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The relation of the conceptual self to recent and distant autobiographical memories

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Based on the self-memory system model (SMS; Conway, Singer, & Tagini, 2004) of autobiographical memory, this study uses a large sample of young and middle-aged adults to investigate the relation between individuals' current self-characteristics and the content of both their earliest childhood memory and a recent memory. In the first session, participants' current self-characteristics were assessed. In the second session, individuals provided a written narrative of their earliest childhood memory and a more recent memory (within-participants design) and rated the self themes present in each memory. In keeping with the SMS model, findings show that current self-characteristics were reflected in individuals' memories. As predicted, however, recent memories were more frequently linked to current self-characteristics than were earliest memories. All six current self-characteristics predicted the inclusion of these themes in recent memories, but only four self-characteristics were associated with memory themes in earliest memories. The relation between current self-characteristics and memory themes did not differ across young and middle-aged adults, suggesting developmental stability in these relations. Findings provide general support for the SMS model but also suggest possibilities for its extension and refinement.

Keywords: Autobiographical memory; Self-memory system model; Earliest childhood memories; Self.

The current study is grounded in the self-memory system model of autobiographical memory (SMS model; Conway & Pleydell-Pearce, 2000; Conway, Singer & Tagini, 2004). The model is based on research showing that individuals tend to retrieve autobiographical memories from the perspective of their current selves (e.g., Ross, 1989). The SMS model details how an individual's current *conceptual self* guides recall of autobiographical memories. Although the model makes an excellent theoretical contribution, there is not enough empirical research examining the link between the conceptual self and retrieved memories. Moreover, no research has examined whether the conceptual self guides recall not only of relatively recent memories, but also of distant

memories such as earliest childhood memories (Dudycha & Dudycha, 1941; Howes, Siegel, & Brown, 1993). Such memories represent the developmental onset of autobiographical memory (Davis, Gross, & Hayne, 2008). Thus, the present study fills a gap in the literature by examining the relation of the current conceptual self to two types of autobiographical memories: recent memories that allow a basic examination of the SMS model and earliest memories that allow a more stringent examination of the model.

The study also examines these SMS model relations in two adult age groups. Recently, researchers have argued in favour of taking a lifespan developmental approach in studying autobiographical memory (Habermas & Bluck,

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2000; Schroots, van Dijkum, & Assink, 2004). The SMS model does not specify whether self-guided retrieval processes change across adulthood. To begin a developmental examination of these processes, the current study investigates whether there is developmental stability (Baltes, 1997) in the relation of the current conceptual self to recalled memories in young adults and persons in midlife.

THE SELF-MEMORY SYSTEM: RELATION OF THE CONCEPTUAL SELF TO AUTOBIOGRAPHICAL MEMORIES

According to the SMS model (Conway & Pleydell-Pearce, 2000) the current conceptual self shapes the themes that appear in memories at retrieval. The model postulates that the current conceptual self affects retrieval of autobiographical memories. When recalling a relatively recent memory, current self-characteristics should certainly appear as themes in the memory. Although 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 generally to all memories, thereby including earliest memories. In relation to childhood amnesia the model argues that the failure to retrieve memories from infancy is not only due to deficits in early encoding processes (Howe & Courage, 1993; Nelson, 1993), but to the mismatch between one's goals in infancy and the current

goals of the conceptual self during retrieval in adulthood. As such, all retrieved memories from across one's lifetime (starting with one's earliest memories) should represent instances where the conceptual self guides retrieval, thereby resulting in a match between one's current self-characteristics and the themes in the retrieved memories.

The manner in which the conceptual self influences retrieval is fully delineated in the SMS model, but briefly described here. Autobiographical memories are described as patterns of activation across the three components of the self-memory system: episodic memory, the working self, and the long-term self (see Figure 1). *Episodic memories* are described as event specific composites of sensory-perceptual-cognitive-affective details that invoke visual imagery and the experience of mentally reliving an event (Conway et al., 2004). The *working self* coordinates and modulates cognition, affect, and behaviour through prioritising 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

The conceptual self is described in more detail here, as it is of greatest interest in terms of the SMS claim (being examined in the current study) that recalled memories are shaped by the conceptual self at retrieval. The conceptual self contains abstract knowledge that one knows about

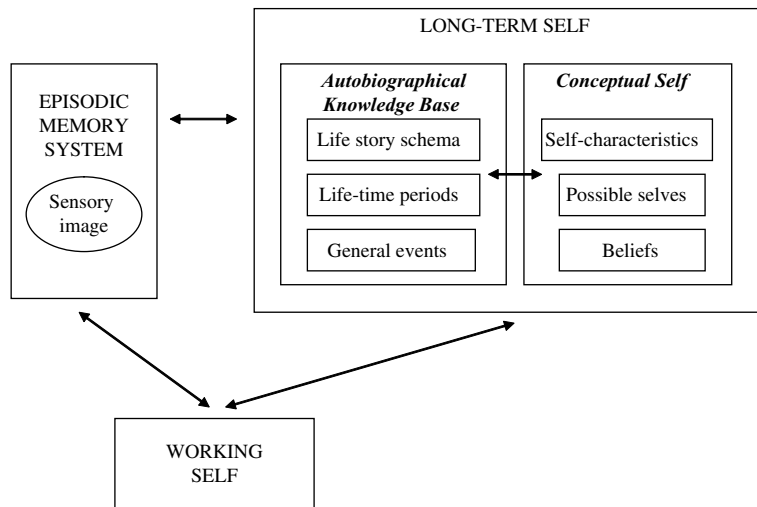


Figure 1. The self-memory system with self-characteristics shown as aspects of the conceptual self (modified from Conway et al., 2004).

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one's self, such as self-characteristics, personality traits, attitudes, possible selves, and personal motives. The conceptual self influences the working self by shaping current goals, and thereby influencing the retrieval (i.e., construction at recall) of memories.

