressed using a variety of analytical techniques: Analyses of variance, bootstrapping for testing mediation, and hierarchical regressions with appropriate follow-ups were conducted.

Hypothesis 1: Relation of Age Group to Future Time Perspective

Late middle-aged adults were expected to have a less open-ended perspective on future time, viewing their future as limited time-wise and lacking in opportunities as compared to young adults. To demonstrate the predicted developmental differences between the two age groups, a MANOVA was conducted with age group and sex as the between-subjects factors. Dependent variables were the two future time perspective measures. Initial evaluations of the data showed that Box-M test for the homogeneity of variance-covariance matrices produced a significant result, $F(9, 421263.09) = 5.77$, $p < .001$. Levene's test found that the assumption of homogeneity of variance could not be supported for the two time perspective measures, F ranges from 4.97 – 9.79, all $p < .05$. Therefore, the more conservative and robust Pillai's trace is used for the estimation of F -statistics in the analysis that follows.

The MANOVA showed a significant main effect for age $F(2, 412) = 450.04$, $p < .05$, $\eta^2 = .69$, but not for sex, $F(2, 412) = 1.36$, $p > .05$. There was no significant interaction with sex, $F(2, 412) = 0.85$, $p > .05$. As predicted, follow-up univariate ANOVAs showed significant differences between young and late middle-aged adults on both the Future Time Perspective Scale, $F(1, 413) = 90.19$, $p < .05$, $\eta^2 = .18$, and the Rappaport Time Line, $F(1, 413) = 901.89$, $p < .05$, $\eta^2 = .69$. Individuals in late midlife had a less open-ended future time perspective ($M =$

47.92, $SD = 11.44$) than young adults ($M = 57.82$, $SD = 8.72$) as measured by the Future Time Perspective Scale, and had lower scores on the Rappaport Time Line ($M = 6.83$, $SD = 2.03$) than young adults ($M = 12.04$, $SD = 1.41$) indicating a shorter future time perspective.

Hypothesis 2: Relation of Age Group to Current Self-Attributes

Individuals in late midlife were expected to have higher current levels of several self-attributes, including positive relations with others, self-acceptance, autonomy and environmental mastery than young adults. Young adults were expected to show higher purpose in life and personal growth than those in late midlife. To test for the predicted developmental differences on current self-attributes between the two age groups, a MANOVA was conducted with age group and sex as the between-subjects factors. Dependent variables were the six current self-attributes. Initial evaluations of the data showed that Box-M test for the homogeneity of variance-covariance matrices produced a significant result, $F(63, 110337.2) = 1.73$, $p < .001$. Levene's test showed that the assumption of homogeneity of variance could not be supported for four of the six dependent variables, F ranges from 3.35 – 5.49, all $p < .05$. Therefore, the more conservative and robust Pillai's trace is used for the estimation of F -statistics in the analyses that follow.

The MANOVA found significant main effects for both age, $F(6, 349) = 15.03$, $p < .05$, $\eta^2 = .21$, and sex, $F(6, 349) = 3.98$, $p < .05$, $\eta^2 = .06$. There was no significant interaction, $F(6, 349) = 1.40$, $p > .05$. Follow-up univariate ANOVAs were conducted. In terms of age, late middle-aged adults had significantly higher autonomy, environmental mastery, self-acceptance, positive relations and purpose in life than young adults, F ranges from 6.79 – 54.16, all $p < .05$ (see Table 3-1). There was no significant difference in personal growth between young and late middle-aged adults, $F(1, 354) = 2.41$, $p > .05$. These findings mostly supported the hypothesis,

but those in late midlife, instead of scoring higher than younger adults on four of the six self-attributes scored either on par or higher than the young on all six self-attributes.

In examining current self-attributes by sex, women self-reported higher personal growth ($M = 59.34, SD = 7.32$) than men ($M = 56.46, SD = 9.01$), $F(1, 354) = 4.67, p < .05$, and more positive relations with others ($M = 59.53, SD = 9.20$) than men ($M = 54.78, SD = 11.59$), $F(1, 354) = 12.35, p < .05$. Men and women were similar in terms of the other four self-attributes, F ranges from 1.35 – 3.58, all $p > .05$.

Hypothesis 3: Examining Future Time Perspective as a Mediator Between Age Group and Self-Attributes

Future time perspective was expected to be a mediator between age group and four self-attributes: purpose in life, personal growth, positive relations and self-acceptance. That is, some of the variance in these four self-attributes explained by participants' age group was expected to be due to their sense of future time. Autonomy and environmental mastery were expected to be directly linked to chronological age.

Analytical approach

Mediation was tested using Preacher and Hayes' (2004) bootstrapping method. This innovative, non-parametric method for testing mediations does not impose the assumption of normality of the distributions and does not require large samples (Preacher & Hayes, 2008). This method was preferred over Baron and Kenny's (1986) causal steps approach with the Sobel test (1982) due to its higher power and higher control over Type 1 error rate (MacKinnon, Lockwood, & Williams, 2004; Hayes, 2009). This method was also preferred particularly for the current study because it allows entering multiple mediating variables into the model simultaneously (i.e., the two future time perspective measures) to see whether they have a combined indirect effect on the dependent variable (Preacher & Hayes, 2008). This method also

allows testing the indirect effect of each of the mediators individually while controlling for all other variables in the model and compares the effects of the mediators against one another (Preacher & Hayes, 2008).

As the two future time perspective measures used in the study assess slightly different aspects of the concept of future time, they were tested both separately and simultaneously in the mediation analyses. That is, three mediation models were used. In the first two models, the Future Time Perspective Scale and the Rappaport Time Line were entered separately as single mediators. The third model was a multiple-mediators model, in which the Future Time Perspective Scale and the Rappaport Time Line were entered simultaneously. Running these analyses with single and then multiple mediation models allowed for investigation of each of the time perspective measures as independent mediators, as well as examining both their joint effects and their relative efficacy.

It is important to distinguish between various effects and their corresponding weights in these mediation analyses to interpret the following results. For illustrative purposes, Figure 3-1 depicts the general mediation model used for all of the mediation analyses, illustrating the hypothetical paths through which the Future Time Perspective Scale and/or the Rappaport Time Line are expected to mediate the relation between age group and current self-attributes. Figure 3-1A presents the *total effect* of the independent variable (i.e., IV = age group) on the dependent variable (e.g., DV = autonomy) which is weight c . In Figure 3-1B, weights $a1$ and $a2$ represent the effect of the IV (i.e., age group) on the mediators (i.e., Future Time Perspective Scale and Rappaport Time Line). Weights $b1$ and $b2$ represent the effects of the mediators on the DV (e.g., current self attributes, such as autonomy) partialling out the effect of the IV and any other mediators entered in the model. All of these paths are quantified with unstandardized regression

coefficients. The *indirect effect* of the IV on the DV through the mediators (i.e., the mediational path) is the product of weights a and b (i.e., $a1*b1$ or $a2*b2$). This indirect effect and the *direct effect* (i.e., weight c') of the IV on the DV after controlling for the mediator(s) are the two components that sum to explain the total effect of the IV on the DV (i.e., weight c).

A mediation model is a path model that specifies a causal chain between the IV, DV and the mediating variables (MacKinnon, 2008). A significant mediation requires obtaining a significant indirect effect, as well as a direct effect (weight c') that is of smaller magnitude than the total effect (weight c). That is, the simple relation between the IV and the DV should be reduced with the addition of the mediator (MacKinnon et al., 2000). In contrast, if the magnitude of the direct effect becomes larger than the total effect after the addition of a mediator(s), this indicates a *suppression effect* (i.e., inconsistent mediation; Davis, 1985). Suppression occurs when a mediator increases the magnitude of the relation between the IV and the DV, and thus increases the predictive validity of the IV (MacKinnon et al., 2000). Within a mediation model, the fact that the direct and the indirect effects of an IV on a DV have opposite signs is also a sign of suppression (Shrout & Bolger, 2002). Suppressor variables are informative: they suppress variance in the IV that is irrelevant to the prediction of the DV, and thereby enhance the predictive power of the IV (Tabachnick & Fidell, 2001). In sum, mediation models and suppression models are closely related, and are tested using the same set of methods. The bootstrapping analyses performed here can reveal whether there is mediation, suppression or no relation between variables in the specified models (Shrout & Bolger, 2002).

Findings

To begin, bivariate Pearson's correlations were conducted for all of the variables to be used in mediation analyses: current self-attributes, the future time perspective measures and age group (see Table 3-2). Note that age group is negatively correlated with both of the future time

perspective measures, but its association with the Rappaport Time Line is much stronger than its association with the Future Time Perspective Scale. Also note that the Rappaport Time Line is negatively correlated with some of the self-attributes, whereas the Future Time Perspective Scale is positively correlated with self-attributes.

Mediation analyses were conducted separately for each of the six self-attributes, with three mediation models for each self-attribute as presented in Tables 3-3 – 3-5. The analyses and bootstrap estimates that are presented are based on 5000 bootstrap re-samples. Bias corrected confidence intervals with a confidence level of 95 % were computed.² Point estimates of indirect effects were considered significant when zero was not contained in their confidence intervals indicating that the indirect effects are significantly different from zero.

Note that these mediation analyses include the variables examined in hypothesis 1 and 2. MANOVA results were presented above to illustrate mean group differences since those were most appropriate for testing hypothesis 1 and 2. The regression results, as expected, show the same pattern of findings for those variables. Supporting hypothesis 1, age group was negatively and significantly associated with both the Future Time Perspective Scale and the Rappaport Time Line (*a* weights in Tables 3-3 – 3-5) replicating the MANOVA findings. Age group was positively and significantly associated with five of the current self-attributes (*c* weights in Tables 3-3 – 3-5) also replicating the MANOVA findings presented for hypothesis 2 above.

Three mediation models were used to test the separate and combined effects of the two time perspective variables as mediators. In the first two models, the Future Time Perspective

² Bias corrected confidence intervals are preferred over percentile confidence intervals or bias corrected and accelerated confidence intervals due to extensive simulation results supporting bias corrected bootstrapping (Preacher & Hayes, 2008).

Scale and the Rappaport Time Line were each entered separately. In the third model, they were entered simultaneously. With respect to the effect of the two mediators on current self-attributes (*b* weights), although there were no specific hypotheses, negative weights were expected for positive relations and self-acceptance. That is, in keeping with the hypotheses concerning age group differences in current self-attributes, it was expected that (due to the inverse conceptual relation between age and future time perspective) future time perspective would be negatively related to these two self-attributes, but positively related to personal growth and purpose in life. Finally, future time perspective was not expected to be related to autonomy and environmental mastery.

The first model showed, however, that (controlling for age group) the Future Time Perspective Scale was significantly and positively related to all six current self-attributes (see Table 3-3). That is, as time perspective increases (i.e., becomes more open-ended and positive), the level of all self-attributes increases. Similarly, the second model (using the Rappaport Time Line) also revealed positive relations, but for only four self-attributes: positive relations, purpose in life, personal growth and self-acceptance (see Table 3-4). That is, as predicted, time left to live as measured by the Rappaport Time Line did not predict adults' current autonomy or environmental mastery levels. The third model showed that when the two measures were entered as simultaneous mediating variables, only the Future Time Perspective Scale significantly predicted the six self-attributes (see Table 3-5). There were significant positive relations between Future Time Perspective and the six self-attributes, but no significant relations between the Rappaport Time Line and any of the self-attributes.

With respect to the indirect effect of age group on the current self-attributes through the mediators (weights $a*b$), the first model showed that the indirect effects through the Future Time

Perspective Scale were significant for all six self-attributes (see Table 3-3). Confidence intervals for the point estimates of these six indirect effects did not contain zero, indicating statistical significance. These significant indirect effects, however, indicated suppression rather than mediation. For all six self-attributes, the indirect effects and direct effects had opposite signs. As is usual with a suppressor effect, the addition of the Future Time Perspective Scale into the model increased the magnitude of the direct effects making them larger than the initial total effects of age group on the self-attributes. That is, the Future Time Perspective Scale acted as a suppressor rather than a mediator in the relation between age group and the six self-attributes. It suppressed the irrelevant variance in age group allowing age group to emerge as an even stronger predictor of each of the self-attributes.

The second model showed that the indirect effects through Rappaport Time Line were significant for only three self-attributes: purpose in life, personal growth and self-acceptance (see Table 3-4). Similar to the findings for the Future Time Perspective Scale, the Rappaport Time Line acted as a suppressor rather than a mediator in the relation between age group and current self-attributes: The direct effects of age group on purpose in life, personal growth and self-acceptance were larger than the total effects of age group on these three self-attributes, indicating suppression.

The third model that analyzed the Future Time Perspective Scale and Rappaport Time Line simultaneously revealed *specific indirect effects* separately for the two mediators, and a *total indirect effect* for both mediators as a combined set. In terms of specific indirect effects, when the Future Time Perspective Scale and Rappaport Time Line were analyzed simultaneously, only the indirect effect through the Future Time Perspective Scale was significant (see Table 3-5). Again in line with suppression, the direct effects of age group on the six self-attributes were

stronger than the total effects of age group on these self-attributes. That is, the Future Time Perspective Scale was a significant suppressor in the effect of age group on all six self-attributes (controlling for Rappaport Time Line and age group), but Rappaport Time Line was not a significant suppressor (controlling for Future Time Perspective Scale and age group). In terms of the total indirect effect of the two mediators (i.e., the specific indirect effect through Future Time Perspective Scale plus the specific indirect effect through Rappaport Time Line), the total indirect effect of age group was significant on only one self-attribute: personal growth. That is, the total indirect effect of age group on personal growth through the two variables was significant with a point estimate of -0.79 , and a 95 % bias corrected bootstrap confidence interval of -1.4539 to -0.1243 . This suggests that the two variables worked together as suppressors in the relation between age group and personal growth, but that the Future Time Perspective Scale, not the Rappaport Time Line, played the suppressor role in relation to the other five self-attributes.

