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Age Differences in the Content of Self-Defining Autobiographical Memories

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Research has consistently shown that age is related to phenomenological memory characteristics (e.g., increased vividness is associated with increased age). However, little research has examined age-related qualitative differences in autobiographical memories. Thus, the purpose of the current study was to examine qualitative differences in the content of self-defining memories across age. Two hundred sixty-one individuals between the ages of 18 and 94 provided self-defining memory descriptions that were systematically categorized as part of a content analysis. No meaningful differences in content were identified across the three age groups. Word analysis was also conducted, and no differences in word choice were found across age. Results therefore suggest that the content of and the words used to describe self-defining memories are not significantly influenced by age.

Keywords: aging, autobiographical memory, positivity effect, self-defining memory

Autobiographical memories are characterized by and can be rated based on several different phenomenological features. These features include details related to sensory information (e.g., visual images, smells, tastes), contextual information (e.g., individuals present at the event, the time when and the place where the event occurred), and affective information (e.g., feelings experienced during the event) associated with recollecting a past event from one's personal history. These phenomenological features are also characteristic of a subset of autobiographical memories, called self-defining memories (SDMs). Self-defining memories are considered to be central to an individual's personal identity. In an earlier study, Singer, Rexhaj, and Baddeley (2007) described SDMs as "vivid, emotionally intense, repetitively recalled, linked thematically to similar memories, and focused on enduring concerns or unresolved conflicts" (p. 886). Research indicates that ratings of phenomenological characteristics of autobiographical memories, and of SDMs specifically, may differ across age.

Siedlecki, Hicks, and Kornhauser (2015) found that age was significantly correlated with a number of phenomenological memory characteristics for SDMs of high personal meaning. Increased age was associated with greater vividness, coherence, sensory detail, time clarity, taking a first-person perspective, and less distancing (Siedlecki et al., 2015). These age-related differences were consistent with previous research by Comblain, D'Argembeau, and Van der Linden (2005), who found that older adults rated their memories as more vivid, containing more details, and less complex than did younger adults. Moreover, older adults showed greater clarity of the memory for the moment when the event took place compared to younger adults. Similarly, Singer and colleagues (2007) found that older adults rated SDMs as more vivid and important than did a sample of college students. Thus, research has consistently shown quantitative differences in ratings of memory characteristics across age, but few studies have taken the content of the memories into account. The purpose

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of the current paper is to examine, using quantitative analyses, whether there are also differences in content across age.

Examining the content of memories that individuals select will allow us to examine qualitative differences in SDMs across age and may also help to explain why there are age-related differences in ratings of phenomenological characteristics in autobiographical memories. For instance, when asked to rate characteristics of autobiographical memories, older adults have been shown to report more memories that contain themes of growth and integration (Bauer, McAdams, & Sakaeda, 2005), life lessons, and self-transformation (Pasputhi & Mansour, 2006) as compared to younger adults. These findings are consistent with research showing that individuals evaluate past events as more positive, or less negative, as they get older (Comblain et al., 2005; Gallo, Korthauer, McDonough, Teshale & Johnson, 2011; Schlagman, Schulz, & Kvavikashvili, 2006). This finding is referred to as the positivity effect. The positivity effect refers to findings that older adults remember more positive information relative to negative information as compared to younger adults. This effect may represent motivational changes with increasing age to focus on the importance of emotional satisfaction in old age, consistent with the socioemotional selectivity theory of aging (Carstensen, Isaacowitz, & Charles, 1999). Specifically, the socioemotional selectivity theory maintains that a motivational shift takes place in the latter portion of an individual's life, and the perception of limited time left in life leads individuals to prioritize their attention on emotionally meaningful goals. Carstensen and colleagues (1999) explain that time is perceived as open-ended in early adulthood, motivating individuals to pursue knowledge-related goals and novel experiences. Alternatively, as time constraints become more apparent and individuals grow more aware of their own mortality, older adults tend to focus more on emotional satisfaction, maximizing positive affect and minimizing negative affect to enhance well-being, often through emotionally satisfying relationships. This shift may motivate older adults to select SDMs with themes that differ from younger adults, which may account for some of the differences in phenomenological ratings of SDMs across age.