Some previous research has examined how particular aspects of the conceptual self affect the construction of autobiographical memories. For example, Woike and her colleagues (Woike, 1994; Woike, Lavezzary, & Barsky, 2001; Woike, McLeod, & Goggin, 2003) have shown that individuals with more agentic motives at a personality level retrieve memories that are thematically more agentic, whereas individuals with more 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 bidirectional relation between autobiographical memory and the conceptual self. Their research shows that individuals reconstruct their past according to how they currently want to perceive themselves: 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). Singer's (2004) *self-defining memories* are considered building blocks of identity, and have been linked to personality dimensions such as defensiveness, self-restraint and distress (Blagov & Singer, 2004). The link between autobiographical memory and the conceptual self has also been demonstrated in clinical contexts: Berntsen and Rubin (2006, 2007) demonstrated significant positive relations between the extent to which a traumatic memory forms a central component of identity and the self-reported severity of post-traumatic stress disorder symptoms. Retrieval of trauma-related self-defining memories has also been associated with reporting trauma-related personal goals (Sutherland & Bryant, 2006).

Thus, a growing body of empirical research relevant to the SMS model generally suggests that specific aspects of the current conceptual self influence the themes found in retrieved autobiographical memories. The current study directly assesses the relation of the conceptual self to autobiographical memories, but also tests the limits of the SMS model through examining whether the current conceptual self affects the recall of earliest memories (i.e., encoded up to 50 years ago). Further, no previous studies have taken an adult developmental perspective. Given

that the SMS model does not highlight or predict any developmental changes in the self-memory system and postulates its central constructs (e.g., conceptual self, autobiographical knowledge base) as universal, the relation between the conceptual self and the themes in retrieved memories should be stable at least into midlife.

Self-characteristics: One aspect of the conceptual self

Research on the relation of the conceptual self to autobiographical memory has examined different aspects of the conceptual self such as personal motives (Woike, 1994). In the current research the aspect of the conceptual self being operationalised is self-characteristics. The measurement tool for these particular self-characteristics (Ryff, 1989) was developed through integration of concepts from personality psychology, clinical psychology (Allport, 1961; Maslow, 1968; Rogers, 1961), and lifespan developmental psychology (e.g., Erikson, 1959; Neugarten, 1973). This set of self-characteristics have been validated in several studies (Ryff & Singer, 2006) and shown to be sensitive to changes across adulthood (Ryff & Heidrich, 1997; Ryff & Keyes, 1995). The self-characteristics are: self-acceptance, a sense of positive relations with others, autonomy, environmental mastery, purpose in life, and personal growth. Identifying these characteristics as theoretically part of the conceptual self is novel, but is in line with other researchers who refer to these characteristics as aspects of personality (Fleeson & Heckhausen, 1997). These characteristics have been widely used as indicators of how adults from different age groups perceive their current selves (e.g., Ryff & Singer, 2006, 2008).

THE CURRENT STUDY: RELATION OF THE CONCEPTUAL SELF TO RECENT AND DISTANT MEMORIES

This research provides a novel examination of the SMS model (i.e., examining earliest memories and examining different age groups) as well as contributing to the small but growing literature examining the relation of the conceptual self to relatively recent memories (e.g., Conway & Holmes, 2004; Woike & Polo, 2001). In an initial session young and middle-aged participants'

current self-characteristics were assessed. In a second session (at least 48 hours later) participants provided an open-ended written narrative of their earliest childhood memory and a recent memory narrative (i.e., an event that had occurred from several months ago to a year ago). Participants then rated their memories for the extent to which each included a variety of self-related themes.

The first aim of the study is to provide a basic examination of the SMS model claim that the current conceptual self (i.e., characteristics of the current self) guides the self-related themes found in autobiographical memories in general. The second aim is to specifically examine the relation between characteristics of the current conceptual self and themes found in earliest childhood memories (as compared to recent memories). If earliest memories are the first memories that fit with the current self, as suggested by the SMS model (Conway & Pleydell-Pearce, 2000), they should contain themes that reflect current self-characteristics. We postulate, however, that the effect of self-characteristics should be more evident in recent than earliest memories because one is likely to have the same self-characteristics now, at retrieval, as at the time the event was encoded. That is, as these memories are encoded and retrieved in the same developmental stage, there should be a strong match between current self-characteristics and memory themes. In contrast, the fit between current self-characteristics and themes in earliest memories 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.

Instead of relying solely on a college student sample, the study addresses these aims in a sample including both young adults and those in midlife. As such, the third aim of the study is to examine whether the relation between the conceptual self and self-related themes in earliest and recent memories shows developmental stability. As the SMS model does not have a developmental focus, it does not make predictions about whether this relation should be different in different adult age groups. The current study predicts, however, that the relation should remain constant across the two age groups examined for both earliest and recent memories. That is, regardless of age, the relation between current self-characteristics and memory themes should be

evident. The following hypotheses represent expected findings in line with study aims.

- Hypothesis 1. Individuals with higher levels of a particular self-characteristic will rate their memories (regardless of memory type: recent, earliest) as including higher levels of that theme. This is expected for all six self-characteristics.
- Hypothesis 2. The influence of current self-characteristics on memory themes should be less evident in earliest memories than in recent memories. For example, a person with a high current level of a certain self-characteristic (e.g., environmental mastery) should show a high level of that theme in their recent memory but not necessarily in their earliest memory. As such, a greater number of current self-characteristics will be related to recent memory themes than to earliest memory themes.
- Hypothesis 3. The relation of current self-characteristics to memory themes (both earliest and recent) should be consistent across young and middle-aged adults.

METHOD

Participants

Invitations to complete the online survey were sent to 398 young and 501 middle-aged adults. Among those, 346 young adults (87%) and 212 middle-aged adults (42%) started the survey, and 309 young adults (89%) and 148 middle-aged adults (70%) completed it. To ensure data quality, participants who did not follow instructions (e.g., did not provide a memory narrative), those who did not complete the items properly (e.g., gave the same response to all survey items), and those who spent too little (less than 10 minutes) or too much time (more than 1 hour) on the survey were excluded (a total of 12 individuals). A total of 25 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: 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 middle-aged adults ranged from 47 to 64 years old ($M = 55.67$, $SD = 5.99$). Of the young adults,

64% were Caucasian, 15.2% Hispanic, 7.8% African American, 6.4% Asian, and 6.7% reported his or her race as “other”. Of the middle-aged adults, 87% were Caucasian, 8.3% Hispanic, 3% African American, and 1.5% Asian.