These findings suggest that the Future Time Perspective Scale and the Rappaport Time Line do not act as mediators of the relation between age group and current self-attributes as hypothesized. They do (particularly the Future Time Perspective Scale) play an important role in explaining the relation of age group to current self-attributes. The nature of this role (i.e., suppression), however, is different from the hypothesized expectation of mediation.

Hypothesis 4: Relation of Current Self-Attributes to Memory Content

The first three hypotheses examined adult developmental differences in two aspects of the conceptual self: future time perspective and current self-attributes. Recall that the final hypothesis had a different focus: testing the relation of the conceptual self to autobiographical memory content. Hypothesis 4 provided an empirical test of the self-memory system model (Conway & Pleydell-Pearce, 2000) by examining whether current self-attributes are reflected in

the content of both earliest and recent memories. More specifically, individuals with higher current levels of a particular self-attribute were expected to rate their memories as including higher levels of the content of that attribute. This was expected for all six self-attributes and across both age groups. Note, however, that the effect was predicted to be less evident in earliest memories than in recent memories.

To test this hypothesis, autobiographical memories rather than participants were used as the unit of analysis. The hypothesis was tested with six hierarchical regression analyses conducted separately for the six current self-attributes (see Tables 3-6 – 3-11). The criterion variable was memory content rating (e.g., autonomy content in memories). Sex was included in the initial step of each regression. In the second step, age group (young vs. late midlife), memory type (earliest vs. recent) and current self-attribute (e.g., current autonomy) were entered. In the third step, two-way interaction terms were entered: the interaction between memory type and age group, the interaction between memory type and current self-attribute, and the interaction between age group and current self-attribute. Finally, a three-way interaction term between age group, memory type and current self-attribute was entered. Variables included in interaction terms were centered by subtracting the mean of each variable from the participant's score for that variable.³

Four findings were central to testing hypothesis 4: a significant effect of current self-attributes on memory content, no interaction between current self-attributes and age group, a

³ The six hierarchical regression analyses conducted to test hypothesis 4 were replicated with order of reporting the memories (earliest memory first vs. recent memory first) as an additional predictor. This did not change the pattern of effects found in hypothesis 4, therefore regressions without the order variable are presented for simplicity purposes.

significant interaction between current self-attributes and memory type, and no three-way interaction between current self-attributes, age group and memory type.

As predicted, there was a significant and positive relation between current self-attributes and memory content for all six self-attributes (see Step 4 in Tables 3-6 – 3-11). Overall, individuals with higher levels of current positive relations, purpose in life, personal growth, autonomy, environmental mastery and self-acceptance recalled memories that contained higher levels of these six themes than individuals who scored lower in these self-attributes. Also as expected, the interaction between current self-attributes and age group was non-significant for all six self-attributes (see Step 4 in Tables 3-6 – 3-11), indicating no age differences in the relation between current self-attributes and memory content: The relation between current self-attributes and overall memory content appears to hold for both young and late middle-aged adults. Note that this finding was qualified by a three-way interaction, involving only autonomy, as described below.

The interaction between current self-attributes and memory type was significant for environmental mastery and self-acceptance (see Step 4 in Tables 3-10 and 3-11). Pearson's correlations were thus conducted separately for earliest and recent memories. Results show that for both variables there is a significant correlation between current self-attribute and memory content for the recent but not for the earliest memory. That is, there was no relation between current environmental mastery and environmental mastery content of earliest memories, whereas there was a significant positive relation between current environmental mastery and environmental mastery content of recent memories, $r(394) = .25, p < .001$. Similarly, there was no relation between current self-acceptance and self-acceptance content of earliest memories, but there was a significant positive relation between current self-acceptance and self-acceptance

content of recent memories, $r(395) = .32, p < .001$. In sum, these two significant interactions provide partial support for the hypothesis that the relation between current self-attributes and memory content is less evident in earliest memories than in recent memories. For both age groups, all six self-attributes showed a significant positive relation with the content of recent memories, however only four self-attributes (i.e., positive relations, purpose in life, personal growth and autonomy) were linked with the content of earliest memories.

Finally, the three-way interaction between age group, memory type and current self-attributes was significant, but for only one of the six memory content ratings: autonomy (see Step 4 in Table 3-9). Pearson's correlations were conducted separately for the earliest and recent memories of both young and late middle-aged adults. Findings showed a positive relation between young adults' current levels of autonomy and the autonomy content of their recent memories, $r(278) = .25, p < .001$, but not earliest memories, $r(275) = .10, p > .05$. In contrast, late middle-aged adults' current autonomy was related to their earliest memory content, $r(126) = .28, p < .05$, but was not related to their recent memory content, $r(122) = .16, p > .05$. That is, young and late middle-aged adults' current levels of autonomy related differently to their earliest and recent memory content. Autonomy is the only self-attribute that shows this age difference in the relation between current self-attributes and memory content. The relation of current self-attributes to memory content is the same for young and late middle-aged adults across the other five self-attributes (i.e., positive relations, purpose in life, personal growth, environmental mastery and self-acceptance).

In sum, these four findings generally support hypothesis 4. They show that current self-attributes are significantly associated with the content of memories, that this relationship does not vary across age groups, and that it is somewhat less evident in earliest memories (i.e., current

levels of environmental mastery and self-acceptance are not linked to these two themes in earliest memories). One difference between the two age groups is that young and late middle-aged adults' current autonomy is related differently to their earliest and recent memory content. Aside from this small difference, these findings suggest generally that current self-attributes are associated with the content of autobiographical memories, and that this pattern is quite similar for young and late middle-aged adults.⁴

Other findings that emerged as part of this model but that are not central to this hypothesis will be mentioned briefly. First, age group was a significant predictor of memory content: Younger adults tended to recall memories that included higher levels of positive relations ($B = 1.32$, $SEB = 0.54$), personal growth ($B = 0.94$, $SEB = 0.37$) and environmental mastery content ($B = 1.49$, $SEB = 0.70$) than late middle-aged adults. Second, the two-way interaction between age group and memory type was significant for positive relations and self-acceptance content of memories (see Step 4 in Tables 3-6 and 3-11). Pearson's correlations between memory type (earliest, recent) and memory content (positive relations, self-acceptance) were conducted separately for young and late middle-aged adults to follow-up these significant interactions. Results showed that late middle-aged adults report higher levels of positive relations content in recent than earliest memories, $r(256) = .19$, $p < .05$, but there was no such relation for young

⁴ The six hierarchical regression analyses conducted to test hypothesis 4 were replicated with current self-attribute (e.g., current autonomy) as the criterion variable instead of a predictor. After supporting hypothesis 4 by finding that current self-attributes significantly predict memory content, another aim was to test whether memory content predicts current self-attributes as well. In these reversed set of regression analyses, sex was included in the initial step of each analysis. In the second step, age group, memory type and memory content (e.g., autonomy content of memories) were entered. In the third step, two-way interaction terms were entered, and in the final step the three-way interaction was entered. Results showed that all six memory content themes significantly predicted current self-attributes (e.g., autonomy content in memories significantly predicted current levels of autonomy). This suggests that there is a significant bi-directional relation between current self-attributes and memory content as predicted by the self-memory system model (Conway et al., 2004).

adults, $r(562) = .02, p > .05$. Self-acceptance shows the same pattern: Late middle-aged adults' self-acceptance content was higher in recent than earliest memories, $r(257) = .19, p < .05$, but young adults' self-acceptance content was not related to memory type, $r(564) = .00, p > .05$.

Other minor findings include the relation of sex and memory type to the content of memories. Sex was a significant predictor of only self-acceptance content (see Step 4 in Table 3-11). Men tended to have higher self-acceptance content in their memories than women, $B = -1.20, SEB = 0.58$. Memory type was a significant predictor of purpose in life content ($B = 2.34, SEB = 0.33$), personal growth content ($B = 1.03, SEB = 0.34$), autonomy content ($B = 1.66, SEB = 0.36$) and environmental mastery content ($B = 1.44, SEB = 0.63$). Recent memories were more likely to include all of these content themes than earliest memories.

Table 3-1. Descriptive statistics for current self-attributes in young and late middle-aged adults

| Current Self-Attribute | Young | | Late Middle-Aged | |
|------------------------|----------|-----------|------------------|-----------|
| | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> |
| Positive Relations | 56.52 | 10.61 | 60.25 | 9.60 |
| Purpose in Life | 56.91 | 9.26 | 58.83 | 9.67 |
| Personal Growth | 58.07 | 7.50 | 58.60 | 9.33 |
| Autonomy | 50.84 | 8.14 | 58.02 | 9.33 |
| Environmental Mastery | 51.27 | 9.29 | 57.35 | 9.99 |
| Self-Acceptance | 54.64 | 11.71 | 58.70 | 11.05 |

Note. The maximum possible score for each subscale was 72 (nine items per subscale measured on an 8-point Likert scale). Middle-aged participants scored significantly higher on all current self-attributes except Personal Growth.

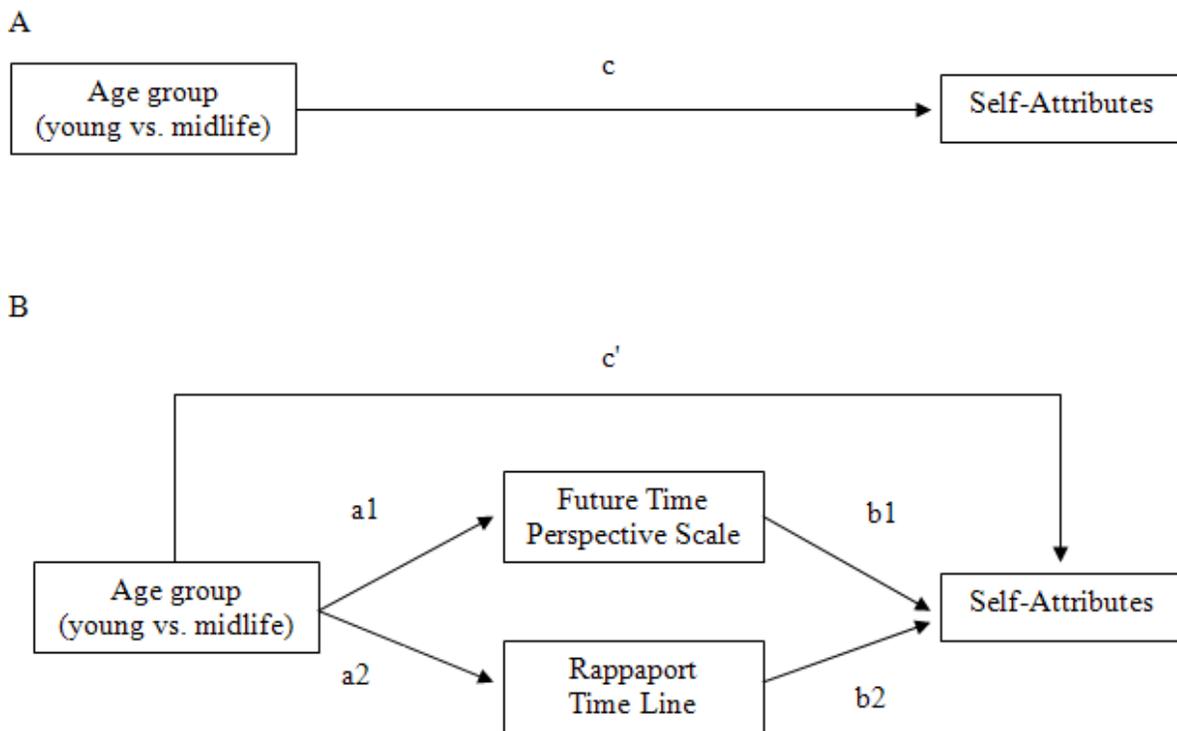


Figure 3-1. Illustration of effects and their weights in mediation models. (A) Direct effect of age group on the six self-attributes. (B) Indirect effect of age group on the six self-attributes through mediators.

Table 3-2. Pearson correlation coefficients between the six self-attributes, the Future Time Perspective Scale, the Rappaport Time Line and age group

| Measure | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|----------------------------|-------|-------|-------|--------|--------|-------|--------|--------|---|
| 1. Positive Relations | - | | | | | | | | |
| 2. Purpose in Life | .52** | - | | | | | | | |
| 3. Personal Growth | .53** | .61** | - | | | | | | |
| 4. Autonomy | .32** | .37** | .42** | - | | | | | |
| 5. Environmental Mastery | .62** | .61** | .45** | .48** | - | | | | |
| 6. Self-Acceptance | .72** | .59** | .53** | .49** | .75** | - | | | |
| 7. Future Time Perspective | .28** | .31** | .33** | .04 | .25** | .35** | - | | |
| 8. Rappaport Time Line | -.08 | -.02 | .04 | -.27** | -.20** | -.07 | .53** | - | |
| 9. Age group | .17** | .10 | .03 | .37** | .29** | .16** | -.43** | -.83** | - |

Note. ** $p < .001$. Age Group: 1 = Young, 2 = Late Midlife.