De Vries et al. (1995) found that in personal memories within a life review, older adults' memories contained fewer themes of relationships compared to younger and middle-aged adults and contained more themes of life-threatening situations, such as illness and injury. Singer et al. (2007) extended this research by examining the content of SDMs across age groups and hypothesized that older adults' SDMs would contain fewer relationship themes and more life-threatening themes as compared to younger adults. Singer et al. (2007) failed to replicate the findings reported by DeVries et al. (1995) and instead found that older adults reported memories that were more positive in tone and contained more integrative meaning. Thus, in line with findings reported by Singer et al. (2007) and consistent with the socioemotional selectivity theory, we expect that older adults' memories will contain fewer achievement-related themes and more themes related to relationships than younger age groups, as this aligns with older adults' shift in motivation toward emotionally satisfying endeavors and relationships. Furthermore, it is expected that older adults will use more positive words and/or fewer negative words when describing their SDMs compared to middle-aged and younger adults in line with the positivity effect and previous research (Comblain et al., 2005; Gallo, Korthauer, McDonough, Teshale & Johnson, 2011; Schlagman, Schulz, & Kvavikashvili, 2006).

There is some evidence that the content of autobiographical memories may vary across age. Specifically, Schlagman et al. (2006) asked a sample of young adults and older adults to describe involuntary autobiographical memories that they spontaneously experienced throughout the period of 1 week. The authors completed a content analysis using systematic categorization and found that the presence of certain themes in memories differed across the age groups. Specifically, they found that there were a greater percentage of accident/illness, stress events, and conversation-related categories present within memories of the young adults and a greater percentage of traveling/journeys category present within memories of the older adults. In addition, older adults were less likely to recall memories with negative themes.

However, not all researchers find age-related differences in the content of autobiographical memories. For example, although Singer et al. (2007) found that compared to college students, older adults' SDMs were rated as more positive, included more summary memories, and were more likely to contain "integrative meaning" than SDMs described by younger adults. However, there were no differences in the content of the memories, as classified in seven categories (experiences with life threatening themes, relationships, recreation, achievement, guilt, drug and alcohol themes, and unclassifiable).

In addition to the content of SDMs, word choice used to describe these memories may also vary across age. According to Tausczik and Pennebaker (2010), word usage is the most fundamental way to communicate internal thoughts and emotions. In light of these findings, we chose to concurrently analyze text content and word usage to determine if there are differences in SDMs across age. Rice and Pasupathi (2010) analyzed self-narratives and noted that older adults tend to use lower levels of present tense words, fewer self-focused pronouns, and greater numbers of words indicating positive emotions for self-discrepant and self-confirming events. Thus, the current study also utilized a word analysis technique, but assessed SDMs rather than self-narratives. To our knowledge, this is the first study to incorporate text analysis of SDMs.

In the current study, we were interested in exploring possible qualitative differences in the content of an SDM such as, what types of memories were selected, and how did types of memories differ in content across age? We also examined differences in word usage in SDMs across age. In addition, we were particularly interested in whether the content and the description of the memories were more positive in the older sample as compared to the younger sample, as would be expected from findings related to the positivity effect and socioemotional selectivity theory.

Method

Participants

Two hundred sixty-one participants (ages 18-94 years; M_{age} = 54.06; SD = 16.77) provided summaries of a SDM. Three age groups were created; the young group comprised individuals between the ages of 18 and 40 years (n = 75; M_{age} = 31.87; SD = 6.76), the middle-age group consisted of individuals between the ages of 41 and 64 years (n = 93; M_{age} = 54.90; SD = 6.31) and the older group comprised individuals between 65 and 94 years of age (n = 93; M_{age} = 71.12; SD = 4.63). The age ranges included in each group were chosen to have a large enough sample within each group and are also consistent with previous research that has categorized participants into younger, middle, and older adult age groups (e.g., Salthouse, 2013; Salthouse, 2016; Siedlecki et al., 2015). There were no significant differences between the three age groups in terms of self-reported health, $F(2, 258) = 2.70$, $p = .069$, or levels of education, $F(2, 258) = 2.22$, $p = .111$. Participants were recruited through Surveymonkey.com and completed a survey online. Additional information about the sample recruitment can be found in Siedlecki et al. (2015). Participant demographic characteristics are provided in Table 1.

