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A Comparison of Lifelines Recalled by Older Adults and Anticipated by Younger Adults

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The reminiscence bump effect is the tendency for older adults to recall more life events from their teens, twenties, and early thirties than from other decades of life. The purpose of this study was to compare patterns of life events recalled by older adults as they looked back at their past to life events anticipated by younger adults to occur in their future. Twenty-five older adults (mean age = 79.68 years, *SD* = 7.84) completed a lifeline by drawing the course of their life from birth to their current age, placing life events on the line, and indicating their age when each event occurred. Sixty-five younger adults (mean age = 18.88 years, *SD* = 0.82) completed a future-oriented lifeline by drawing the anticipated course of their life from their current age to the age of their anticipated death, placing anticipated life events on the line, and indicating their age when each event was expected to occur. Younger adults reported a significantly higher frequency of anticipated life events from the reminiscence bump period (58.60%) than did older adults recalling events from their past (35.29%). Younger adults anticipated a significantly higher percentage of negative life events (43.41%), compared to the percentage of those recalled by older adults (17.64%). Overall, the pattern of an anticipation bump for younger adults was similar to that of a reminiscence bump observed for older adults. Findings are consistent with a cultural life script account of the reminiscence bump.

Keywords: reminiscence bump; anticipation bump; autobiographical memory; cultural life script

The reminiscence bump in autobiographical memory refers to the tendency of older adults to recall more events from their teens, twenties, and early thirties than from childhood or middle age (Rubin et al., 1986). The effect is highly robust, with this basic pattern observed using different techniques for soliciting autobiographical memories (e.g., cued word association, Rubin et al., 1986; describing important memories, Fitzgerald, 1988; lifelines, Assink & Schroots, 2010) and across a wide range of demographic subgroups (e.g., gender and years of education, Janssen et al., 2005) and cultures (e.g., Scherman, 2013). The effect has attracted a great deal of attention from gerontologists and cognitive psychologists because of its potential to inform our understanding of the encoding and retrieval of memories for personal history as well as the relationship between these memories and the formation, maintenance, and revision of a person's sense of self and identity.

A number of theories have been proposed to account for the reminiscence bump. Berntsen and Rubin (2002), summarized several possible explanatory factors, including narrative/identity, cognitive, and neuromaturational influences. They also proposed an additional potential source of influence on life events recalled by older adults, that of cultural life scripts.

Theories centered on identity formation account for the overrepresentation of life events from the reminiscence bump period by referring to the special significance of these events in shaping a person's sense of who they became as a person. Erikson (1963, as cited in Berntsen & Rubin, 2002), for example, notes that individuals in adolescence and young adulthood work to form their identity and find their place in society "socially, vocationally, and ideologically" (p. 639). Upon forming a coherent adult identity in young adulthood, reminiscence bump events may "remain highly accessible in memory because of their enduring association with the current goals of the working self" (Conway & Pleydell-Pearce, 2000, p. 280). Furthermore, Fitzgerald (1988) notes that narrative identity may become less malleable after young adulthood because it may no longer be necessary to add new elements to the existing, cohesive narrative.

Cognitive accounts of the reminiscence bump propose that reminiscence bump period events recalled by older

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adults are those that were most subject to deeper levels of cognitive processing in adolescence and young adulthood because of the novelty of these experiences and/or their perceived importance (Rubin, et al., 1998). Memory for events from this period may also be better recalled because 1) this is the point at which the brain has developed the cognitive structures required to integrate autobiographical memories within a coherent and self-consistent life story narrative (Habermas & Bluck, 2000), and/or 2) this period of life represents the peak of an individual's overall cognitive ability (Janssen & Murre, 2008).

Yet another factor proposed to explain the reminiscence bump is that of cultural life scripts acquired by a person before or during the reminiscence bump period. These scripts predict the life events young adults are most likely to experience as they progress through adulthood and are specific to a person's culture (Berntsen & Rubin, 2002). The life-script account of the reminiscence bump proposes that adolescents and younger adults hold beliefs about the events they are most likely to experience later in life, and when these events do occur, they are subject to deeper levels of processing than events which were not part of the culturally scripted course of adult life. Consequently, the events people expect to occur when they are young become the very events these individuals recall decades later as older adults.