Table 3-3. Mediation model 1: Future Time Perspective Scale as a single mediator between age group and current self-attributes (5000 bootstrap samples)

| Dependent variable (DV) | Effect of IV on M (a) | Effect of M on DV (b) | Direct effects (c') | Indirect effects (a*b) | Total effects (c) |
|-------------------------|-----------------------|-----------------------|---------------------|------------------------|-------------------|
| Positive Relations | - 2.43* | 0.40* | 1.95* | - 0.97* | 0.98* |
| Purpose in Life | - 2.40* | 0.37* | 1.42* | - 0.97* | 0.53* |
| Personal Growth | - 2.48* | 0.31* | 0.98* | - 0.77* | 0.21 |
| Autonomy | - 2.46* | 0.22* | 2.32* | - 0.54* | 1.79* |
| Environmental Mastery | - 2.38* | 0.41* | 2.50* | - 0.98* | 1.54* |
| Self-Acceptance | - 2.32* | 0.55* | 2.31* | - 1.28* | 1.04* |

Note. IV = Independent variable (i.e., age group). M = Mediator (i. e., Future Time Perspective Scale). Sex was entered as a covariate in all mediation models.

* $p < .05$.

Table 3-4. Mediation model 2: Rappaport Time Line as a single mediator between age group and current self-attributes (5000 bootstrap samples)

| Dependent variable (DV) | Effect of IV on M (<i>a</i>) | Effect of M on DV (<i>b</i>) | Direct effects (<i>c'</i>) | Indirect effects (<i>a*b</i>) | Total effects (<i>c</i>) |
|-------------------------|--------------------------------|--------------------------------|------------------------------|---------------------------------|----------------------------|
| Positive Relations | - 1.31* | 0.63* | 1.81* | - 0.82 | 0.99* |
| Purpose in Life | - 1.31* | 0.65* | 1.38* | - 0.85* | 0.53* |
| Personal Growth | - 1.31* | 0.62* | 1.02* | - 0.81* | 0.21 |
| Autonomy | - 1.30* | 0.32 | 2.21* | - 0.41 | 1.80* |
| Environmental Mastery | - 1.29* | 0.42 | 2.08* | - 0.53 | 1.54* |
| Self-Acceptance | - 1.30* | 0.87* | 2.18* | - 1.13* | 1.06* |

Note. IV = Independent variable (i.e., age group). M = Mediator (i. e., Rappaport Time Line). Sex was entered as a covariate in all mediation models.

* $p < .05$.

Table 3-5. Mediation model 3: Future Time Perspective Scale and Rappaport Time Line as multiple mediators between age group and current self-attributes (5000 bootstrap samples)

| Dependent variable (DV) | Effect of IV on M (<i>a</i>) | Effect of M on DV (<i>b</i>) | Direct effects (<i>c'</i>) | Indirect effects (<i>a*b</i>) | Total effects (<i>c</i>) |
|-------------------------|--------------------------------|--------------------------------|------------------------------|---------------------------------|----------------------------|
| Positive Relations | | | | | |
| Future Time | - 2.43* | 0.41* | 1.74* | - 0.97* | 0.98* |
| Rappaport | - 1.30* | - 0.19 | - | 0.25 | - |
| Purpose in Life | | | | | |
| Future Time | - 2.40* | 0.38* | 1.21* | - 0.91* | 0.53* |
| Rappaport | - 1.31* | - 0.18 | - | 0.24 | - |
| Personal Growth | | | | | |
| Future Time | - 2.47* | 0.31* | 1.00* | - 0.77* | 0.21 |
| Rappaport | - 1.31* | 0.01 | - | - 0.01 | - |
| Autonomy | | | | | |
| Future Time | - 2.46* | 0.22* | 2.18* | - 0.54* | 1.79* |
| Rappaport | - 1.30* | - 0.12 | - | 0.16 | - |
| Environmental | | | | | |
| Future Time | - 2.37* | 0.43* | 2.03* | - 1.01* | 1.54* |
| Rappaport | - 1.29* | - 0.41 | - | 0.53 | - |
| Self-Acceptance | | | | | |
| Future Time | - 2.32* | 0.57* | 1.92* | - 1.32* | 1.06 |
| Rappaport | - 1.30* | - 0.34 | - | 0.44 | - |

Note. IV = Independent variable (i.e., age group). M = Mediator (i. e., Future Time Perspective Scale, Rappaport Time Line). Sex was entered as a covariate in all mediation models.

* $p < .05$.

Table 3-6. Hierarchical multiple regression analysis predicting positive relations content of all memories (N = 791)

| | B | SE B | β | <i>t</i> |
|----------------------|-------|------|---------|----------|
| Step 1 | | | | |
| Sex | .00 | .52 | .00 | .00 |
| Step 2 | | | | |
| Sex | -.92 | .52 | -.06 | -1.78 |
| Age | 1.22 | .54 | .08 | 2.28* |
| Memory Type | 1.10 | .49 | .08 | 2.26* |
| Positive Relations | .17 | .02 | .26 | 7.14** |
| Step 3 | | | | |
| Sex | -.92 | .52 | -.06 | -1.79 |
| Age | 1.33 | .54 | .09 | 2.46* |
| Memory Type | 1.13 | .49 | .08 | 2.34* |
| Positive Relations | .18 | .03 | .26 | 7.30** |
| Memory Type*Positive | .05 | .05 | .04 | 1.11 |
| Age*Positive | -.07 | .05 | -.05 | -1.37 |
| Age*Memory Type | -2.50 | 1.07 | -.08 | -2.35* |
| Step 4 | | | | |
| Sex | -.91 | .51 | -.06 | -1.77 |
| Age | 1.32 | .54 | .09 | 2.44* |
| Memory Type | .96 | .49 | .07 | 1.94* |
| Positive Relations | .18 | .03 | .26 | 7.31** |
| Memory Type*Positive | .07 | .05 | .05 | 1.37 |
| Age*Positive | -.07 | .05 | -.05 | -1.37 |
| Age*Memory Type | -2.14 | 1.08 | -.07 | -1.99* |
| Age*Positive*Memory | -.21 | .11 | -.07 | -1.94* |

Note. $R^2 = .00$ for Step 1 ($p > .05$); $\Delta R^2 = .07$ for Step 2 ($p < .05$); $\Delta R^2 = .01$ for Step 3 ($p < .05$); $\Delta R^2 = .00$ for Step 4 ($p > .05$).

* $p < .05$, ** $p < .001$. Age Group: 1 = Late Midlife, 2 = Young.

Table 3-7. Hierarchical multiple regression analysis predicting purpose in life content of all memories (N = 800)

| | B | SE B | β | <i>t</i> |
|---------------------|-------|------|---------|----------|
| Step 1 | | | | |
| Sex | .06 | .35 | .01 | .18 |
| Step 2 | | | | |
| Sex | -.21 | .34 | -.02 | -.62 |
| Age | -.02 | .36 | -.00 | -.04 |
| Memory Type | 2.29 | .33 | .24 | 7.01** |
| Purpose in Life | .09 | .02 | .18 | 5.08** |
| Step 3 | | | | |
| Sex | -.15 | .34 | -.02 | -.44 |
| Age | .01 | .36 | .00 | .03 |
| Memory Type | 2.30 | .33 | .24 | 7.05** |
| Purpose in Life | .09 | .02 | .18 | 5.06** |
| Memory Type*Purpose | -.03 | .04 | -.03 | -.82 |
| Age*Purpose | -.05 | .04 | -.04 | -1.25 |
| Age*Memory Type | -1.02 | .71 | -.05 | -1.44 |
| Step 4 | | | | |
| Sex | -.15 | .34 | -.02 | -.44 |
| Age | .01 | .36 | .00 | .04 |
| Memory Type | 2.34 | .33 | .24 | 7.12** |
| Purpose in Life | .09 | .02 | .18 | 5.07** |
| Memory Type*Purpose | -.03 | .04 | -.03 | -.82 |
| Age*Purpose | -.05 | .04 | -.04 | -1.26 |
| Age*Memory Type | -1.08 | .71 | -.05 | -1.52 |
| Age* Purpose*Memory | .08 | .08 | .04 | 1.09 |

Note. $R^2 = .00$ for Step 1 ($p > .05$); $\Delta R^2 = .09$ for Step 2 ($p < .05$); $\Delta R^2 = .00$ for Step 3 ($p > .05$); $\Delta R^2 = .00$ for Step 4 ($p > .05$).

* $p < .05$, ** $p < .001$. Age Group: 1 = Late Midlife, 2 = Young.

Table 3-8. Hierarchical multiple regression analysis predicting personal growth content of all memories (N = 795)

| | B | SE B | β | <i>t</i> |
|----------------------|------|------|---------|----------|
| Step 1 | | | | |
| Sex | .30 | .36 | .03 | .80 |
| Step 2 | | | | |
| Sex | -.12 | .36 | -.01 | -.33 |
| Age | .96 | .37 | .09 | 2.58* |
| Memory Type | 1.03 | .34 | .10 | 2.98* |
| Personal Growth | .13 | .02 | .21 | 5.84** |
| Step 3 | | | | |
| Sex | -.16 | .36 | -.02 | -.44 |
| Age | .94 | .37 | .09 | 2.54* |
| Memory Type | 1.03 | .34 | .10 | 2.99* |
| Personal Growth | .13 | .02 | .22 | 6.08** |
| Memory Type*Personal | .04 | .04 | .03 | .89 |
| Age*Personal | .08 | .04 | .06 | 1.80 |
| Age*Memory Type | -.12 | .74 | -.01 | -.15 |
| Step 4 | | | | |
| Sex | -.16 | .36 | -.02 | -.44 |
| Age | .94 | .37 | .09 | 2.54* |
| Memory Type | 1.03 | .34 | .10 | 2.99* |
| Personal Growth | .13 | .02 | .22 | 6.08** |
| Memory Type*Personal | .04 | .04 | .03 | .89 |
| Age*Personal | .08 | .04 | .06 | 1.80 |
| Age*Memory Type | -.12 | .74 | -.01 | -.17 |
| Age*Personal*Memory | .05 | .09 | .02 | .52 |

Note. $R^2 = .00$ for Step 1 ($p > .05$); $\Delta R^2 = .06$ for Step 2 ($p < .05$); $\Delta R^2 = .00$ for Step 3 ($p > .05$); $\Delta R^2 = .00$ for Step 4 ($p > .05$).

* $p < .05$, ** $p < .001$. Age Group: 1 = Late Midlife, 2 = Young.

Table 3-9. Hierarchical multiple regression analysis predicting autonomy content of all memories (N = 799)

| | B | SE B | β | <i>t</i> |
|----------------------|-------|------|---------|----------|
| Step 1 | | | | |
| Sex | .02 | .35 | .00 | .06 |
| Step 2 | | | | |
| Sex | .16 | .34 | .02 | .46 |
| Age | .64 | .39 | .06 | 1.64 |
| Memory Type | 1.37 | .34 | .14 | 4.10** |
| Autonomy | .11 | .02 | .21 | 5.58** |
| Step 3 | | | | |
| Sex | .16 | .34 | .02 | .47 |
| Age | .69 | .40 | .07 | 1.72 |
| Memory Type | 1.38 | .34 | .14 | 4.13** |
| Autonomy | .11 | .02 | .20 | 5.48** |
| Memory Type*Autonomy | .02 | .04 | .02 | .62 |
| Age*Autonomy | -.03 | .04 | -.02 | -.61 |
| Age*Memory Type | -1.05 | .78 | -.05 | -1.35 |
| Step 4 | | | | |
| Sex | .16 | .34 | .02 | .46 |
| Age | .68 | .40 | .07 | 1.70 |
| Memory Type | 1.66 | .36 | .17 | 4.64** |
| Autonomy | .11 | .02 | .20 | 5.47** |
| Memory Type*Autonomy | .03 | .04 | .03 | .85 |
| Age*Autonomy | -.02 | .04 | -.02 | -.60 |
| Age*Memory Type | -1.46 | .80 | -.07 | -1.83 |
| Age*Autonomy*Memory | .18 | .08 | .08 | 2.16* |

Note. $R^2 = .00$ for Step 1 ($p > .05$); $\Delta R^2 = .06$ for Step 2 ($p < .05$); $\Delta R^2 = .00$ for Step 3 ($p > .05$); $\Delta R^2 = .01$ for Step 4 ($p < .05$).

* $p < .05$, ** $p < .001$. Age Group: 1 = Late Midlife, 2 = Young.

Table 3-10. Hierarchical multiple regression analysis predicting environmental mastery content of all memories (N = 789)

| | B | SE B | β | <i>t</i> |
|-------------------------|-------|------|---------|----------|
| Step 1 | | | | |
| Sex | -.48 | .63 | -.03 | -.76 |
| Step 2 | | | | |
| Sex | -.76 | .62 | -.04 | -1.22 |
| Age | 1.39 | .69 | .07 | 2.02* |
| Memory Type | 1.66 | .60 | .10 | 2.74* |
| EnvironmentalMastery | .15 | .03 | .17 | 4.66** |
| Step 3 | | | | |
| Sex | -.76 | .62 | -.04 | -1.22 |
| Age | 1.48 | .70 | .08 | 2.12* |
| Memory Type | 1.68 | .60 | .10 | 2.80* |
| EnvironmentalMastery | .15 | .03 | .17 | 4.67** |
| Memory Type*Environment | .14 | .06 | .08 | 2.19* |
| Age*Environment | -.05 | .07 | -.03 | -.73 |
| Age*Memory Type | -2.65 | 1.36 | -.07 | -1.94 |
| Step 4 | | | | |
| Sex | -.75 | .62 | -.04 | -1.21 |
| Age | 1.49 | .70 | .08 | 2.12* |
| Memory Type | 1.44 | .63 | .08 | 2.29* |
| EnvironmentalMastery | .15 | .03 | .17 | 4.68** |
| Memory Type*Environment | .14 | .06 | .08 | 2.15* |
| Age*Environment | -.05 | .07 | -.03 | -.74 |
| Age*Memory Type | -2.24 | 1.40 | -.06 | -1.60 |
| Age*Environment*Memory | -.18 | .14 | -.05 | -1.32 |

Note. $R^2 = .00$ for Step 1 ($p > .05$); $\Delta R^2 = .04$ for Step 2 ($p < .05$); $\Delta R^2 = .01$ for Step 3 ($p < .05$); $\Delta R^2 = .00$ for Step 4 ($p > .05$).