Materials

Memory Experiences Questionnaire. The Memory Experiences Questionnaire (MEQ; Sutin & Robins, 2007) measures 10 categories of phenomenological characteristics of autobiographical memory, including vividness, coherence, accessibility, sensory detail, emotional intensity, visual perspective, time perspective, sharing, distancing, and emotional valence. In the present study, participants completed a slightly shortened version of the MEQ for two separate memories, one of which asked participants to select a memory of any kind, and the other asked participants to report a self-defining memory. The following instructions were given to participants:

> Please select a memory that is PERSONALLY MEANINGFUL to you, it can be either positive or negative, but it should convey the most important experience you have had that helps you to understand who you are and how you arrived at your current identity. It may be a memory about any kind of experience, but it should be something you have thought about many times and is still important to you, even as you are recalling it now. Please remember that the memory you choose

Table 1
Participant Demographic Characteristics

	Total $N = 261$	Young (ages 18-40 years) $n = 75$	Middle (ages 41-64 years) $n = 93$	Older (ages 65-94 years) $n = 93$
Mean Age	54.1 (16.8)	31.9 (6.8)	54.9 (6.3)	71.1 (4.6)
Gender (%)				
Female	59.9	54.7	58.1	66.7
Male	39.3	45.3	41.9	32.2
Not reported	0.8	0	0	1.1
Race (%)				
American Indian/Alaska native	0.8	0	1.1	1.1
Asian	2.7	2.7	2.1	3.2
Native Hawaiian/Pacific Islander	0.4	0	1.1	0
Black	5.3	6.7	6.4	3.2
White	85.5	80.0	84.9	91.4
Hispanic	6.2	14.7	4.3	1.1
More than one	1.9	4.0	2.2	0
Other	2.3	5.3	2.2	0
Missing	1.1	1.3	0	1.1
Mean Education, years	15.0 (2.7)	14.7 (2.4)	14.8 (2.5)	15.5 (3.0)
Mean Health, self-report	2.5 (1.0)	2.4 (0.9)	2.7 (1.1)	2.4 (1.0)

Note. Standard deviations are listed next to mean values in parentheses.

> should be a personal event that occurred only one time, at a particular place and date, and lasted less than one day.

Participants then typed a description of their SDM into an open-ended response section of the survey. The current study focused on the content analysis of participants' memory descriptions across age. The relationships between age and the phenomenological characteristics of the SDMs for these data are presented in Table 5 of Siedlecki et al. (2015). In these data, age was shown to be associated with increased vividness, increased coherence, increased sensory detail, increased field perspective, and increased time perspective.

Procedure

Content analysis. A content analysis using systematic categorization of themes (Thorne & McLean, 2001) was conducted in three steps by two independent coders who were blind to participant age.

Step 1. Thorne and Mclean's (2001) six themes for categorization of self-defining memories were utilized. Each independent coder was first trained to use the coding scheme before accessing the data. Categories suggested by Thorne and McLean (2001) include "life threatening event," "recreation/ exploration," "relationships," "achievement/ mastery," "guilt/shame," "drugs, alcohol, or tobacco use," and "event not classifiable."

Step 2. The two independent coders placed each memory into the appropriate memory theme category by reading each memory and indicating whether a particular category was present. Coders were instructed to choose only one category and to take brief notes on their selections. Once completed, coder agreement was calculated. Across the categories, the mean Cohen's kappa coefficient (k) of interrater agreement between the two coders was .40.

Table 2
Relative Frequencies of Content Categories Across Age

			Young *n* = 75		Middle *n* = 93		Older *n* = 93	
	χ^2	*p*	N	%	N	%	N	%
Life Threatening	0.40	0.820	20	26.7	22	23.7	21	22.6
Recreation/ Exploration	0.07	0.967	7	9.3	9	9.7	8	8.6
Relationships	0.91	0.635	20	26.7	19	20.4	22	23.7
Achievement & Mastery	5.49	0.064	17	22.7	34	36.6	36	38.7
Guilt and Shame	--	--	4	5.3	1	1.1	0	0.0
Event Not Classifiable	0.53	0.769	7	9.3	8	8.6	6	6.5

Note. [a]Three cells have an expected count less than 5; *$p < .05$.