In support of a life-script influence on the reminiscence bump, Bohn and Berntsen (2011) asked children in grades 3, 5, 6, and 8 to write their future life stories. The researchers then rated the age at which each life event occurred and whether the life event was part of a life script or not. The results for children in all grade levels showed that events anticipated to occur later in life were distributed according to the pattern corresponding to the reminiscence bump – the decades with the greatest number of anticipated life events were those between 11 and 30 years of age. The effect was significantly more pronounced for life-script events than for non-life script events. On the basis of these results, the authors noted the presence of similar distributions of life events from children anticipating events in their future and older adults recalling events from their past. They interpreted this common pattern as evidence that cultural life scripts are driving the selection of life events included in both distributions. That is, a child's expectations regarding the ages at which important events are typically experienced in their culture provide a pre-made network of associations within which to fit and interpret events when they occur later in life. These associations within a semantic network defining an adolescent's future self later serve to promote deeper levels of processing for expected events when they occur later in life, greater levels of consolidation within episodic memory, and a higher likelihood of recall decades later.

Replicating and extending the findings of Bohn and Berntsen (2011), this paper reports data from two studies providing frequency distributions of life events, allowing for a direct comparison between younger adults' anticipated life events and older adults' remembered life events. Imagining a personal future life event (often called episodic future thinking) and remembering a personal past life event (episodic memory) share many similarities (Schacter, Benoit, & Szpunar, 2017). For example, both episodic future thinking and episodic remembering depend on the same neural systems (Schacter & Addis, 2007) and show similar patterns in the types of details imagined and remembered, such as a reduction in the number of internal, episodic details and an increase in the number of external, semantic details reported with age (Devitt, Addis, & Schacter, 2017).

Most relevant for the present study, both episodic future thinking and autobiographical remembering may depend on one's life narrative and one's cultural life script (Berntsen & Bohn, 2010; Rathbone, Conway, & Moulin, 2011). That is, one's own self-image may guide event construction of both past and future events for younger and older adults, with events most important for self-image formation most frequently generated (Chessell et al., 2013). Further, episodic future thinking, like autobiographical remembering, can be guided by one's cultural life script, and this dependence tends to increase with increasing temporal distance (Berntsen & Bohn, 2010; Berntsen & Jacobsen, 2008). Given these parallels, one may expect the pattern of generated future life events from younger adults and generated remembered past life events from older adults to be very similar.

The first study compiled life events from older adults who recalled events from their past, while the second study asked adults in their late teens and early twenties to list events they expected to occur in the future. Like Bohn and Berntsen (2011), we were able to examine whether anticipated life events would show a reminiscence bump, but unlike Bohn and Berntsen, we were able to directly compare a potential anticipated reminiscence bump with a remembered reminiscence bump. Our study also differed from that of Bohn and Berntsen in several additional ways. First, our younger age group consisted of undergraduates in their late teens and early twenties, compared to the younger sample of 3rd through 8th grade children in Bohn and Berntsen's study. This allowed us to determine if the presence of an anticipation bump extends to younger participants at the later stages of emerging adulthood and whose ages are close to the middle of the reminiscence bump period. Cultural life scripts continue to develop and become more culturally normative through adolescence (Saraiva et al., 2020). Therefore, if cultural life scripts guide both future and past event generation, we would expect to see even more similarities between younger and older adults than between children and older adults. Second, rather than obtaining life events by asking participants to write about their life story, we asked participants to record life events on lifelines representing the course of their lives through its positive and negative periods (de Vries, 2013). Specifically, we used a modified version of the Lifeline Interview Method (LIM) developed by Hans Schroots (Assink & Schroots, 2010; Schroots & Assink, 1998) to elicit the retrospective recall of life events by older adults and the prospective anticipation of life events by younger adults. Using this technique, Schroots

and colleagues have replicated the reminiscence bump effect (Assink & Schroots, 2010, Schroots & Assink, 2005) and reported, in addition, that older adults devoted a disproportionately large share of space on their lifelines to events from the reminiscence bump period (Pierce & Schroots, 2010). Third, because the lifeline technique allows life events to be categorized as positive or negative, we were able to compare the affective valence of anticipated events versus remembered events. Older adults tend to have a positivity bias such that they are more likely to recall positive events than negative events (Mather & Carstensen, 2005). However, studies have also shown a positivity bias in episodic future thinking, such that people tend to imagine a more positive future than remembered past (Salgado & Berntsen, 2020). For these reasons, it is unclear whether older adults will remember their life more positively or negatively than how younger adults anticipate their life will be.