* $p < .05$, ** $p < .001$. Age Group: 1 = Late Midlife, 2 = Young.

Table 3-11. Hierarchical multiple regression analysis predicting self-acceptance content of all memories (N = 789)

| | B | SE B | β | <i>t</i> |
|------------------|-------|------|---------|----------|
| Step 1 | | | | |
| Sex | -.78 | .59 | -.05 | -1.33 |
| Step 2 | | | | |
| Sex | -1.22 | .58 | -.07 | -2.11* |
| Age | 1.04 | .62 | .06 | 1.68 |
| Memory Type | .89 | .56 | .06 | 1.59 |
| Self-Acceptance | .15 | .03 | .21 | 5.97** |
| Step 3 | | | | |
| Sex | -1.20 | .58 | -.07 | -2.09* |
| Age | 1.02 | .62 | .06 | 1.64 |
| Memory Type | .94 | .56 | .06 | 1.69 |
| Self-Acceptance | .15 | .02 | .21 | 6.01** |
| Memory Type*Self | .15 | .05 | .11 | 3.10* |
| Age*Self | -.00 | .05 | -.00 | -.08 |
| Age*Memory Type | -2.44 | 1.23 | -.07 | -1.99* |
| Step 4 | | | | |
| Sex | -1.20 | .58 | -.07 | -2.09* |
| Age | 1.02 | .62 | .06 | 1.64 |
| Memory Type | .96 | .57 | .06 | 1.69 |
| Self-Acceptance | .15 | .02 | .21 | 6.01** |
| Memory Type*Self | .15 | .05 | .11 | 3.07* |
| Age*Self | -.00 | .05 | -.00 | -.08 |
| Age*Memory Type | -2.48 | 1.24 | -.07 | -2.00* |
| Age*Self*Memory | .02 | .11 | .01 | .19 |

Note. $R^2 = .00$ for Step 1 ($p > .05$); $\Delta R^2 = .05$ for Step 2 ($p < .05$); $\Delta R^2 = .02$ for Step 3 ($p < .05$); $\Delta R^2 = .00$ for Step 4 ($p > .05$).

* $p < .05$, ** $p < .001$. Age Group: 1 = Late Midlife, 2 = Young.

CHAPTER 4 DISCUSSION

The study combined a life span developmental perspective (Baltes, 1997) with the self-memory system model of autobiographical memory (SMS model; Conway & Pleydell-Pearce, 2000) to examine how individuals' current conceptual self guides their recall of autobiographical memories. One major goal of the study was to examine adult development by demonstrating age differences in young and late middle-aged adults' current conceptual self: Those in late midlife reported higher levels of all self-attributes and also reported that they saw future time as more limited and as holding less opportunity. Further, findings showed that future time perspective plays a significant role as a suppressor in the relation between age group and current self-attributes. Understanding age differences in the conceptual self was important in adding a developmental perspective to the original SMS model.

Another major goal was to test the SMS model. The study found support for the model using recent memories, but also challenged the model with a novel and stringent test examining the link between the current conceptual self and earliest childhood memories. The SMS model provides a general consideration of the relation of the conceptual self to memory content, without notice that different types of memories (e.g., very distant vs. recent) may show different patterns of relations. The current study showed that the relation between the current conceptual self and memory content is less evident in earliest memories than recent memories. Although it is less evident, there is still a link between the current conceptual self and earliest memories. This finding contributed to the debate on the emergence of autobiographical memories (i.e., offset of childhood amnesia). Findings also extended the SMS model by showing that young and late middle-aged adults, although they have *different content* in the conceptual self (i.e., future time

perspective and self-attributes), show the *same pattern of relation* between their current conceptual self and content of their autobiographical memories.

These findings are discussed in more detail below in two sections: (i) differences in the conceptual self in young adulthood and late midlife, and (ii) the relation between current self-attributes and autobiographical memory content as a test of the self-memory system model (Conway & Pleydell-Pearce, 2000) and as a contribution to the debate on why earliest memories are recalled. Study limitations are then discussed, and a final section provides some overall conclusions.

Adult Development and the Conceptual Self: Future Time Perspective and Self-Attributes

The conceptual self is a major component of the self-memory system (Conway & Pleydell-Pearce, 2000). The current study examined two aspects of the conceptual self expected to show developmental variation (Ryff, 1989b; Staudinger & Bluck, 2001): future time perspective and self-attributes (see Figure 1-1). As well as demonstrating age differences in these two aspects, the study examined whether future time perspective mediated the relation between one's age group and current self-attributes (see the first three boxes in Figure 1-2 for the conceptual model).

Relation of Age Group to Future Time Perspective

The study examined future time perspective as an aspect of the current conceptual self likely to show variation across adult age groups. Individuals in late midlife reported a less open-ended future time perspective than young adults on both future time perspective measures: the Rappaport Time Line (Rappaport et al., 1985) which is a straightforward measure of one's subjective sense of position in the life span, as well as the Future Time Perspective Scale (Carstensen & Lang, 1996) which assesses subjective time left to live (similar to Rappaport Time Line), but also includes optimism about the future. Individuals in late midlife are not only aware

that they are temporally closer to the end of their lives, but perceive the future as having fewer opportunities than young adults. These findings support classic theories suggesting that midlife is governed by an internal social clock that reminds individuals that they are ‘in the middle’ and that life has an ending (Jung, 1933; Neugarten, 1996).

These findings are also in line with other studies documenting changes in time perspective across the life span. Midlife is the developmental stage when awareness of the finitude of life emerges for the first time, and particularly late midlife is the phase when a shift to a more limited future time perspective occurs (Heckhausen, 2001). For example, Gould (1972) asked adults to rate the item “There is still plenty of time to do most of the things I want to do” and showed that endorsement of this item dropped between ages 35 and 40, and then remained stable throughout the 50s. Cate and John (2007) showed that women in their twenties focused more on opportunities for the future than either women in early-midlife (40-49 years) or late-midlife (50-60 years). As such, it appears that late midlife is a time when individuals recognize that the future is limited, even as compared to those in early midlife (Cate & John, 2007). The current study embraced this two-phase perspective on midlife, focusing on late midlife as a time when individuals are likely to have crossed the boundary of realizing that there is now more life lived than left to live (Neugarten, 1996). This is in line with socioemotional selectivity theory (Carstensen, 1993, 1995). The theory suggests that young adults have an expansive future time perspective leading them to hold knowledge-oriented goals, whereas older individuals have a constrained future time perspective leading them to focus on emotional goals (Fredrickson & Carstensen, 1990; Lang & Carstensen, 1994). Midlife is the developmental stage when time perspective is changing and the crossover between knowledge-oriented and emotion-oriented goals occurs (Carstensen & Turk-Charles, 1994).

All of these findings, including those of the current study, support the conceptualization of midlife as a period in which time perspective shifts: Adults realize that time will eventually run out and that life does not present limitless opportunities. This sense of time perspective is one aspect of the conceptual self that varies across adulthood. The next section focuses on age group differences in current self-attributes.

Relation of Age Group to Current Self-Attributes

Study findings also demonstrate developmental differences in another aspect of the conceptual self: one's current self-attributes. Largely as predicted, those in late midlife report higher levels of autonomy, environmental mastery and purpose in life than young adults. Individuals in young adulthood face the Eriksonian developmental task of forming a coherent identity and resolving the intimacy-isolation crisis. Middle-aged adults have moved beyond a focus on their self and finding a partner, to broaden their commitments to family, work, society and future generations (Erikson, 1959; McAdams, 2001). Midlife involves many family and work roles and duties that need to be juggled (Heckhausen, 2001). As such, it is unsurprising that middle-aged individuals show greater autonomy in decision-making, stronger feelings that they have an impact on their environment, and a greater sense of purpose concerning how their life is proceeding. These findings are also in line with theories of adult personality development (Erikson, 1959; Gould, 1978; Levinson, 1978) and previous empirical research (Ryff, 1989a) suggesting that midlife is characterized by considerable complexity. It is a time when adults must move nimbly and competently ahead in a variety of domains of life (Heckhausen, 2001; Neugarten, 1973). Previous research suggests that midlife is in some ways the peak of life, when individuals have skills such as the ability to handle stress, be productive, show social responsibility (Lachman, Ziff, & Spiro, 1994), and excel in both everyday problem solving and life-problem solving (Heckhausen, 2001; Staudinger & Bluck, 2001).

The current demonstration of higher autonomy, environmental mastery, purpose in life in late midlife fit well with previous theory and literature. Past research has been inconsistent, however, about age group differences in two self-attributes: positive relations with others and self-acceptance. Some studies have found no age differences, whereas others showed that older adults report greater positive relations and self-acceptance than both young and middle-aged adults (Ryff, 1989b; Ryff, 1991; Ryff & Keyes, 1995). In order to more clearly examine the differences between young and middle-aged adults, the current study purposely sampled a late middle-aged group which was expected to be more similar to older adults. Indeed, the late middle-aged group in this study was similar to older adults, showing higher levels of positive relations with others and greater self-acceptance than young adults. This suggests that late middle-aged adults are more positive in both self-evaluation (self-acceptance) and other-evaluation (positive relations with others) than young adults. The self-acceptance findings are in line with previous research showing that discrepancies between the actual and the ideal self are greater for young adults than for middle-aged individuals (Okun, Dittburner, & Huff, 2006). The positive relations findings are consistent with research showing that middle-aged adults are more likely to focus on emotionally meaningful goals in social relations (Fung, Carstensen, & Lang, 2001) and more likely to attend to and recall positive information and positive events than young adults (Charles, Mather, & Carstensen, 2003). Having positive relations with one's self and with others bodes well for those in midlife. Positive relationships (especially with family and friends) are the strongest predictor of middle-aged adults' current well-being, whereas daily activities are the strongest predictor for young adults (Ryff & Heidrich, 1997). In sum, these findings help to clarify past work that showed mixed results, potentially due to the wide age range previously

used to define midlife. The current study demonstrates that younger adults report less positive relations with both self and others than do those in late midlife.

Note that there were also exceptions to the predicted pattern of developmental differences. Young adults were expected to have higher levels of purpose in life and personal growth than middle-aged people. This was based on life span developmental theory suggesting that young adulthood is the developmental stage when allocation of resources are directed towards growth (Baltes, 1987, 1997). The theory suggests there are three aspects of life span development: growth, maintenance (including recovery), and regulation of loss (Baltes, 1997; Staudinger, Marsiske, & Baltes, 1995). Each of these is present in all phases of life. In the second half of life, however, due to an overall age-related decline in biological and sensory-cognitive resources, there is a gradual shift in the proportion of gains to losses such that losses become greater than gains by late adulthood (Baltes, 1987, 1997; Labouvie-Vief, 1981). Thus, young adults were expected to show more purpose in life and personal growth because they are in a developmental stage focused on growth and gain, particularly as compared to those in late midlife.

Past research shows that young (18-29 years) and middle-aged adults (30-64 years) express higher personal growth and purpose in life than do older adults (over 64 years; Ryff, 1989b; Ryff, 1991; Ryff & Keyes, 1995). We had expected that, because the study particularly focused on late midlife, the pattern for young as compared to older adults would be replicated in the current sample of late middle-aged adults. This was not the case: this late middle-aged sample reported higher purpose in life than young adults, and there were no age differences in personal growth. Thus, it appears that while older adults may show lower levels of purpose and growth orientation, these attributes remain strong across both early and late midlife. Ebner, Freund and

Baltes (2006) showed a similar pattern of results for personal goal orientation: Young adults had a stronger orientation towards growth than towards maintenance of resources or regulation of losses and declines. Middle-aged adults showed an increase in goal orientation toward maintenance and prevention of losses, but like in the current study, still reported a primary focus on growth. This suggests that although adults may start expecting losses and considering ways to maintain current resources in late midlife, they experience personal growth at levels similar to young individuals and have more purpose in life than the younger generations.

In conclusion, current self-attributes are a part of one's conceptual self that vary according to one's age group. Those in late midlife show higher scores on a variety of positive and advantageous characteristics including autonomy, self-acceptance, environmental mastery, purpose in life and positive relations (Ryff, 1989a; 1989b; Keyes & Ryff, 1999). Research also shows that life satisfaction continues to increase towards the end of midlife (approximately age 65; Lachman, Röcke, Rosnick, & Ryff, 2008; Mroczek & Spiro, 2005). Together, these findings suggest that midlife is not a period of decline or crisis as per current stereotypes, but a period in which an individual has developed many positive self-attributes. In contrast, young adulthood is the period of learning and practicing the necessary knowledge and skills to master adult life (Staudinger & Kunzmann, 2005), with the expectation that through effort and experience one can achieve higher "future" and "ideal" levels of the six self-attributes (Ryff, 1991; Ryff & Heidrich, 1997).