Differences in the categorization can be attributed to the fact that many of the memories contained complex concepts that could be included in more than one category.

Step 3. To address this issue, the coders went through each of the memories individually and compared their notes about its categorization in order to agree upon a final categorization. No memories were ultimately categorized as being part of the drugs, alcohol, or tobacco use category, thus this category was removed from subsequent analyses.

Word analysis. Differences in the word choice within the text of participants' SDM descriptions were examined with the newest version of the Linguistic Inquiry Word Count (LIWC) software (Pennebaker, Booth, & Francis, 2007), which calculates the frequencies of words from certain categories that are predefined by the creators of the program (e.g., words such as 'accept,' 'affection,' and 'appreciate' were considered part of the Positive Emotions category). Several studies have provided support for the validity of the LIWC program (e.g., Hirsch & Peterson, 2009; Pennebaker, Chung, Ireland, Gonzales & Booth, 2007; Rice & Pasputhi, 2010).

Results

Content Analysis of SDMs

Of the five content analysis themes, the most common category across the entire sample was related to achievement/mastery (33.6%, *n* = 88). Self-defining memories related to achievement/ mastery included obtaining a driver's license, having a child graduate from high school, and graduating from graduate school. Life threatening event was the second most common theme to emerge across the entire sample (24%, *n* = 63). This type of memory contained themes related to death, life threatening experiences and severe distress, including memories related to death of a parent, death of a spouse, and car accidents. SDMs classified in the relationship category included positive experiences (e.g., the birth of a child, the start of a new relationship) and also negative experiences (e.g., the discontinuing of a

Table 3
Correlations Between Age and Word Analysis Categories

	1	2	3	4	5	6	
1. Age	1						
2. Word Count	-.05	1					
3. Social processes	.05	-.13*	1				
4. Family	.01	-.22**	.51**	1			
5. Friends	-.01	.00	.05	-.10	1		
6. Affective processes	-.06	.04	-.02	-.09	.08	1	
7. Positive emotion	-.03	.02	.03	-.04	.10	.89**	
8. Negative emotion	-.06	.05	-.10	-.09	-.03	.40**	
9. Cognitive processes	-.07	.35**	-.09	-.17**	.08	.05	
10. Leisure	.06	-.08	.00	-.02	-.04	.03	
11. Achievement	.06	-.11	.09	-.12*	.03	.28**	
12. Work	-.03	-.07	.23**	-.13*	-.05	-.09	
13. Religion	-.01	-.07	-.03	-.10	-.04	.04	
14. Death	.05	-.09	.10	.22**	-.03	-.06	

	7	8	9	10	11	12	13
1. Age							
2. Word Count							
3. Social processes							
4. Family							
5. Friends							
6. Affective processes							
7. Positive emotion	1						
8. Negative emotion	-.07	1					
9. Cognitive processes	.00	.09	1				
10. Leisure	.07	-.06	-.09	1			
11. Achievement	.16**	.28**	-.08	-.02	1		
12. Work	-.05	-.09	-.08	.00	-.04	1	
13. Religion	.05	-.06	-.08	.01	-.08	-.05	1
14. Death	-.06	-.01	-.09	-.04	-.08	-.05	-.03

Note. *$p < .05$; **$p < .01$.