The young adult sample was recruited from the psychology department’s participant pool and received course credit. The middle-aged participants were accessed through the young adult sample. Young adults were invited to provide the researcher with names and contact information of up to two middle-aged individuals. Middle-aged participants were also invited to refer other middle-aged individuals. Analyses were conducted to demonstrate the independence of these groups in the sample.¹ All middle-aged participants were compensated with a research-based informative electronic handout on midlife development and a small donation to one of two charities (their choice) was made on their behalf.

Procedure

The online survey (surveymonkey.com) was completed in two sessions. Participants were sent an email including the link to the first part of the survey and were instructed to complete it within 1 week. When this was completed they were sent the link to the second part of the survey within 48–72 hours and again asked to complete it within 1 week. Participants were asked to choose a quiet location to complete the survey and told that they needed to complete each session in one sitting.

The choice to split the survey questions into two sessions was deliberate. Having two separate sessions with a 48–72-hour time lag prevented dependency between the current self-characteristics measure (Session 1) and the memory-sharing and memory theme ratings (Session 2). Dividing the survey into two sessions also helped to

prevent participants from becoming bored or tired while completing the survey. The first session took about 10 minutes and the second session took 20–30 minutes to complete. The first session included, in order of administration, the informed consent, the current self-characteristics measure (Ryff, 1989), and the demographic items.

In the second session individuals shared two written autobiographical memories and rated the self-related memory themes in each (see description of memory-sharing below). Through counterbalancing (within age and gender), half of the participants retrieved their earliest childhood memory first, followed by a recent memory. 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 theme ratings for that particular memory. They then proceeded to the second memory narrative and completed the same memory theme ratings for the second memory.

The instructions for producing the memory narratives were designed to elicit two *specific* memories from the participants’ lives. Specific memories were defined 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 1 day). Participants were told that their memories might be quite unique experiences or just everyday events, but that it was important for them to be specific events (i.e., not general life periods) that “say something about them as a person”. This instructional set was used in order to collect memories that were generally associated with the self as per the self-memory system model (Conway & Pleydell-Pearce, 2000). For both memories, participants wrote a memory narrative that filled a standard text box of 800 characters. This narrative length was determined through pilot testing.

The earliest memory instructions were to take a moment to think back to their childhood and to recall their very earliest event/experience. Instructions emphasised that the memory should be their own recollection, not an episode that they had only seen in a picture or heard about from someone else. The recent memory instructions were to take a moment to think back over the last year and to recall something memorable from the period between 3 months ago and a year ago. The last 3 months were excluded in order to avoid recall of trivial recent events (e.g., yesterday’s breakfast), and to avoid recency effects (e.g.,

¹To ensure that young adults who referred middle-aged adults were not different from those who did not refer, they were compared on major study variables. ANOVAs showed no differences, F ranges 0.13–2.21, all $p > .05$. Similarly, middle-aged adults who referred others were not different from those who did not refer, F ranges 0.22–2.01, all $p > .05$. Some young adults were related to some middle-aged adults, and some middle-aged adults were related to other middle-aged adults. ANOVAs examined whether pairs of related individuals were different from single individuals. A dummy variable for “group” was created (entered as random factor) so that each group had a distinct code, as did single individuals. Groups did not differ on any variables, F ranges 0.62–1.26, all $p > .05$.

remembering what you did just before beginning the study). For both memories, participants were instructed to write down everything they were doing, thinking and feeling at the time of the event. Thus the instructions were the same for both memories except for the focus on earliest versus recent events.

To examine whether individuals had followed instructions in terms of producing an earliest and a recent memory, age at time of memory was calculated for recent and earliest memories. Young adults ($M = 4.53$, $SD = 1.51$) and middle-aged adults ($M = 4.74$, $SD = 1.57$) showed no differences between age at earliest memory, $t(370) = 1.22$, $p > .05$. Age at these earliest memories is in line with previous research showing that childhood amnesia wanes between age 4 and 5 (Multhaup, Johnson, & Tetirick, 2005). For recent events, young adults' memories were from when they were about 19 years old ($M = 19.31$, $SD = 2.10$), whereas middle-aged adults' memories were from events that occurred when they were about 55 years old ($M = 54.77$, $SD = 5.50$). Thus all participants appear to have accurately followed study instructions for both earliest and recent memories.

Measures

Self-characteristics measure. This 54-item scale (Ryff, 1989) consists of 9-item subscales designed to measure six self-characteristics: self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life, and personal growth. Participants were explicitly instructed to focus on their current selves while completing the measure and rated the items on scales ranging from 1 (strongly disagree) to 8 (strongly agree).

Self-acceptance is a central component of self-actualisation (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 love, and forming deep friendships (Erikson, 1959). *Autonomy* refers to making decisions independently and regulating behaviours 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 realisation of one's potential. Internal consistency for the total scale was .95, and the six subscales showed moderate to high consistencies with Cronbach's alphas between .75 and .90.

Memory theme ratings. Based closely on the Ryff scales (1989), this 24-item measure was developed for the current study to assess the extent to which participants' self-characteristics (i.e., self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life, and personal growth) are reflected as themes in their autobiographical memories. Themes related to each of the six self-characteristics are measured with four self-report items. Participants responded to each item in relation to both their recent and earliest memory on a scale ranging from 1 (strongly disagree) to 8 (strongly agree). The administered items were selected from among the items of the larger self-characteristics measure (Ryff, 1989) because they were applicable (with minor modification) to rating in relation to specific memories, and they had high loadings on the relevant self-characteristic factor (suggesting that they were representative items; Abbott et al., 2006). Example items include "In this memory, I was not afraid to voice my thoughts even if others might disagree" (autonomy theme), "In this memory, I was feeling in charge of my situation" (environmental mastery theme), "In this memory, I didn't have a good sense of what I was trying to accomplish" (purpose in life theme, reversed), "In this memory, I was learning, changing or growing" (personal growth theme), "In this memory, I was feeling confident and positive about myself" (self-acceptance theme), and "In this memory, I felt I trusted people and they trusted me" (positive relations theme).