Findings reviewed thus far show that those in late midlife differ from younger adults in two aspects of the conceptual self (i.e., future time perspective and self-attributes). Note that these aspects provide a complex picture of the conceptual self in different stages: Future time perspective is becoming less open in time, but individuals are showing high levels of positive

self-attributes in late midlife. In contrast, in young adulthood, the future appears open and limitless, but the individual displays lower levels of positive self-attributes. The next section examines this complex set of relations in more detail to further understand development in young adulthood and late midlife.

The Role of Age and Future Time Perspective in Predicting Current Self-Attributes.

Many psychological outcomes vary by age group, and chronological age is an important and widely-used variable in life span developmental research. It is also, however, a rather clumsy and abstract variable as it represents only lived time since birth in a numerical sense. For example, although the study showed that age group is related to current self-attributes, there may be variables related to age that are more proximal to self-attributes, and are better able to explain why individuals in different age groups have different levels of these attributes. In the conceptual model developed for this study (see Figure 1-2), future time perspective was added as a proximal psychological variable that might elucidate why adults in late midlife have higher levels of these positive self-attributes than those in young adulthood.

Two measures of future time perspective were used to assess both subjective sense of position in the life span (Rappaport Time Line; Rappaport et al., 1985), and feelings about how open-ended the future is and what opportunities it may hold (Future Time Perspective Scale; Carstensen & Lang, 1996). As such, three assessments of one's place in the life span were made: objective chronological age, sense of life span position, and feelings about the future.

Mediation analyses examined whether the two future time perspective measures were important in the pathway between objective chronological age and self-attributes. Indeed, findings showed that time perspective had a significant impact, but it was a suppression effect rather than a mediation effect (Davis, 1985). That is, instead of decreasing the validity of age group for predicting current self-attributes, future time perspective increased the predictive

validity of age group (i.e., future time perspective suppressed the criterion-irrelevant variance in age group) and this occurred for all of the six self-attributes. Note that the Future Time Perspective Scale, assessing feelings that the future is open and offers opportunities, best demonstrated this suppression effect. That is, when the two future time perspective measures were assessed as multiple mediators in one model, the Future Time Perspective Scale attenuated the effect of the Rappaport Time Line and acted as the only suppressor for all six self-attributes. As this multiple mediators model is the most informative and parsimonious model, findings from only this model are interpreted below. This suggests that subjective location in the life span (Rappaport Time Line) is not crucial in the relation between age group and self-attributes. It is an awareness of one's place in the life span in combination with 'optimistic feelings' about the future that shows a meaningful effect on the relation between age group and self-attributes.⁵

The suppression effect occurred in the same manner across all six self-attributes: Age group is negatively associated with optimistic feelings about the future. That is, young adults have a more open-ended and positive view of the future than late middle-aged adults. Holding such positive feelings about the future is related to having higher levels of positive self-attributes *independent of one's age*. That is, regardless of whether one is in young adulthood or midlife, having an optimistic and open future time perspective is positively associated with higher levels of all self-attributes. Finally, age group is also positively related to all six self-attributes, and the inclusion of positive feelings about the future into the model bolsters this relation of age group to

⁵ When the Future Time Perspective Scale was tested as a single mediator, it acted as a suppressor for all six self-attributes, whereas when the Rappaport Time Line was tested as a single mediator, it did not act as a suppressor for positive relations, autonomy and environmental mastery. For purpose in life, personal growth and self-acceptance, both the Rappaport Time Line and the Future Time Perspective Scale act as single suppressors. That is, these self-attributes are affected by both subjective location in the life span and positive view of future, whereas positive relations, autonomy and environmental mastery are not affected by subjective location in the life span.

the self-attributes. That is, when optimistic future orientation is accounted for, age group shows an even stronger relation to self-attributes (through the suppression of criterion-irrelevant variance in age group which makes age group a purer predictor of self-attributes).

These findings suggest that chronological age and future time perspective act as opposing forces for both age groups. For late middle-aged adults, chronological age acts as an advantage and provides them with high levels of self-attributes (gained through maturation and life experience), however their limited future time perspective diminishes the positive effect of their age on their self-attributes. That is, late middle-aged adults' less open future perspective works against them and attenuates the 'self-attribute-enhancing effect' of their current age. When future time perspective is accounted for, however, the negative effect of their limited perspective disappears, and their age shows its actually stronger positive effect on self-attributes. This indicates a compensatory effect of chronological age: Late middle-aged adults may benefit from coping strategies to compensate for their limited future view and to eliminate its negative effects on their self-attributes. To the extent that late middle-aged adults can compensate for their negative future time perspective, they can enhance their self-attributes more. Some unmeasured factors associated with being middle-aged may be helping them compensate for the realization that they are closer to death with fewer opportunities ahead of them.

This interpretation is in line with the model of selective optimization with compensation (SOC model; Baltes & Baltes, 1990; Freund & Baltes, 2000; Marsiske, Lang, Baltes, & Baltes, 1995). The SOC model, suggests that selection, optimization and compensation are three strategies inherent in any developmental process. Successful development requires an efficient coordination of these three strategies to respond to available resources by focusing on the maximization of growth (gains) and the minimization of losses across the life span (Marsiske et

al., 1995). Late midlife is a period when selection and compensation are important to maintain adequate levels of functioning and to continue to experience gains in some domains (Baltes & Carstensen, 1996; Marsiske et al., 1995; see also Brandtstädter & Greve, 1994). In the second half of life, adults begin to more frequently use compensation or an accommodative coping strategy (Brandtstädter & Renner, 1992) by adjusting their personal goals and standards to their actual functioning levels. This strategy is especially used when losses and declines related to aging are uncontrollable or irreversible such as the realization of the finitude of life and a shorter time left to live (Wentura & Brandtstädter, 2003). Late middle-aged adults may begin to use compensation strategies such as positive reappraisals (i.e., seeing the positive sides of developmental losses such as a more limited time perspective) in order to maintain their high levels of positive self-attributes. Research shows that although such secondary control strategies are not preferred by young adults and are negatively related with young adults' well-being, they are more frequently used by middle-aged people and are positively related with middle-aged people's well-being (Wrosch, Heckhausen, & Lachman, 2000). This suggests that such control strategies gained through aging help midlife adults to compensate for their diminishing time perspective and keep their self-attributes high. This notion that individuals can control age-related changes through psychological mechanisms is in line with previous research showing that a majority of Americans believe that they have control over many domains of life, including aging and its negative aspects. For example, 84% of Americans believe that there are things they can do to control the aging process (Lachman, 2006).

For young adults, the same opposing forces are evident, but in the opposite direction. Young adults have a more open-ended and positive future view than older adults, but they lack the accumulated life experiences that come with age. As chronological age is a much stronger

predictor of current self-attributes than positive feelings about the future, young adults are disadvantaged and they have lower levels of self-attributes due to their young age. Unlike middle-aged adults, they cannot compensate for their future time perspective which is already limitless and positive. They just need to go through the natural stages of development and age in order to reach the self-attribute levels of adults in midlife. As previous research has shown (Ryff, 1989a, 1991) growing older and potentially gaining life experience (Clark-Plaskie & Lachman, 1999) increases one's positive relations with others, self-acceptance, sense of autonomy, environmental mastery and purpose in life. This suggests that one's current age determines their levels of self-attributes, and a positive future view can further enhance these attributes. All of the self-attributes accumulate with age and maturation (potentially due to life experience), but in addition, having a positive and optimistic future time perspective is associated with higher levels of attributes. Young adults are in an early developmental stage in which they have not benefited from such life experiences or maturation, but they realize that they have an open-ended future in which to still grow and enhance their self-attributes.

Note however, that regardless of their current age, all individuals benefit from feeling that the future is positive and open-ended. This reflects the fact that not every middle-aged person has a narrow and pessimistic time perspective, and similarly not every young person has a very open-ended time perspective. In sum, chronological age has a stronger impact on current self-attributes than positive feelings about the future, but both young and late middle-aged people benefit from an open-ended and positive future time perspective to enhance their self-attributes even more. It seems like these attributes are strongly shaped by the past and how much has been experienced already, but they are also influenced by feelings about the future and how much time there is left to live.

Suppression effects in relation to predicted results. As discussed above, the suppression effect of future time perspective was evident for all six self-attributes, however in relation to the study predictions, this effect challenged the hypotheses in different ways. Thus, having reviewed the actual study findings, it seemed prudent to simply mention how they differ from expected effects (see Figure 4-1). There were no specific study hypotheses concerning the relation of future time perspective to self-attributes, but the study had expected to find a negative relation between future time perspective and positive relations and self-acceptance. Note, however, that a more open-ended future time perspective was positively (not negatively) associated with adults' feelings that they have positive relations with others and their degree of self-acceptance (see Figure 4-1A). Regarding purpose in life and personal growth, it was hypothesized that chronological age would be negatively associated with these two self-attributes. It was found, however, that being in the late midlife group was positively related to having a purpose in life and experiencing personal growth (see Figure 4-1B). Finally, autonomy and environmental mastery were not expected to be influenced by future time perspective at all, but results revealed a positive relation between future time perspective and these two self-attributes (see Figure 4-1C).

Summary: Adult Development and the Conceptual Self

Individuals in late midlife report higher levels of a number of positive self attributes, and a shortening view of time left to live in relation to their younger counterparts. Although current age is a better predictor of self-attributes than future time perspective, to the extent that individuals feel that the future is open and offers opportunity, this sense of time is also related to more positive self-attributes. In combination, these findings contribute to the adult development literature, particularly the relatively sparse literature on midlife development (Lachman & Bertrand, 2001). The findings highlight how both maturation in time, and optimism about the

future enhance one's current sense of self. Ryff (1989a) has interpreted these positive self-attributes as components of psychological well-being. Indeed, high levels of autonomy, self-acceptance, environmental mastery, purpose in life and positive relations represent advantageous adult characteristics. This suggests that adults in late middle-age experience higher well-being than young adults (Ryff, 1989a; 1989b; Keyes & Ryff, 1999). Despite stereotypes, research shows that aging is not related to negative affect, depression or decreases in well-being or life satisfaction (Brandtstädter, Wentura, & Greve, 1993; Westerhof & Barrett, 2005). In particular, middle-aged adults constitute the powerful group in the society who are the norm-bearers and the decision makers who to some extent control the other age groups (Neugarten, 1973). They have many roles which help to increase their sense of responsibility and self efficacy (Clark-Plaskie & Lachman, 1999). Although midlife is also a time of high stress due to multiple roles and duties and little time for leisure, middle-aged adults peak in competence and ability to handle stress (Clark-Plaskie & Lachman, 1999). In sum, although adults in midlife have more limited and negative views of the future than young adults, they still have more positive self-attributes than young adults, and they can use certain strategies to compensate for their shortened time left to live, and thereby enhance their self-attributes even more.

Findings discussed thus far have demonstrated that individuals in young adulthood and late midlife show differences in both time perspective and current self-attributes, important features of the conceptual self. The next section discusses whether these different conceptual selves are represented in the content of autobiographical memories that people have about themselves in recent times and in early childhood.

Testing the Self-Memory System Model

The discussion thus far has focused on adult development, particularly the relation of age to the make-up of adults' conceptual self (i.e., future time perspective and self-attributes). In

particular, the outcome variable of interest in the mediation models was current self-attributes, which was expected to shape memory content as per the self-memory system model (Conway & Pleydell-Pearce, 2000). Recall that the SMS model predicts that the conceptual self shapes autobiographical remembering (see last two boxes in Figure 1-2). This study tested the self-memory system model by investigating the relation between the current conceptual self and the memory content of both recent memories and earliest childhood memories. Little previous research has tested the model (Conway & Holmes, 2004; Ross & Wilson, 2002; Woike, 1994a; 1994b). None of the previous studies examined the effect of the conceptual self on earliest childhood memories, and none have taken an adult developmental perspective, comparing the relation of self to memory in different age groups. The current study addressed these gaps in the literature.

Relation of Current Self-Attributes to Memory Content

The SMS model suggests that individuals' current conceptual self guides the retrieval of individual memories, thereby shaping the content of what is currently recalled (Conway et al., 2004). This claim was supported: people who currently report having higher levels of positive relations, purpose in life, personal growth, autonomy, environmental mastery and self-acceptance recall memories that contain higher levels of these six themes than people who score lower in these self-attributes. Independent of one's current age (i.e., young adult vs. late middle-aged adult) and the type of memory recalled (i.e., earliest vs. recent), individuals' current self-attributes are reflected in the content of their memories.

The Reconstructive Nature of Autobiographical Memory

These findings support the reconstructive nature of autobiographical memory (Conway, 2005) on which the self-memory system model (Conway et al., 2004) is based. The model suggests that autobiographical memories are not stored in the brain as holistic and static

representations of the past, but are constructed at retrieval from abstract representations of our past experiences (Mace, 2007). Memories are constructed during retrieval in accordance with the current goals and needs of the rememberer (Bluck, Alea, & Demiray, in press). They are produced not just by a memory system but an integrated self-memory system. That is, memories emerge from the intersection of two competing demands: the need to record accurate goal activity and reflect reality (i.e., adaptive correspondence), and the need to maintain a coherent and stable record of the self's interaction with the world (i.e., self coherence; Conway et al., 2004). Due to this reconstructive, integrative memory system, human beings have a tendency to gently shape the recall of past events to confirm their current identity, thereby maintaining self-coherence (Wilson & Ross, 2003). In the current study, for example, a highly autonomous person when asked to recall a memory tends to recall a time in which they felt autonomous. A person currently low in autonomy may have fewer high autonomy memories to choose from, but also retrieves memories that are consistent with the current conceptual self which has low autonomy.