Table 4
Correlations between Memories within Content Themes and Word Analysis Categories

	Content Themes					
	Life Threatening	Recreation/ Exploration	Relationships	Achievement	Guilt and Shame	Event Not Classifiable
Social processes	.01	-.05	.36**	-.19**	-.06	-.17**
Family	.07	-.05	.14*	-.05	-.06	-.16**
Friends	-.05	.04	.17**	-.13*	.01	-.03
Affective processes	-.02	-.01	.12*	-.09	.03	.00
Positive emotion	-.17**	.09	.21**	-.04	-.01	-.08
Negative emotion	.19**	-.13*	-.07	-.11	.06	.11
Cognitive processes	-.03	-.07	.16*	-.11	.03	.04
Leisure	-.09	.29**	-.05	-.02	-.03	-.03
Achievement	-.07	-.04	-.01	.08	-.02	.04
Work	-.14*	-.01	-.12	.24**	-.02	.00
Religion	-.11	.05	-.09	.16**	-.02	-.03
Death	.32**	-.06	-.10	-.13*	-.01	-.05

Note. *$p < .05$, **$p < .01$.

relationship with a parent; 23.3%, $n = 61$). SDMs classified in the recreation category (9.2%, $n = 24$) included learning how to play a sport and attending a music concert. Twenty-one memories (8%) were included in the event not classifiable category. Examples in this category included losing a substantial amount of weight and arriving late for a meeting. Five memories were classified into the guilt and shame category (1.9%, $n = 5$). As mentioned above, no memories were categorized into the drugs, alcohol, or tobacco use category.

Age Differences in the Content of the SDMs

Chi square analyses were conducted to determine whether the frequency of content categories varied across the three age groups. Chi square values and relative frequencies of content categories across age are reported in Table 2. Results indicate that the content of SDMs did not significantly differ across age.

Word Analysis

Word analyses were conducted on SDMs by determining the proportion of words that counted toward a particular word category (e.g., social processes, family, friends, affective processes, etc.) over the total number of words used to describe the memory. There were no significant differences in total word count in the SDMs across young ($M = 43.53$, $SD = 57.10$), middle-aged ($M = 34.84$, $SD = 32.00$), and older adults ($M = 39.31$, $SD = 33.79$), $F(2, 258) = .93$, $p = .398$. The correlations between age and the word variables are presented in Table 3. Consistent with results of the content analysis, there were no significant relationships among age and

the types of words used when asked to describe an SDM. In fact, all the correlations between age and the categories were less than .08, suggesting there was essentially no relationship between word usage and age. In particular, there were no significant correlations between age and the use of positive or negative words in the memory descriptions. Although there was no relationship found between age and word selection, several word categories did correlate with content categories. For example, memories that were categorized as life threatening were significantly less likely to contain words with positive emotions (r = -.17, $p < .01$), and were more likely to contain words consistent with the negative emotion word category ($r = .20$, $p < .01$). Memories classified as containing a relationship theme had positive associations with several word categories, such that memories that contained a relationship theme were more likely to include words that comprised social processes (r = .36, $p < .01$), family ($r = .14$, $p < .05$), friends ($r = .17$, $p < .01$), affective processes ($r = .12$, $p < .05$), and positive emotion ($r = .21$, $p < .01$). The correlations between content themes and word categories are reported in Table 3.

Discussion

Previous research has found differences in phenomenological characteristics of autobiographical memories across age (e.g., Comblain et al., 2005; Montebarocci, Luchetti, & Sutin, 2014; Siedlecki et al., 2015; Singer et al., 2007). The goal of the current study was to determine whether there were also differences in the content of SDMs across age, with a focus on examining potential differences in the positivity in the memories. Results of the current study did not reveal any meaningful differences between the content or word choice of SDM descriptions across age.

The lack of meaningful differences in content across age is consistent with findings reported by Singer et al. (2007) who found no significant differences in the memories that younger and older adults described. In contrast, Schlagman et al. (2006) identified differences in the content of memories across age. These mixed results may be a function of different methodologies. In addition, the types of memories that participants were instructed to recall differed across the studies as well. For example, the current study required individuals to report voluntary SDMs while Schlagman et al. (2006) examined involuntary memories. Moreover, Alea et al. (2004) found that older adults reported more negative emotions (e.g., sadness) when reporting memories of the OJ Simpson verdict compared to younger adults. According to Alea and colleagues (2004), older adults may be able to suppress negative emotions with everyday events but may not be able to do this when a memory is personally meaningful.