Internal consistencies were calculated separately for earliest and recent memory theme ratings overall (Cronbach's alpha = .91 for both). Internal consistencies for environmental mastery, self-acceptance, and positive relations were high in both earliest and recent memories (Cronbach's alphas between .82 and .87). Because consistencies for purpose in life, personal growth, and autonomy were somewhat low, one item from each of these three subscales was excluded to increase inter-item reliability (new Cronbach's alphas were, respectively, .63, .62, and .48 for the

recent memory and .58, .68, .51 for the earliest memory). Participants also 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.

Potential relation of the self-characteristic measure and memory theme ratings

The possibility of dependency in responses across the current self-characteristics measure (Ryff, 1989) and the memory theme ratings was clearly an issue, and four specific steps were taken to prevent it. The two measures were administered in separate sessions with a minimum 48-hour time lag between them. There were clear instructional set differences between the two measures. Ryff's (1989) measure of current self-characteristics instructed participants to focus on themselves in general and in the present, whereas the memory theme ratings instructed participants to focus on themselves as they were in each of the reported memories. The exact wording of the items measuring the same self-characteristic (e.g., autonomy) across the two measures was slightly different so that participants were unlikely to recall responses to similar items that they had made in the first session. Finally, foil items (e.g., items that simply give an instruction such as "Answer 'Strongly agree' for this item") were randomly distributed among the items of both measures to reduce recall of similar previous responses. The content and the order of foil items were different across the two measures.

Online data collection: Methodological considerations

Internet-based data collection is an increasingly popular method of conducting research. Previous research on the quality of internet-based data collection shows no differences between paper and pencil surveys and online surveys in terms of internal consistency, criterion-related validity, factor loadings, and mean scores when assessing neutral constructs such as student ratings of quality of instruction or more personal issues such as reporting of sexual behaviours (Chang, 2005; Chuah, Drasgow, & Roberts, 2006; Epstein, Klinkenberg, Wiley, & McKinley, 2001). Missing

data are often more common in the paper and pencil format compared to both supervised and unsupervised online surveys (Lonsdale, Hodge, & Rose, 2006; Wood, Nosko, Desmarais, Ross, & Irvine, 2006). For open-ended questions such as the memory narratives in the present research, studies show that online responses are either the same or longer than mail-in responses (Fricker & Schonlau, 2002).

Various steps were taken to further ensure data quality in the online format used in the current research. First, the surveys were broken into multiple short pages to make items clearer for participants and to prevent technical problems such as pages not loading due to length. Participants were instructed to report any technical problems such as a server crash, a broken Internet connection, or a program error (Nosek, Banaji, & Greenwald, 2002) to the experimenter. To ensure that individuals were actually reading all the items and responding to each, foil items were embedded in the survey. Those who incorrectly answered more than two foils were excluded from the study, and participants who spent less than 10 minutes and those who spent more than 1 hour on the whole survey were excluded from the study.

RESULTS

Preliminary analyses

Preliminary analyses examined potential differences in demographic variables (i.e., race, sex, education, health) to identify any necessary control variables. Separate MANOVAs with major study variables (e.g., self-characteristics) entered as dependent variables and demographic variables entered as independent variables revealed a main effect for sex on current self-characteristics, $F(6, 340) = 2.30, p = .034$: Women had higher levels of positive relations and purpose in life than men, t ranges from 2.06 to 2.013, all $p < .05$. Therefore sex was entered as a predictor in the major analyses.² For descriptive purposes, Table 1 presents means and standard deviations for current self-characteristics and memory theme ratings by age group.

²Note that degrees of freedom across analyses vary due to missing data on some of the criterion variables.

TABLE 1

Descriptive statistics for current self-characteristics, earliest memory themes, and recent memory themes in young and middle-aged adults

Variables	Young		Middle-aged	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
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
Positive Relations	56.52	10.61	60.25	9.60
Environmental Mastery	51.27	9.29	57.35	9.99
Self-Acceptance	54.64	11.71	58.70	11.05
Early Purpose Theme	17.72	4.48	17.56	5.68
Early Pers. Growth Theme	17.13	4.77	16.11	5.66
Early Autonomy Theme	15.63	4.57	15.13	5.51
Early Pos. Relations Theme	24.37	6.55	22.58	7.93
Early Env. Mastery Theme	20.54	8.07	18.38	9.64
Early Self-Acceptance Theme	23.40	7.76	21.51	8.53
Recent Purpose Theme	19.74	4.28	20.33	5.05
Recent Pers. Growth Theme	18.13	4.67	17.26	5.16
Recent Autonomy Theme	16.59	4.71	17.38	4.80
Recent Pos. Relations Theme	24.68	6.57	25.56	7.78
Recent Env. Mastery Theme	21.02	8.15	22.52	9.25
Recent Self-Acceptance Theme	23.42	8.01	24.65	7.81

Maximum score per self-characteristic subscale = 72 (9 items per subscale on 8-point scales). Maximum score for purpose in life, personal growth, and autonomy themes in earliest and recent memories = 24 (3 items per subscale). Maximum score for positive relations, environmental mastery and self-acceptance themes in earliest and recent memories = 32 (4 items per subscale).

Major analyses

Each of the study aims was tested using a set of hierarchical regression analyses with the six memory theme ratings (e.g., autonomy theme in memories) as the criterion variable. Sex was included in the initial step of each regression. In the second step, age group (young versus mid-life), memory type (earliest versus recent), and current self-characteristic (e.g., current autonomy) were entered. In the third step, two-way interaction terms were entered: interaction of memory type and age group, memory type and current self-characteristic, and age group and current self-characteristic. Finally, a three-way interaction term for age group, memory type, and current self-characteristic was entered. Variables included in interaction terms were centred.