The SMS model illustrates how the conceptual self affects the content and structure of retrieved memories, but *why* are memories constructed during retrieval in accordance with the current goals and characteristics of the self? According to the functional approach to autobiographical memory (Bluck, 2003), they are reconstructed so that they are useful and functional for the self in the contexts they are recalled in daily life (Bluck et al., in press). That is, memories are not retrieved without reason. They are remembered because the self is in a context where it is necessary to bring to mind memories that are somehow relevant and useful in meeting current environmental demands. According to the functional approach, there are three ecological functions of memories: self (i.e., development and continuity of the self), social (i.e., developing, maintaining and enhancing social relationships) and directive (i.e., guiding present

and future behavior; Bluck, Alea, Habermas, & Rubin, 2005; Pillemer, 1992). All of these functions serve the current self so that the self can adapt to the environment better and operate better. Thus, in daily life, individuals recall memories that fit with their current self-attributes so that they maintain their self coherence, and use these memories for certain purposes such as presenting themselves to others in social interactions. The current findings suggested that, for example, a highly autonomous middle-aged person is more likely to recall autonomy-related memories in daily life, which will confirm and enhance his or her current autonomy level. These autonomy-related memories will serve a self function and implicitly remind that person that he or she is really an autonomous person. Similarly, a less autonomous young person might be recalling memories that carry a weaker autonomy theme, which represents the current self of the young person.

In sum, the current study found support for the SMS model by showing an effect of self-attributes on memory content overall (without distinguishing between different memory types). This effect makes more ecological sense when a functional approach is taken towards autobiographical memory (Bluck et al., in press). The SMS model shows how the current conceptual self shapes the retrieval of autobiographical memories. Future research could further integrate the functional approach (Bluck, 2003) to the SMS model to also shed light on why the current conceptual self shapes the recall of memories (i.e., toward what adaptive ends). The next section provides an interpretation of the more stringent test of the SMS model that distinguished between earliest and recent memories. Doing so revealed a slightly different picture.

Stringent Test of the SMS Model Using Earliest Childhood Memories

Another study aim was to potentially expand the SMS model through examining findings from a more stringent test of the model using earliest childhood memories. The study examined whether the general relation between memory content and current self that was observed with all

of the six self-attributes was equally observed for recent and earliest memories. For environmental mastery and self-acceptance, there was a relation between current self-attributes and memory content in recent memories but not earliest memories.

These findings suggest that the relation between current self-attributes and memory content is more evident in recent memories. Across age groups, all six self-attributes were positively related to the content of recent memories, however only four self-attributes were linked with the content of earliest memories. This difference between the relation of the conceptual self to earliest and recent memories both supports and challenges the SMS model. According to the model, earliest memories are theorized to be retrieved because they are the first memories that match one's current self-attributes. The current findings show that they do match on some self-attributes, but not on as many as recent memories do. That is, the extent of the association between the conceptual self and retrieved memories is different across memories from different lifetime periods.

There are two plausible reasons for these differences. One possibility is that adult self-attributes, particularly environmental mastery and self-acceptance, are less likely to occur during the experience of childhood events. Note that self-attribute themes, at the mean level, are lower in earliest than in recent memories. For example, earliest memories are less likely to include purpose in life, personal growth, autonomy and environmental mastery content than recent memories. This suggests that these characteristics may be less strongly experienced in early childhood events, which tend to be simpler events, and are of course thereby less evident when these events are recalled. Research shows that earliest memories contain less information in different categories (e.g., emotion, setting, context, color) and fewer details, and that earliest memory narratives are less complete than recent memories (Howes et al., 1993; West & Bauer,

1999; Westman & Orellana, 1996). This is in line with the SMS model that suggests that the goals of the self in childhood are very different than self goals in adulthood. That is, children's goals are most probably associated with less complicated needs that might not fit perfectly with adult goals.

In particular, environmental mastery and self-acceptance may be characteristics that may not yet have developed in the conceptual self of a four or a five-year-old. According to Erikson (1959), by the time children are three years old, they have sufficiently resolved the trust vs. mistrust conflict, and the autonomy vs. self-doubt conflict. These two stages seem to be the stages to develop positive relations, autonomy, growth and purpose in life, but it might be too early for one to have environmental mastery and self-acceptance skills. Environmental mastery and self-acceptance may still be developing as they might require a more advanced, even a reflective self-concept. For example, Levine (2004) suggests that the cognitive self that emerges at around age two is a very basic form of self awareness that is demonstrated by the mirror test in which children detect the sticker on their head upon looking in a mirror (Amsterdam, 1972). A more advanced temporally-extended self awareness emerges at around age four. For example, although two-year-old children can retain event knowledge for long time periods, this knowledge is fragmentary, cue-dependent and inconsistent. Although their event knowledge persists, it does not become integrated into their self before the age of four. Due to this primitive self awareness before the age of four, earliest memories that are recalled from around the age of four and a half might be lacking self-acceptance and environmental mastery that may be developing later.

The second possibility is simply the age of the memory. The age of the current participants' earliest memories range from 17 to 51 years, whereas recent memories are at most one year old. Very old memories tend to become more fixed and stable over time and are more

likely to be reproduced in an unvarying and schematized format (Anderson, Cohen, & Taylor, 2000). In contrast, recent memories may be more likely to be dynamically reconstructed according to the current conceptual self. Thus, earliest memories may be less affected by the current conceptual self. Future iterations of the SMS model will need to elucidate how different types of memories may be dealt with differently in the self-memory system, and to further elaborate the role that time and recall across lifetime periods, play in the strength of associations between the conceptual self and retrieved memories.

In sum, the relation between current self-attributes and memory content is less evident in earliest memories than in recent memories. There is less of a match between the current conceptual self and the content of earliest memories (encoded in a distant developmental stage) as compared to recent memories (encoded and retrieved in the same developmental stage; e.g., young adulthood for young adults) and the same lifetime period (e.g., ‘the college years’ for young adults). Thus, the current study provided some refinements to the SMS model by testing it with earliest childhood memories.

Does the SMS Model Explain Why Adults Recall Their Earliest Memories?

Findings on the relation between earliest memories and the current conceptual self also contribute to solving the puzzle concerning why adults are able to recall very distant memories such as their earliest childhood memories. Why adults recall certain childhood memories and not others remains a mystery (Peterson, Grant, & Boland, 2005). The current study contributes a potential solution to this puzzle by showing that both young and late middle-aged adults recall earliest memories that are linked with their current conceptual self. According to the SMS model, adults cannot recall memories from the first years of life because of the discrepancy between goals that were active in the self during the encoding of memories (i.e., in early childhood) and the goals and characteristics that are currently active in the adult during retrieval (Conway &

Pleydell-Pearce, 2000). Young children's goals are most probably associated with basic needs for nurturance, healthy attachment as well as gaining autonomy (Erikson, 1959). As implied above, memories in early childhood tend to be encoded in line with these basic goals which have almost no overlap with one's goals in adulthood. If there is little continuity between encoding and retrieval goals, then effective retrieval cannot occur (Conway & Pleydell-Pearce, 2000). According to this view, earliest memories represent the first events in life that fit both with the self at encoding and with one's current conceptual self.

Neisser's (1962) view is in line with the SMS approach to earliest memories, and with the current findings. According to Neisser (1962), cognitive structures change with development; therefore memories from childhood do not fit with adult schemata and cannot be brought to mind. Research shows that children and adults have different retrieval mechanisms such that children recall things that would not seem memorable to adults (Davis et al., 2008; Fivush, Gray, & Fromhoff, 1987; Usher & Neisser, 1993). They might recall uninteresting or trivial details of events such as (What did you do on the camping trip?) 'First we eat dinner, then go to bed, and then wake up and eat breakfast' (Fivush & Hamond, 1990, p. 231). In sum, young children and adults perceive and retrieve the world differently (West & Bauer, 1999). The current study found support for this view by assessing the current self during retrieval, as well as retrospectively assessing the conditions during encoding. Conditions during retrieval are not taken into consideration by the cognitive self account (Howe & Courage, 1993) or the social-interaction account (Haden et al., 1997; Nelson, 1993). In fact, it is unlikely that any one of these accounts is adequate on its own; therefore recent theoretical formulations have emphasized an eclectic approach to the study of earliest memories (Reese, 2002; Wang, 2003). We contributed to this

approach by finding empirical support for the SMS account of earliest memories for the first time in the literature.

Another goal of the study was to examine whether the SMS model adequately explains the relation of the conceptual self to memory content in individuals from different age groups. The next section compares young and late middle-aged adults in terms of the relation between their current self-attributes and memory content.

Expanding the SMS model with a Life Span Development Perspective

Though the SMS model does present a complex representation of the relation between the self and autobiographical memory, it does not consider how developmental processes may affect this relation. A contribution of the current study was to examine whether theorized processes in the SMS model hold across two adult age groups. Given that the model does not rely on processes expected to change from young adulthood to late midlife, the overall relation between the conceptual self and memory content was not expected to, and did not, differ across young and late middle-aged adults. Although this is a cross-sectional study, this finding suggests that the relation between current conceptual self and memory may be stable across age groups. As mentioned above, young and late middle-aged adults show differences in the nature of their conceptual self (with middle-aged adults higher in many positive self-attributes). In spite of such age differences in *content* of the current conceptual self, there are no age differences in the *relation* between the current self and memory content. So age may shape how adults see themselves in the present, but does not have an impact on the way the conceptual self affects retrieval of autobiographical memories.

This is in line with the life span development theory which describes life span development as multidimensional and multidirectional. Baltes (1997) suggests that different domains of development should be examined individually as there might be declines in some

domains, stability in others, and others may show growth with age (e.g., Brandtstädter & Wentura, 1995). The current findings indicate growth in a variety of current self-attributes from young to late midlife, but stability in the relation between current self-attributes and memory content across young adulthood and late midlife.

Showing developmental stability in the relation between current self and memory content is an important extension of the SMS model. Given the overarching constructs of the model (e.g., conceptual self, autobiographical knowledge base), these processes are postulated as universal and would in fact be expected across the entire adult life span. This would require examination in samples that also include additional younger (e.g., adolescence) and older adults. For example, there is evidence showing that across various samples (e.g., university students, middle-aged individuals, celebrities) and on a variety of dimensions, people believe their past selves to be inferior to their present self (Wilson & Ross, 2000, 2001), and they tend to recall past selves that are consonant with their current self (Wilson & Ross, 2003). As mentioned above, one function of autobiographical memories is that they help people maintain self-continuity (Bluck & Alea, 2008; Wilson & Ross, 2003). The fact that the SMS model shows developmental stability at least in the first half of life, may provide an underpinning for maintaining such continuity. This continuity might begin to break down in very old age, especially the fourth age (Baltes, 1997) or under dementia conditions (e.g., Alzheimer's disease) when the self-memory system is under threat due to neurological change. Future research might focus on the relation between self and memory in both the normal and impaired aging mind.

Note that the above discussion focuses on the age of the participant. Age invariance also occurs, however, for the age of the memory. Young and late middle-aged adults' current self-attributes are similarly related to both recent and earliest memories. Both age groups' recent

memories are from the previous year so it makes sense that recent memories would be uniformly related to current self-attributes across age groups. Late middle-aged adults' earliest memories, however, are much more distant (i.e., about 34 years earlier) than young adults' earliest memories, but are still related to the current conceptual self. Research shows that by the time children are 14 years old, they have adult-like childhood amnesia which is quite stable from that point on (Peterson, Wang, & Hou, 2009). As both the young and late middle-aged adults in the current sample are much older than 14, they are experiencing childhood amnesia similarly, and it appears that their first memories after amnesia offsets, are similarly related to their current conceptual self. Future research should examine memories from other ages (e.g., reminiscence bump memories, i.e., memories from ages 10-30; Demiray, Gülgöz, & Bluck, 2009) to examine whether adults from different ages demonstrate the same relation between their current self-attributes and these memories.

In conclusion, the stringent test of the SMS model with earliest memories both extended the model by showing that some modifications might be necessary for explaining the retrieval of different memories, and contributed to solving the puzzle of why earliest memories are recalled. The model was also extended with an adult developmental focus. Young and late middle-aged adults who are currently in different developmental stages and who show differences in the content of their current conceptual selves, display a similar relation between their current self-attributes and memory content (for both earliest and recent memories).

Limitations

The current study had several limitations that could be addressed in future research. These were related to participant recruitment, online data collection, and the cross-sectional design of the study. Issues concerning conceptualization of the complexity of adult development,

and the ability to test the SMS model (Conway & Pleydell-Pearce, 2000) in a single study are also discussed.