Previous research has demonstrated the positivity effect, most of these studies include laboratory stimuli that may not be meaningful to participants. In contrast, because autobiographical memories are more personally relevant and are deemed more important, it may be difficult for participants to regulate emotions associated with these particular memories, which could serve as an explanation as to why no differences in SDM content was found across age. In essence, it is possible that the positivity effect is less evident when personally relevant, meaningful stimuli, such as SDMs, are utilized as opposed to laboratory stimuli (Alea et al., 2004; Siedlecki et al., 2015). This is an important distinction to make because it may provide more nuance to our understanding of the positivity effect; this phenomenon may not be a universal experience of all older adults in all contexts but may depend greatly on the stimuli or information being considered or recalled.

Interestingly, the most common theme described in the SDMs across the three age groups was related to achievement/mastery. It should be noted, however, that the categorization guidelines include a wide variety of topics (e.g., winning a competition, getting one's braces off, getting into college, child birth, religion, embracing ethnic heritage) that fall into this category (Thorne & Mclean, 2001). The wide variety of topics that can be classified as achievement/mastery may account for its prevalence in the current sample. Our findings suggest that achievement/mastery are important sources of self-defining memories across adulthood, irrespective of age.

Text analysis of each SDM revealed several significant associations between different word categories and content themes. However, there were no associations between age and text used to describe

the SDM. In particular, there was no evidence that age was associated with the use of more positive or less negative words, which would be expected from findings related to the positivity effect. Although consistent with the results of our content analysis, the lack of association between age and text are in contrast to findings reported by Pennebaker and Stone (2003) and Rice and Pasputhi (2010), both of whom found strong age differences in language used in participant narratives. Differences in methodology utilized in studies that have identified age differences in language usage may explain why no significant findings were observed in the current study. For example, Rice and Pasputhi (2010) required participants to recall an experience from the prior month that was either self-discrepant or self-consistent, and Pennebaker and Stone (2003) analyzed participants' writing styles about either emotional or superficial events. However, as discussed by Pennebaker and Stone (2003), the LIWC word analysis technique cannot consider context, humor, and sarcasm when analyzing the words a participant utilizes to describe their memories. This is a limitation of the current study and thus may explain why there were no significant relationships identified between age and text use. It is important to note, however, although LIWC failed to capture the thematic essence of narratives provided by participants, this software has been validated and utilized in previous research to assess word choice (Pennebaker & Stone, 2003; Rice & Pasputhi, 2010). Thus, it was an appropriate analytic approach for the current study's purposes, but future studies may seek to assess word choice within the broader context of the memory description. Another limitation of the present study was that a large majority of the participants identified as white, so it is unclear whether similar results would be replicated in a more diverse sample. Finally, it is worth noting that much research examining SDMs elicit several from each participant (e.g., Singer et al., 2007). In the current study, we had participants retrieve a singular SDM. As a result, the full range of personal SDMs were unlikely to have been captured in the current study.

In conclusion, we found that age was not associated with differences in the content of SDMs or with SDM descriptive word choices, thus our hypotheses were not supported. Although there are age-related differences in phenomenological ratings of SDMs, it is unlikely that these differences can be attributed to differences in content or word choice. Future studies should continue to examine the variety of roles SDMs play across the lifespan as well as investigate other possible explanations for age-related differences in phenomenological ratings. For instance, it is possible that reflective functioning is another factor that may impact individuals' SDMs across age. According to Katznelson (2014), "mentalization, or reflective functioning, has been defined as the capacity to understand and interpret – implicitly and explicitly – one's own and others' behavior as an expression of mental states such as feelings, thoughts, fantasies, beliefs and desires" (p. 108). It is possible that over the course of a lifespan, older adults may have had the opportunity to hone their ability to engage in reflective functioning. As a result, the phenomenological differences of SDMs across age may be related to differences in reflective functioning, rather than the content of the SDMs; thus, future studies may investigate the relationship between reflective functioning and SDMs across age. Additionally, future research should also examine psychological distance of the stimuli to further ascertain whether relevance of the memory could serve as a moderator for the positivity effect. In conclusion, content and word choice of SDMs did not differ across age, but additional research should continue to focus on the complexities of memory storage, encoding, and retrieval in relation to aging and autobiographical memory.

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