³Hierarchical regressions were replicated separately with two order variables in order to examine possible order effects. First regressions were run with order of reporting the two types of memories (earliest memory first versus recent memory first) as an additional predictor in the first step. Second, regressions were run with order of reporting (first memory versus second memory independent of memory type) as an additional predictor in the first step. As this did not change the pattern of results, regressions without these two order variables are presented for simplicity.

All regression analyses were replicated with two order variables entered in the first step to examine possible order effects.³ Bivariate Pearson's correlations for variables used in the regression analyses can be found in Table 2. Tables 3–8 present only the relevant final step of each of the regression models for brevity.⁴ There are no collinearity issues in the regression analyses, as the tolerance statistic values are all much higher than .2 (Field, 2005; Menard, 1995).

Aim 1: Relation of self-characteristics to memory themes. The first aim was to examine whether individuals' current self-characteristics are reflected in the themes of their memories (regardless of recent versus earliest). As per the SMS model, we predicted that individuals

⁴The hierarchical regressions were replicated with current self-characteristic as the criterion variable instead of the predictor. Regressions showed that all six memory themes significantly predicted self-characteristics. This indicates a significant bidirectional relation between self-characteristics and memory themes as predicted by the SMS model (Conway et al., 2004). The current study, however, was framed to highlight the influence of the current conceptual self on the content of memories, as it measured current self at Time 1 and memory themes at Time 2 (48–72 hours later).

TABLE 2
Pearson correlation coefficients for all variables included in the regression analyses

<i>Variables</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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. Pos. Relations Theme	.23**	.15**	.17**	.07*	.18**	.20**	–								
8. Purpose Theme	.21**	.17**	.20**	.17**	.20**	.20**	.48**	–							
9. Pers. Growth Theme	.18**	.16**	.20**	.05	.14**	.18**	.43**	.52**	–						
10. Autonomy Theme	.15**	.10**	.18**	.18**	.15**	.17**	.38**	.43**	.31**	–					
11. Env. Mastery Theme	.14**	.09**	.10**	.07	.15**	.17**	.71**	.59**	.47**	.50**	–				
12. Self-Acceptance Theme	.14**	.12**	.12**	.11**	.17**	.19**	.65**	.60**	.50**	.48**	.85**	–			
13. Age group	–.17**	–.10	–.03	–.37**	–.29**	–.16**	.03	–.02	.09*	–.01	.02	.02	–		
14. Sex	.22**	.16**	.17**	–.08*	.08*	.11**	.00	.02	.03	.01	–.02	–.03	.03	–	
15. Memory Type	.00	.00	.00	.00	.00	.00	.08*	.23**	.11**	.14**	.10**	.06	.00	.00	–

* $p < .05$, ** $p < .01$. Age Group: 1 = Young, 2 = Midlife. Sex: 1 = Male, 2 = Female.

TABLE 3

Hierarchical multiple regression predicting positive relations theme in memories

	<i>B</i>	<i>SE B</i>	β	<i>t</i>
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

$R^2 = .00$ 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 = Midlife, 2 = Young. Sex: 1 = Male, 2 = Female.

with higher current levels of a particular self-characteristic would rate their memories as including higher levels of that theme (i.e., a significant effect of current self-characteristics on memory theme ratings). As predicted, there was a significant relation between each of the current self-characteristics and the corresponding memory theme rating. Findings relevant to this hypothesis appear in the regression models in Tables 3–8, Line 4.

Aim 2: Relation of self-characteristics to memory themes in earliest versus recent memories. The second hypothesis was fewer of the six self-characteristics would be significantly related to earliest memory themes than to recent memory themes. The test of this hypothesis was

TABLE 5

Hierarchical multiple regression predicting personal growth theme in memories

	<i>B</i>	<i>SE B</i>	β	<i>t</i>
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

$R^2 = .00$ 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 = Midlife, 2 = Young. Sex: 1 = Male, 2 = Female.

TABLE 4

Hierarchical multiple regression predicting purpose in life theme in memories

	<i>B</i>	<i>SE B</i>	β	<i>t</i>
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

$R^2 = .00$ 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 = Midlife, 2 = Young. Sex: 1 = Male, 2 = Female.

the interaction between current self-characteristics and memory type (i.e., earliest, recent). This interaction was significant for environmental mastery and self-acceptance (see Tables 7 and 8, Line 5 of the models) indicating that these two self-characteristics are differentially associated with earliest and recent memories. Pearson's correlations show that there was no relation between current environmental mastery and the environmental mastery theme in earliest memories, $r(397) = .05$, $p > .05$, but there was a significant relation between current environmental mastery and environmental mastery theme in recent memories, $r(394) = .25$, $p < .001$. The difference between these two correlations was significant, Fisher's $z = 2.88$, $p < .002$. Similarly, there was no relation between current self-acceptance

TABLE 6

Hierarchical multiple regression predicting autonomy theme in memories

	<i>B</i>	<i>SE B</i>	β	<i>t</i>
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*

$R^2 = .00$ 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 = Midlife, 2 = Young. Sex: 1 = Male, 2 = Female.

TABLE 7
Hierarchical multiple regression predicting environmental mastery theme in memories

	<i>B</i>	<i>SE B</i>	β	<i>t</i>
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

$R^2 = .00$ 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 = Midlife, 2 = Young. Sex: 1 = Male, 2 = Female.

and the self-acceptance theme in earliest memories, $r(396) = .07$, $p > .05$, but there was a significant positive relation between current self-acceptance and self-acceptance themes in recent memories, $r(395) = .32$, $p < .001$. The difference between these two correlations was also significant, Fisher's $z = 3.66$, $p < .001$. In sum, these analyses support the hypothesis that the relation between current self-characteristics and memory theme ratings is less evident in earliest memories than in recent memories.