Participant Recruitment: Sampling Adults from Late Midlife

Recruiting individuals in midlife to participate in research is notoriously difficult (Nosek et al., 2002), and this was no different in the current study. Researchers contacted 501 middle-aged people, but only 42% of them started the survey and of those 70% completed both parts of the study. Basic analyses were conducted to show that those who began but did not complete the survey were no different from those who did complete. It is not possible, however, to know if the obtained sample is different from those who were invited but did not participate, or how representative they are of the general late middle-aged population. For example, since this was an online study, those who did not start the survey might not be very familiar or comfortable with computers, though all had an email address through which they were contacted. Such people might not be employed, not have easy access to computers, or might have lower education levels and socio-economic status. These adults might show lower levels of self-attributes (e.g., environmental mastery) and potentially a less open-ended future time perspective than adults who are highly educated and active in society. For example, Markus, Ryff, Curhan, and Palmersheim (2004) showed that college-educated adults in midlife scored higher on nearly every self-attribute than high school-educated middle-aged adults. Note that 75% of our late-midlife sample had an education level of a Bachelor's degree or higher, and 81% were employed, which suggests that our sample was relatively highly educated and active. Though this might be a bias, note that obtained age differences are in comparison with young adults who are also enrolled to obtain a college degree. Thus, education level might account for absolute levels but would not account for age differences in current self-attributes. In addition, though it is possible that those who did not participate were hindered by computer literacy, it is unlikely that

such a large percentage of middle-aged individuals are computer illiterate given current rates of computer ownership and literacy in society and in the workplace.

An alternative possibility is that those who did not start the survey might be extremely active, busy individuals who simply did not feel they had time to participate in research (Heckhausen, 2001). One could speculate that these adults might show even higher levels of some self-attributes such as environmental mastery, autonomy, and purpose in life than those in the current sample. Finally, the type of incentive offered might have been a factor in adults' decision to participate. Those adults who were not interested in the compensation offered in the current study (i.e., an informative handout on midlife development, and a donation to either the American Association of Retired Persons or the Children's Health Fund), or who did not find it sufficient, might have not participated in the study. These individuals may be intellectually different from those who are curious and enthusiastic about reading about their own developmental stage, or they may be different in terms of generativity levels. Midlife, even when conceptualized in two stages with a focus just on late midlife shows great variation in terms of demographic differences, life circumstances and everyday routines (Staudinger & Bluck, 2001). As such, any non-representative sample of midlife, including the current study, must be cautious in generalizing to the wider population.

Online Data Collection

Data were collected through an online survey at SurveyMonkey.com. Internet-based data collection is an increasingly popular method which has been compared with paper and pencil surveys and shown to be psychometrically similar (e.g., internal consistency; Chang, 2005; Chuah et al., 2006). Procedures outlined earlier were put in place to address foreseeable issues related to the use of this medium. One limitation, however, might be the lack of researcher presence during survey completion and the lack of standardization of the conditions in which

participants completed the survey. That is, participants were free to take the survey wherever and whenever they wished within a certain amount of time. Both of these issues were taken into account to some extent through data quality checks. If participants took too long to do the survey, it was clear they were not focusing or were distracted, and they were removed from the sample. Individuals who were identified as not taking the survey seriously (e.g., did not provide correct responses to foil items, had large amounts of missing data, did not provide memory narratives) were also excluded. However, there may be other aspects of the uncontrolled nature of online data collection (e.g., location, lighting, noise, time of day) that had an impact on our findings. Overall, however, online data collection appeared to be an efficient way of collecting data, especially from a difficult-to-access sample such as middle-aged people.

Another shortcoming of online data collection is that online surveys need to be brief so that participants are willing to complete them in the absence of a researcher who can encourage or prompt them to finish the survey. While completing an online survey at home, participants may be more likely to drop out if the survey is too long. Therefore, some items and scales were excluded from the current study in order to keep the survey short. This prevented the measurement of other variables of interest that might be related to the outcomes (e.g., other potential mediators in the relation between age group and self-attributes).

Cross-Sectional Design

All age group differences in the current study are cross sectional findings; therefore they might represent cohort differences (Schaie, 1993) rather than actual developmental differences. That is, the age differences in future time perspective and self-attributes might be cohort-based. Effectively the study compares the ‘me generation’ of baby boomers to young adults born between 1980 and 1990. It is unclear whether cohort might influence people’s self-conceptions and sense of the future. In addition, our findings on the relation between the current conceptual

self and memory content indicated developmental stability across the two age groups. This relation, however, should be investigated in a longitudinal design in future research to examine whether within-subject stability occurs across time, preferably over the life span.

Issues Related to Conceptualizing the Complexity of Adult Development

Only one possible mediator between age group and current self-attributes was tested, although there might be many other processes in the complicated relation between a person's age and how they perceive their own self-attributes. Future research should test the role of other possible mediators such as self-concept clarity (i.e., having a self-concept that is clearly defined and internally consistent). Research shows that older people report higher self-concept clarity (Bluck & Alea, 2008), and self-concept clarity is positively related to psychological well-being (Diehl, 2006), as well as self esteem and positive affect (Diehl, Jacobs, & Hastings, 2006). Based on these findings, one might expect that self-concept clarity would mediate the relation between age group and self-attributes. That is, late middle-aged adults may have higher self-concept clarity than young adults, which in turn would lead them to have higher levels of current positive self-attributes than young adults. Investigating the role of such possible mediators, especially in more complex 'multiple mediators' models or in structural equation modeling analyses, is important in terms of more fully understanding the dynamics of adult development.

Issues Related to Conceptualizing the Complexity of the SMS Model

The self-memory system model (Conway & Pleydell-Pearce, 2000) is complex and even the conceptual self includes many aspects (e.g., personal scripts, possible selves), most of which were not examined in the current study. The research focused on only two aspects of the conceptual self, chosen because they were likely to show adult developmental variation: future time perspective and self-attributes. Showing that current self-attributes are reflected in memory content provides support for the SMS model, but is clearly not sufficient to fully validate the

model or to represent the complex nature of this system. That is, the model proposes that current self-attributes are not the only aspects of the conceptual self that shape memory content: Other attitudes, traits, possible selves and other self-characteristics are thought to play a role. In addition, during retrieval self-attributes interact with other aspects of the conceptual self, with the autobiographical knowledge base, and with the episodic memory system as well as being regulated by the current goals of the working self. The current study focused on a very specific part of this complex network of relations. Future research may help to more fully elucidate the relation between the self and autobiographical memory, providing further tests of the SMS model.

One clear limitation related to that just described, is that the study did not thoroughly examine the current goals of the working self. According to the SMS model, although autobiographical memories are the product of the interaction between all three components of the self-memory system (i.e., episodic memory system, long-term self and working self), the working self is a very important component. The working self is similar to Baddeley's (1986) working memory in the sense that it includes control processes which coordinate and modulate other separate systems: in doing so it prioritizes action within the individual's complex hierarchy of goals (Conway & Pleydell-Pearce, 2000). That is, the working self organizes the psychological present, which is the current experience, through the categorization, evaluation and prioritization of its goals (Conway et al., 2004) and recruits goal-relevant autobiographical memories that will be of use in the current context. Therefore, it is important to examine the effect of the working self on the conceptual self. For example, in this study, one explicit goal of the participant's working self was to pay attention to the study instructions and recall two specific autobiographical memories that said something about them as a person. This goal,

however, was not the only active goal in the self-memory system at that time: the system includes many explicit and implicit goals simultaneously (Woike et al., 2001). In addition to this explicit goal that the study instructions imposed on the participants, they might be carrying other explicit goals such as receiving course credit for their participation in the study, or implicit goals such as being a conscientious person and completing the survey properly. Thus, it is difficult to capture this complex nature of the self-memory system and measure the existing goal hierarchy of a person at any given point in time. Another problem related to the working self is that goals are viewed as ‘processes’, which are difficult to measure and quantify. Future research should measure people’s current goals through self reports, as well as giving people certain goals through experimental manipulation and analyze their autobiographical memories to see the effect of experimentally controlled goals on retrieval.

Conclusions

The study integrated life span developmental theory (e.g. Baltes, 1997) with the self-memory system model of autobiographical memory (Conway & Pleydell-Pearce, 2000) to provide a revised conceptual model in which adult development was included. The study contributes to the adult development literature (especially the scarce midlife development literature) by demonstrating differences in the conceptual self across age groups: Those in late midlife were found to have higher levels of self-attributes such as autonomy, environmental mastery, purpose in life, self-acceptance and positive relations with others than young adults. Both adults’ current age and their feelings about the future were shown to be related to their reports of current self-attributes. That is, self-attributes are affected by both time lived and time left to live, which is a good example of the importance of taking a life span perspective while examining development. Note that although the conceptual self differed across age groups, the relation of the conceptual self to memory content remained the same. These findings provided

important examples of the multidimensionality and multidirectionality of life span development (Baltes, 1997): There are gains, losses and stability in all stages of development. In young adulthood, people perceive the future as infinite and full of possibilities to grow, but they do not have an accumulated and rich set of skills and self-attributes yet. In contrast, in late midlife, people have limited and less positive feelings about the future, but they have gathered positive self-attributes through maturation and life experience. That is, each developmental stage has its own advantages and limitations.

The study also provided support for the SMS model (Conway & Pleydell-Pearce, 2000) claiming that the conceptual self guides retrieval of autobiographical memories, which has been much cited but little researched to date. Beyond support, the study also suggests refinements to the model, such as the focus on development but also concern for the relation of the current self to memory when retrieving different types of memories. Earliest memories were less related to current self-attributes than recent memories, suggesting that the SMS model could be extended to take into account retrieval of different types of memories, in this case, distant memories. At the same time, the match between one's current self and one's earliest memory on several attributes suggests that the SMS model provides a reasonable explanation of why earliest events are recalled. Despite its limitations, the study offers new findings and suggests new directions for research on the changing self in young adulthood and late midlife, and provides new insights on how our current self affects what we recall in daily life.

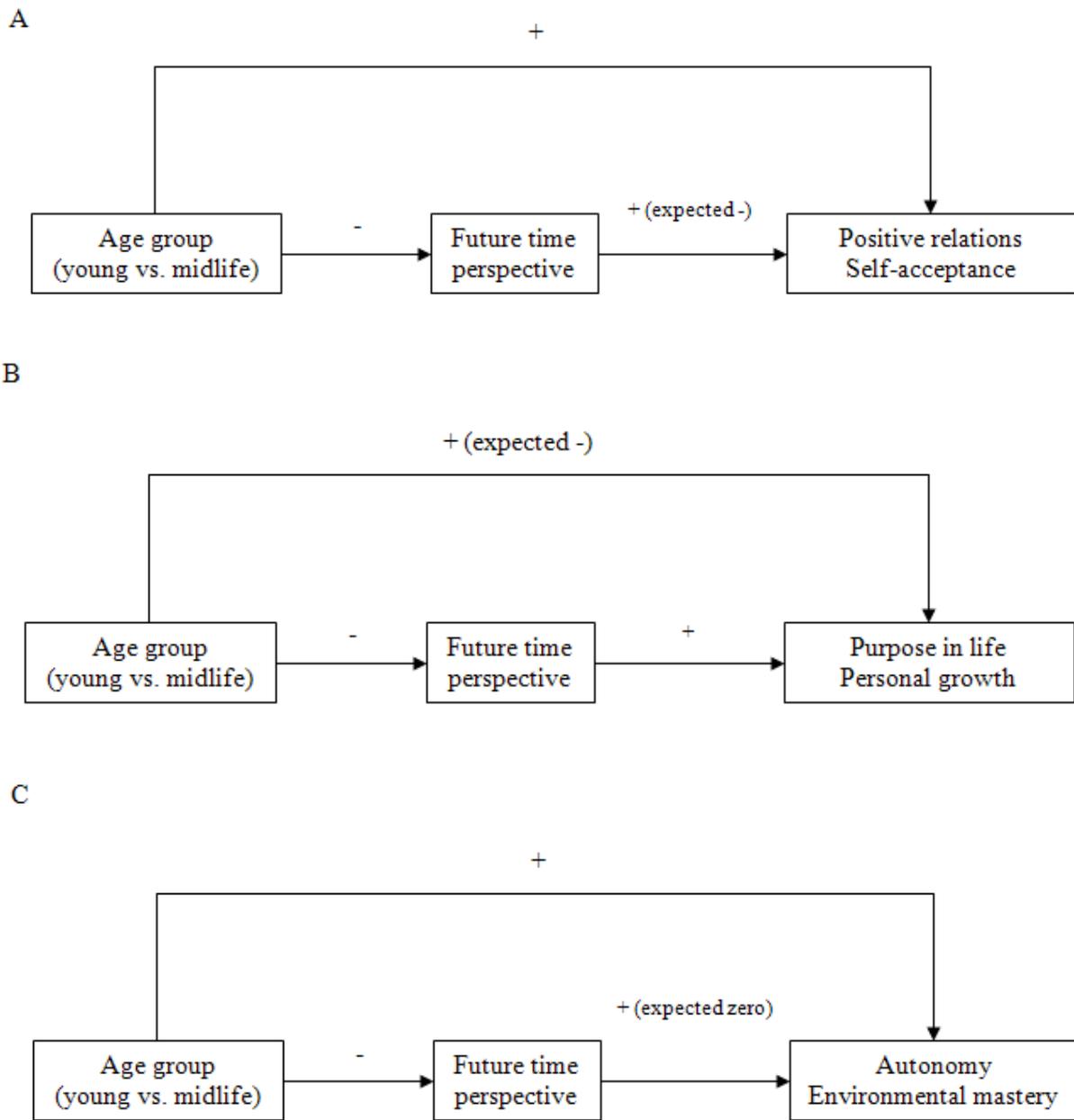


Figure 4-1. Illustration of suppression effects in relation to predicted results. (A) Positive relations and self-acceptance. (B) Purpose in life and personal growth. (C) Autonomy and environmental mastery.