Aim 3: Age comparisons of the relation between self-characteristics and memory themes. The relation between current self-characteristics and memory theme ratings was predicted to be similar for young and middle-aged adults. As expected, and in line with lifespan developmental theory, the interaction between current self-characteris-

TABLE 8
Hierarchical multiple regression predicting self-acceptance theme in memories

	<i>B</i>	<i>SE B</i>	β	<i>t</i>
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

$R^2 = .00$ 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 = Midlife, 2 = Young. Sex: 1 = Male, 2 = Female.

tics and age group in predicting memory themes was non-significant for all six self-characteristics (see Tables 3–8, Line 6).

Note that this finding was qualified by a significant interaction between age group, memory type, and current self-characteristics, but only for autonomy (see Table 6, Line 8). Follow-up Pearson's correlations showed a positive relation between young adults' current levels of autonomy and the autonomy theme in their recent memories, $r(278) = .25$, $p < .001$, but not in their earliest memories, $r(275) = .10$, $p > .05$. The difference between these two correlations was significant, Fisher's $z = 1.81$, $p = .03$. In contrast, middle-aged adults' current autonomy appeared to be related to their earliest memory themes, $r(126) = .28$, $p < .05$, but not their recent memory themes, $r(122) = .16$, $p > .05$. However, the difference between these two correlations was non-significant, Fisher's $z = .98$, $p = .16$. These findings show that, for middle-aged adults, there is no difference between earliest and recent memories, whereas for young adults there is a positive relation between their current autonomy and the autonomy theme only in their recent memories. Expressed differently, young and middle-aged adults do not differ in terms of the relation of current autonomy to autonomy themes seen in recent memories, Fisher's $z = .86$, $p = .39$, but the relationship does differ by age group for earliest memories, Fisher's $z = 1.72$, $p = .04$.

Although there were no hypotheses concerning the interaction between age group and memory type, it is worth mentioning that this interaction was significant for positive relations and self-acceptance themes (see Tables 3 and 8, Line 7). The interactions were followed up with ANOVAs conducted separately for the two age groups, and then separately for the two types of memories. Examination of age group differences in terms of the positive relations theme showed no age group differences in recent memories, $F(1, 405) = 1.39$, $p = .24$, but young adults rated their earliest memories higher in positive relations theme than middle-aged adults, $F(1, 409) = 5.83$, $p = .016$. Similarly in terms of the self-acceptance theme, there were no age group differences in recent memories, $F(1, 408) = 2.10$, $p = .15$, but young adults rated their earliest memories higher in the self-acceptance theme than middle-aged adults, $F(1, 409) = 4.95$, $p = .027$. Next, examination of memory type differences in terms of positive relations theme showed no differences between young adults' earliest and recent

memories, $F(1, 560) = 0.30$, $p = .59$, but middle-aged adults rated their recent memories higher in the positive relations theme than their earliest memories, $F(1, 254) = 9.20$, $p = .003$. Similarly in terms of the self-acceptance theme, findings showed no differences between young adults' earliest and recent memories, $F(1, 562) = 0.001$, $p = .98$, but middle-aged adults rated their recent memories higher in the self-acceptance theme than their earliest memories, $F(1, 255) = 9.45$, $p = .002$.

DISCUSSION

This research examined the relation between young and middle-aged adults' current self-characteristics and the self-rated themes of their earliest childhood memory and a more recent memory. Findings generally support the SMS model and the study hypotheses: (i) Current self-characteristics (i.e., aspects of the conceptual self) are significantly associated with the themes in the memories individuals recall, (ii) this relationship is somewhat less evident in earliest memories than in recent memories, and (iii) this relationship does not vary widely across two adult age groups. Results are discussed in detail below.

Relation of the conceptual self to memory themes

Many researchers have theorised about the relation of the self to autobiographical memory (e.g., Conway, 2005; Ross, 1989) but less research has examined the nature of this relationship. The SMS model (Conway & Pleydell-Pearce, 2000) suggests that individuals' current conceptual self guides the retrieval of individual memories, thereby shaping the content of memories at the time of retrieval (Conway, 2005). This basic claim was examined in the current study through independently assessing individuals' current self-characteristics, and in a separate session the self-rated themes that emerged when participants recalled autobiographical memories. The basic SMS claim was supported: People who currently report having higher levels of positive relations, purpose in life, personal growth, autonomy, environmental mastery, and self-acceptance produce memories that have higher levels of these six themes than people who score lower in these self-characteristics.

These findings support the reconstructive nature of autobiographical memory (e.g., Brewer, 1986) 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 (Mace, 2007). Reconstruction occurs in accordance with the current goals and needs of the rememberer (Bluck, Alea, & Demiray, 2010). They are produced not just by a memory system but an integrated self-memory system. Due to this reconstructive, integrative memory system, human beings have a tendency to shape the recall of past events to fit with their current identity (Wilson & Ross, 2003). The current findings show this to be true for a set of six diverse self-characteristics, thus expanding previous research that showed a significant link between other aspects of the conceptual self (e.g., personal motives; Woike, 1994) and memory content. Note that while the current data do not directly assess retrieval processes, the findings are in line with the reconstruction of memories at retrieval suggested in the SMS model.

The SMS model illustrates *how* the conceptual self affects the themes of retrieved memories, but *why* might memories be constructed during retrieval in accordance with the current characteristics of the self? According to the functional approach to autobiographical memory (e.g., Pillemer, 1992), they are reconstructed so as to serve adaptive self, social, and directive functions for the individual in daily life (Bluck, 2009; Bluck & Alea, 2002). One major function of autobiographical remembering is a self-function (i.e., development and continuity of the self; Bluck & Alea, 2008). In daily life individuals may recall memories that fit with their current self-characteristics in order to maintain self-continuity. The current findings suggest, for example, that a person who currently sees him- or herself as having a high level of personal growth will tend to recall memories with richer personal growth themes. Retrieval of such memories may then feed back to the conceptual self, confirming or enhancing a person's current self-conception as having a personal growth orientation.

In sum, as predicted, the current study found basic support for the SMS model in regard to the postulated link between the conceptual self and the thematic content of independently retrieved

autobiographical memories. The SMS model elucidates *how* the current conceptual self shapes the retrieval of autobiographical memories. Future research might integrate the functional approach to also shed light on *why* the current conceptual self shapes the recall of memories (i.e., toward what adaptive ends; Berntsen, 2007; Bluck et al., 2010).