APPENDIX A
MEMORY NARRATIVE INSTRUCTIONS

We are interested in hearing about memories from your life! We will be asking you to tell us about TWO SPECIFIC MEMORIES. By specific we mean that the memory can be about any event/experience but it must have occurred at a particular place and a particular time. That is, it is not a general time in your life, but must be a memory of one specific time (it may have lasted minutes, or hours, but was not longer than one day). It may be a unique experience or it might be just an everyday event, but what is important is that it is a memory of something that occurred at a particular time and place.

There are no better or worse, or right or wrong memories. We are interested, however, in you sharing specific memories that "SAY SOMETHING ABOUT YOU AS A PERSON".

1) Rest of the Instructions Specific to Earliest Memories:

Let's get started. Think about your early childhood, and try to remember the very earliest event/experience of your life. Please make sure this is the very first memory that you can recall (and that you actually remember it, you did not just see it in a photo or hear the story from a family member). Most people's earliest memories come from BEFORE the age of 7. Also, don't forget that this memory should somehow "say something about you as a person".

2) Rest of the Instructions Specific to Recent Memories:

Please think about your life over the last year and remember an event/experience from your life that occurred over the last year but not very recently, that is NOT in the last three months. So, recall any event that occurred before last summer but was in the last year. Also, don't forget that this memory should somehow "say something about you as a person".

Please describe your memory as thoroughly as possible including all you remember about where the event took place, who was present, what happened, and what you were feeling, perceiving and thinking at that time.

Please type your memory into the box below. Try to fill the entire box, but when you reach the end of the box (when it starts scrolling down) please wrap up your paragraph and do not keep writing.

APPENDIX B MEMORY NARRATIVE EXAMPLES

1) Earliest Memory Narrative of a Young Adult

“I remember the first Christmas after my little brother was born, when I was just about 3 years old. It happened back at our house in Tampa, FL and both of my parents, my 2-month-old little brother, and myself were all present. I still remember being very excited about having a little brother and being able to celebrate Christmas with him for the first time. I can remember coming down the stairs that morning dressed in my Teenage Mutant Ninja Turtles pajamas and just being so happy and excited for the day. It was a great moment and really is the earliest moment I can remember where my entire family was together and having a great time.”

2) Recent Memory Narrative of a Young Adult

“This past summer I was in NYC for about a week. I have a lot of different memories but the one I am describing only lasted a couple hours. On my second day of being in NYC I visited my grandma who was recently moved to an assisted living facility of Manhattan. My mom, little brother, and myself all visited her. I had not seen my grandma in over 4 years so it was just great seeing her again, but it was also sad just seeing her in the type of condition she was in as well. It is always great to be around family and your loved ones, especially after not seeing them for a long time, so it's definitely something I'll remember for a long time.”

3) Earliest Memory Narrative of a Late-Midlife Adult

“My friend and I walked to the corner store alone. We bought some candy and then left to go home. We walked up the street but continued past the street where we were supposed to turn. We walked and walked and were lost. An old lady invited us in and gave us cookies. I didn't eat any because I thought they might be poisoned. I was scared that I would never get back home.”

4) Recent Memory Narrative of a Late-Midlife Adult

“In April of this year I went to visit two of my children who now live in Texas. I had not seen my son for a year or my daughter since the previous Christmas. I was looking forward to seeing them but also a little apprehensive because my son is a "recovering addict" but had recently stopped keeping in touch so I wasn't sure what I was going to find when I got there. I was also feeling a lot of excitement because I was bringing my youngest son with me so we could all be together but neither of them knew that. I was imagining the joy they would get and I would get when the surprise was revealed. My daughter picked us up at the airport and actually started screaming when her brother ran up behind her as she was hugging me. It was a great moment!”

APPENDIX C
SELF-ATTRIBUTES MEASURE (RYFF, 1989A)

Autonomy Subscale

1. I am not afraid to voice my opinions even when they are in opposition to the opinions of most people.
2. My decisions are not usually influenced by what everyone else is doing.
3. I have confidence in my opinions even if they are contrary to the general consensus.
4. Being happy with myself is more important than having others approve of me.
5. I tend to worry about what other people think of me.
6. I often change my mind about decisions if my friends and family disagree.
7. It is difficult for me to voice my own opinions on controversial matters.
8. I tend to be influenced by people with strong opinions.
9. I judge myself by what I think is important, not by the values of what others think is important.

Environmental Mastery Subscale

10. I am quite good at managing the many responsibilities of my daily life.
11. I generally do a good job of taking care of my personal finances and affairs.
12. I am good at juggling my time so that I can fit everything in that needs to be done.
13. I have been able to build a home and a lifestyle for myself that is much to my liking.
14. I do not fit very well with the people and the community around me.
15. I often feel overwhelmed by my responsibilities.
16. I have difficulty arranging my life in a way that is satisfying to me.
17. In general, I feel that I am in charge of the situation in which I live.
18. The demands of everyday life often get me down.

Personal Growth Subscale

19. I think it is important to have new experiences that challenge how you think about the world.
20. I have the sense that I have developed a lot as a person over time.
21. I am not interested in activities that will expand my horizons.
22. I don't want to try new ways of doing things – my life is fine the way it is.
23. When I think about it, I haven't really improved much as a person over the years.
24. I do not enjoy being in new situations that require me to change my old familiar ways of doing things.
25. There is a truth in the saying that you can't teach an old dog new tricks.
26. For me, life has been a continuous process of learning, changing and growth.
27. I gave up trying to make big improvements or changes in my life a long time ago.

Positive Relations with Others Subscale

28. Most people see me as loving and affectionate.
29. I enjoy personal and mutual conversations with family members or friends.
30. People would describe me as a giving person, willing to share my time with others.
31. I know that I can trust my friends and they know that they can trust me.
32. I often feel lonely because I have few close friends with whom to share my concerns.
33. I don't have many people who want to listen when I need to talk.
34. It seems to me that most other people have more friends than I do.
35. Maintaining close relationships has been difficult and frustrating for me.
36. I have not experienced many warm and trusting relationships with others.

Purpose in Life Subscale

37. I am an active person in carrying out the plans I set for myself.
38. I enjoy making plans for the future and working to make them a reality.
39. I tend to focus on the present, because the future nearly always brings me problems.
40. My daily activities often seem trivial and unimportant to me.
41. I don't have a good sense of what it is I am trying to accomplish in life.
42. I used to set goals for myself, but that now seems a waste of time.
43. I sometimes feel I have done all there is to do in life.
44. Some people wander aimlessly through life, but I am not one of them.
45. I live life one day at a time and don't really think about the future.

Self-Acceptance Subscale

46. I have made some mistakes in the past, but feel that all in all everything has worked out for the best.
47. The past had its ups and downs, but in general I wouldn't want to change it.
48. When I compare myself with friends and acquaintances, it makes me feel good about who I am.
49. In general, I feel confident and positive about myself.
50. I feel that many of the people I know have got more out of life than I have.
51. In many ways, I feel disappointed about my achievements in life.
52. My attitude about myself is probably not as positive as most people feel about themselves.
53. I like most aspects of my personality.
54. When I look at the story of my life, I am pleased with how things have turned out.

APPENDIX D
MEMORY CONTENT RATINGS FOR EARLIEST AND RECENT MEMORY
NARRATIVES

| |
|---------------------------|
| EARLIEST MEMORY NARRATIVE |
|---------------------------|

You have just written down your earliest memory. Please think of that specific earliest childhood memory while answering the following questions. We don't want you to answer how you generally felt as a child but really to specifically think about how you felt in this memory. Go back in your mind to the time of this memory. Remember what you were feeling, thinking and doing during this specific memory as you answer each of the following questions. Feel free to use the entire scale from 1 – 8 (1= strongly disagree, 8= strongly agree). There are no wrong answers. How much do you agree with each of these statements about you in this specific memory?

1. In this memory, I was not afraid to voice my thoughts even if others might disagree.
2. In this memory, being happy with myself was more important than getting other's approval.
3. In this memory, it was difficult for me to express myself.
4. In this memory, I was influenced by strong others.
5. In this memory, I was feeling in charge of my situation.
6. In this memory, I was feeling overwhelmed.
7. In this memory, I was having difficulty arranging things in a way that felt satisfying.
8. In this memory, I was feeling I fit very well with the people or community around me.
9. In this memory, I was learning, changing or growing.
10. In this memory, I was not interested in learning.
11. In this memory, it was important for me to have new experiences.
12. In this memory, I was not trying to make improvements or changes.
13. In this memory, I was feeling lonely because there were few people I felt close to.
14. In this memory, I did not have people who wanted to listen to me.
15. In this memory, I felt I trusted people and they trusted me.
16. In this memory, other people were seeing me as loving and affectionate.
17. In this memory, I was actively doing something I wanted to do.
18. In this memory, what I was doing seemed trivial and unimportant to me.
19. In this memory, I didn't have a good sense of what I was trying to accomplish.
20. In this memory, I was living each day and not thinking about the future.
21. In this memory, I was feeling confident and positive about myself.
22. In this memory, I felt everything was turning out for the best.
23. In this memory, my attitude about myself was not as positive as most other people.
24. In this memory, I was feeling disappointed with myself.

RECENT MEMORY NARRATIVE

You have just written down a memory from the last year. Please think of that specific memory while answering the following questions. We don't want you to answer how you have generally felt about yourself in the last year, but really to specifically think about how you felt in this memory. Go back in your mind to the time of this memory. Remember what you were feeling, thinking and doing during this specific memory as you answer each of the following questions. Feel free to use the entire scale from 1 – 8 (1= strongly disagree, 8= strongly agree). There are no wrong answers. How much do you agree with each of these statements about you in this specific memory?

1. In this memory, I was not afraid to voice my thoughts even if others might disagree.
2. In this memory, being happy with myself was more important than getting other's approval.
3. In this memory, it was difficult for me to express myself.
4. In this memory, I was influenced by strong others.
5. In this memory, I was feeling in charge of my situation.
6. In this memory, I was feeling overwhelmed.
7. In this memory, I was having difficulty arranging things in a way that felt satisfying.
8. In this memory, I was feeling I fit very well with the people or community around me.
9. In this memory, I was learning, changing or growing.
10. In this memory, I was not interested in learning.
11. In this memory, it was important for me to have new experiences.
12. In this memory, I was not trying to make improvements or changes.
13. In this memory, I was feeling lonely because there were few people I felt close to.
14. In this memory, I did not have people who wanted to listen to me.
15. In this memory, I felt I trusted people and they trusted me.
16. In this memory, other people were seeing me as loving and affectionate.
17. In this memory, I was actively doing something I wanted to do.
18. In this memory, what I was doing seemed trivial and unimportant to me.
19. In this memory, I didn't have a good sense of what I was trying to accomplish.
20. In this memory, I was living each day and not thinking about the future.
21. In this memory, I was feeling confident and positive about myself.
22. In this memory, I felt everything was turning out for the best.
23. In this memory, my attitude about myself was not as positive as most other people.
24. In this memory, I was feeling disappointed with myself.

APPENDIX E
 FUTURE TIME PERSPECTIVE SCALE (CARSTENSEN & LANG, 1996)

In order to indicate your agreement with the items, please use the following scale:

| | | | | | | |
|------------------------|----------|----------|----------|----------|----------|----------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Very Untrue | | | | | | Very true |

| | |
|--|--|
| 1. Many opportunities await me in the future. | |
| 2. I expect that I will set many new goals in the future. | |
| 3. My future is filled with possibilities. | |
| 4. Most of my life lies ahead of me. | |
| 5. My future seems infinite to me. | |
| 6. I could do anything I want in the future. | |
| 7. There is plenty of time left in my life to make new plans. | |
| 8. I have the sense that time is running out. | |
| 9. There are only limited possibilities in my future. | |
| 10. Over the years, I am beginning to experience time as more limited. | |

APPENDIX F
DEMOGRAPHIC QUESTIONS

1) Date of birth: Month _____ Day _____ Year _____

2) Sex (check one): Male _____ Female _____

3) Race / Ethnicity (check one):

_____ Caucasian

_____ African American

_____ Asian

_____ Other: _____

_____ Hispanic

4) What is the highest degree you have received?

_____ Elementary school

_____ Master's degree

_____ High school diploma / GED

_____ Doctorate degree

_____ Associate's degree

_____ Other: _____

_____ Bachelor's degree

5) Are you currently employed?

_____ Full time employment

_____ Part time employment

_____ Retired

_____ Unemployed

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BIOGRAPHICAL SKETCH

Burcu was born and raised in Istanbul, Turkey. After completing her middle and high school education at American Robert College, she attended Koç University to pursue her undergraduate degree in psychology. During her undergraduate studies, she worked as Dr. Sami Gülgöz's research assistant and became interested in autobiographical memory research. She was excited to examine how and why adults recall their own life events across different phases of their lives. She decided to stay at Koç University to continue working with Dr. Sami Gülgöz and to pursue a master's degree in developmental psychology. Her master's thesis examined middle-aged individuals' life span distribution of memories with a focus on the relatively greater frequency of memories recalled from young adulthood (ages 10 to 30). During her graduate training at Koç, she realized that her research interests and goals strongly fit with Dr. Susan Bluck's program of research at the University of Florida (UF). After starting the developmental psychology Ph.D. Program at UF, she expanded her research program by integrating theory and empirical research on adult development and social cognition. Her training as the manager of Dr. Bluck's Life Story Laboratory, and as teaching assistant to many courses has provided her with a strong background in life span development, providing a foundation for specialization in adult development and its relation to autobiographical memory. In the future, she hopes to further develop her research program on the bi-directional relationship between adults' self conceptions and the autobiographical memories they recall from their lives.