Relation of the conceptual self to earliest and recent memories

The second aim of the study was to more stringently examine the SMS model by also comparing the relation of one's current self-characteristics to one's earliest childhood memories. As predicted, the relation of self-characteristics was stronger for memories from the last year than for earliest childhood memories: Only four of the six current self-characteristics map onto themes in earliest memories (only three for younger adults). Current levels of environmental mastery and self-acceptance were not associated with the existence of those themes in either young or middle-aged persons' earliest childhood memories. Further, young adults' current autonomy was not related to the existence of that theme in their earliest memories. That several current self-characteristics were evident in individuals' earliest memories suggests that the current conceptual self is indeed associated even with very distant memories. Note, however, that these findings also provide a challenge to the SMS model. According to the model, earliest memories are theorised to be retrieved (from the set of all encoded memories) particularly because they are the first memories that match with one's current self-characteristics at the time of retrieval. However, the current research suggests that they do not map as neatly as recent memories do.

There are two plausible reasons for this. One is the age of the earliest memories. The current participants' earliest memories occurred when they were between 4 and 5 years old. These memories are of events that occurred 17–51 years ago, whereas recent memories are at most 1 year old. Earliest memories have been found to contain less information in a variety of categories (e.g., emotion, setting, context, colour, details) and earliest memory narratives are less complete than recent memory narratives (Howes et al., 1993; West & Bauer, 1999; Westman & Orellana,

1996). In addition, very old memories tend to become more stable over time and are more likely to be reproduced in an unvarying, schematised format (Anderson, Cohen, & Taylor, 2000). That is, earliest memories tend to be simpler, skeletal events. They are also unlikely to be frequently thought about or talked about with others (Demiray, Bluck, & Gülgöz, 2008), which may also make them more resistant to effects of the current conceptual self. In contrast, recent memories, encoded in adulthood, may be more complex, less schematised and more often told and re-told, thereby potentially making them more subject to dynamic reconstruction as influenced by the current conceptual self.

The second possibility is that some adult self-characteristics, particularly environmental mastery and self-acceptance, are less likely to occur during the experience of childhood events. If these characteristics are infrequently experienced in early childhood, then even a person with current high levels of these characteristics may not imbue early childhood events with these themes. That is, earliest childhood memories are encoded in childhood and retrieved in adulthood, whereas recent memories are both encoded and retrieved in the same developmental stage. This may lead to a better fit between current self-characteristics and the themes of these characteristics in recent memories.

In particular, Eriksonian psychosocial stage theory (Erikson, 1963) suggests that while the other self-characteristics assessed in the current study may be seen in some nascent form in early childhood, environmental mastery and self-acceptance are characteristics that may not yet have developed in the conceptual self of a 4- or 5-year-old. According to Erikson (1963), by the time children are 3 years old, they should have sufficiently resolved the trust versus mistrust conflict, and the autonomy versus self-doubt conflict. In relation to the self-characteristics assessed in the current study these two stages are ones in which children develop social relations with others, and a new level of autonomy. By the age of 4 to 6, children are facing the initiative versus guilt conflict, followed by industry versus inferiority. Note that initiative is similar to the notion of purpose as assessed in the current study, and industry may be roughly equated with the strivings involved in personal growth. Thus the four current self-characteristics that are reflected in earliest memory themes appear to make sense in terms of child developmental processes.

However, it might be too early for children to have fully developed environmental mastery (at least the type of mastery assessed in the current study) or to have the reflective capacity necessary for self-acceptance. Levine (2004) suggests that the cognitive self that emerges around age 2 is a very basic form of self awareness (i.e., demonstrated by the mirror test; Amsterdam, 1972) and that a more advanced temporally extended self-awareness emerges at around age 4. For example, although 2-year-old children can retain event knowledge for long time periods, this knowledge is fragmentary, cue-dependent, and inconsistent. Due to this primitive self-awareness, young children may not be aware or reflective enough to experience self-acceptance. As such, the adult who is now remembering early childhood events would have to imbue the event with a characteristic that it actually did not contain. While the current conceptual self may influence the level of thematic content in retrieved events, the SMS model does not claim that in most cases the events are radically changed at the time of recall. Similarly, for environmental mastery, although children begin to try to control their environments in a basic way at an early age (Collins, 1999), they do not have the more sophisticated type of environmental mastery that is measured in the current study. The current study assesses environmental mastery in memories with items such as "In this memory, I was feeling in charge of my situation" or "In this memory, I was having difficulty arranging things in a way that felt satisfying". These adult-like abilities might be occurring later in child development. Indeed, although it is not conclusive, this interpretation is bolstered by the fact that these two self-characteristics and autonomy (not associated with young adults' earliest memories only) show somewhat lower mean levels in earliest memories (range: 4.96–5.60) than the other three themes (range: 5.70–5.95). Thus environmental mastery and self-acceptance may be two special self-characteristics that occur later in child development leading to them being found less often in earliest memories regardless of individuals' current conceptual selves.

In sum, the relation of current adult self-characteristics to the themes found in retrieved memories differs across memories from recent and distant life phases. There are fewer relationships between the conceptual self and self-rated themes in earliest memories (encoded in a distant child developmental stage and retrieved as an

adult) as compared to recent memories (that are both encoded and retrieved in the same developmental stage). Thus the current study provided support for the SMS model by showing that even earliest childhood memories can be linked to the characteristics of the current conceptual self. Note, however, that refinements to the SMS model are also suggested: Future iterations of the SMS model will need to elucidate how retrieval of different types of memories is affected by the conceptual self. This should particularly include elaborating the role that time since encoding and the effects of retrieval of memories from previous developmental stages play in the strength of associations between the conceptual self and the self-themes found in retrieved memories.

Expanding the SMS model with a lifespan developmental perspective

Although the SMS model presents a complex representation of the relation between the self and autobiographical memory, it does not consider how development may affect this relation. A contribution of the current study was to examine whether theorised processes in the SMS model hold across two adult age groups. Given that the model does not rely on cognitive processes expected to change dramatically from young adulthood to midlife (e.g., inductive reasoning or verbal skills; Schaie & Zanjani, 2006), the overall relation between the conceptual self and memory theme was not expected to, and largely did not, differ across the two age groups. The one difference was that young adults' current autonomy level was related to recent memories, but not earliest memories. Differences between the two age groups in the qualities of their earliest memories (i.e., young have less-vivid and less-emotional earliest memories, but greater sense of control in these memories than middle-aged adults; Demiray & Gülgöz, 2009) may be partially responsible for this small age group difference in the current study. Further research is necessary to understand why autonomy shows this difference, whereas the other self-characteristics are similarly reflected in young and middle-aged adults' earliest and recent memories. This small age group difference eliminates the possibility that the lack of age group differences (supporting the null hypothesis in the third study aim) in the relations

between most current self-characteristics and memory themes may be due to a methodological error. Furthermore, additional findings, although not the scope of this study, show that middle-aged adults score higher in most self-characteristics and higher in most memory theme ratings than young adults, suggesting developmental stability in the relation between these measures.

Although this is a cross-sectional study, the findings suggest that the relation between the current conceptual self and memory may be basically stable at least into midlife. Showing this developmental stability extends the SMS model, which postulates its central constructs (e.g., conceptual self, working self) as universal. Further research examining younger (e.g., adolescence) and older adult samples will be necessary to chart the developmental stability or change in these processes across the adult lifespan. 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). However, this relation between the current self and autobiographical memory may not be completely present in early adolescence, before one has created a biographical identity (Haber-mas & Bluck, 2000). It may also begin to break down in later life, particularly in the fourth age (from 80 years onward; Baltes, 1997) or under conditions of dementia (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 across the life span, in particular examining both normal aging and the impaired aging mind (Levine, 2004).

Limitations and future directions

The self-memory system model (Conway & Pleydell-Pearce, 2000) is complex. Even the conceptual self, though just one part of the model, includes many aspects (e.g., personal scripts, possible selves), which were not examined in the current study. The research focused on one aspect of the conceptual self: self-characteristics. Showing that current self-characteristics are reflected in the themes expressed in autobiographical memories 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. In addition, during retrieval, self-characteristics 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 goals of the working self. The current study focused on a very specific part of this complex network of SMS relations. Future research might focus on other sets of relations in order to provide further tests of the SMS model and to more fully elucidate the relation between the self and autobiographical memory.

A related limitation is that the study did not explicitly 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, long-term self, and working self), the working self is an important component. In this study the explicit goal of the participant's working self was to pay attention to the study instructions and in response to those, to recall two specific autobiographical memories. We cannot be sure, however, that this was the only explicit goal active during retrieval: The system includes many explicit and implicit goals simultaneously (Woike et al., 2001). However, it is difficult to fully measure an individual's existing goal hierarchy at any given point in time. Thus we relied on using study instructions to direct the goals of the working self during the retrieval of the memories. Future research might attempt to measure people's current goals through self-reports, as well as by giving participants standardised goals through experimental manipulation.

Another limitation is the possibility that the findings are a result of reporting bias related to the study procedures. That is, participants were asked to self-report their current self-characteristics and also asked to assess these themes in their memories. It is possible that participants who have higher levels of a certain self-characteristic may have a tendency to respond to any scale with a bias towards endorsing that characteristic. That is, participants might be rating their memories as having high levels of certain themes regardless of actual themes in the memories. As mentioned in the Method section, to reduce such biases the two measures were administered with a minimum 48-hour time lag between them, the wording of the items assessing

the same self-characteristic was changed across the two measures, and foil items were randomly distributed in both measures to reduce recall of similar previous responses. The pattern of findings (differences by memory type) also argues against the results being driven by a general response bias. Given these procedures and findings, although reporting bias can never be ruled out, it seems highly unlikely that the findings reflect such bias.

One potential way to address this possible response bias issue would be to content code for themes in memory narratives instead of relying on participants' subjective ratings of their memory themes. However, the aim of the study was to examine the link between participants' own subjective perceptions of their current self-characteristics and subjective recall of the themes in their memories (because the study aim was to assess the individual's internal link between self and memory in the self-memory system; Conway & Pleydell-Pearce, 2000). Thus an objective content coding system for memory narratives was not used, as it would demonstrate the link between self-ratings and independent evaluators' views of memory themes. Future research might address the link between self-characteristics, self-rated memory themes, and peer- or experimenter-coded memory themes to further elaborate the self-memory system links.

Conclusions

The study provided basic support for the SMS model claim (Conway & Pleydell-Pearce, 2000) that an individual's conceptual self plays an important role in guiding the retrieval of autobiographical memories. The model is much cited, but has not spawned abundant empirical research since it was first published 11 years ago. The current study contributes to the empirical literature on the SMS model, but also suggests two important refinements.

In terms of the generalisability to different types of autobiographical memories, the current study showed that the model could be further specified for how it operates on different types of memories. The current conceptual self appears to have differential effects on memories from different life phases, showing less relation to distant memories such as people's earliest childhood memories. This suggests that the SMS model might be refined by considering this and other

factors (e.g., memory valence, event centrality, personal significance of the event, life stage at encoding versus retrieval) that may affect the strength of the relation between the conceptual self and retrieved memories.

Findings also suggest that the SMS model could be theoretically enriched by adding a life-span developmental component. Although there may be changes in the current conceptual self across development in terms of mean levels of self-characteristics (Ryff, 1989), the current findings suggest that the *relation* between the current conceptual self and memory themes appears to remain largely constant, at least in young adulthood and midlife. Further testing of adult developmental samples would determine whether the SMS model holds across the entire lifespan. In sum, despite its limitations, the study offers both support and refinements to one of the most prominent models of autobiographical memory. In doing so it provides new insights into how our current self affects the retrieval of both recent and distant memories in daily life.

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