Method

Participants

A sample of 25 older adults was recruited from retirement communities and the general public. The mean age of older participants was 79.68 (*SD* = 7.84), and age ranged from 64 to 93 years. Eleven participants were men, and 14 were women. Twenty-four participants identified as White, and one participant identified as White and an unspecified other ethnicity. The sample was very highly educated, with an average of 18.13 (*SD* = 3.17) years of primary, secondary, and post-secondary education (e.g., 16 years of education was defined as that of a bachelor's degree).

A sample of 65 younger adults was recruited through an online subject pool of students taking psychology classes at Radford University, a school with 8,000 undergraduates located in southwest Virginia. The sample consisted of 24 men and 41 women, and the mean age of the sample was 18.88 years (*SD* = 1.63).

Measures

Both age groups completed lifelines indicating the location of important life events across adulthood and the participant's rating of the degree to which each event was perceived as positive or negative. However, the lifelines of younger and older adults differed in one important way: older adults were instructed to include life events occurring from their birth to their current age, while younger adults were asked to include anticipated life events from their current age to their anticipated age of death.

Retrospective lifelines of older adults. A modified version of the Lifeline Interview Method (Assink & Schroots, 2010) was used in which participants drew a continuous line to depict the ups and downs of their life from birth to their current age. Participants were presented with a piece of legal-sized (8.5" x 14") paper in a landscape orientation. On the page, the space for drawing the lifeline was a rectangular box, with the top and bottom sides measuring 300 mm in length and the left and right sides measuring 185 mm in height. The horizontal axis represented chronological age, with the left boundary marking birth and the right boundary marking current age. The vertical axis represented affective valence, with the top labelled *Most positive* and the bottom labelled *Most negative*. A dashed horizontal line representing neutral affect was placed at the midpoint of the vertical axis and spanned the length of the box. To draw the lifeline, participants were instructed to begin at the origin (birth, neutral affect) and draw the course of their life to the right boundary, with peaks indicating the presence of positive events or periods of their life and troughs showing negative experiences. The participant was also asked to mark important life events with a small, vertical dash through the lifeline at the age at which the event occurred. They then labeled the mark with the age at which the event occurred and briefly described the event.

Prospective lifelines of younger adults. A modified version of the LIM lifeline (Schroots & Assink, 1998) was used to collect prospective lifelines of anticipated, future life events from younger adults. Participants were asked to draw a "future lifeline" that traces the path of the ups and downs of their life from their current age to their anticipated age of death. A blank future lifeline consists of a horizontal line in the middle of the graph that is labeled at the far left with the term "Current Age" and on the right with the term "Age at Death." The horizontal line axis therefore represents time. As participants draw their lifeline from left to right, the distance above and below the horizontal line represents the degree to which the participant anticipates that time of their life to be positive or negative, respectively. The horizontal line represents a neutral position where they did not consider their life to be either positive or negative. After participants drew the line, they were asked to mark the line with specific events that they anticipate to be especially meaningful to them and to indicate their anticipated age at the time of the event and the nature of the event.

Procedure

Older adults. Each participant completed the study in a scheduled interview conducted by the researcher in the participant's home. The participant and the researcher sat across from each other at a table, which provided a flat writing surface for drawing the lifeline. First, the researcher briefly explained the purpose of the study, informed participants that they would be paid $10 for participating, and informed them that they were free to end their participation at any time and still receive the full payment. After prompting the participant for any questions and answering any questions they may have had, the researcher obtained the participant's signature giving their consent to participate.

The procedure followed the basic guidelines used in the Lifeline Interview Method (Assink & Schroots, 2010), with modifications specific to this study. Participants first completed a demographics questionnaire. Following that, the researcher explained the instructions for the lifeline measure and presented three sample completed lifelines, which ranged from simple to more complex wave patterns. Participants then completed the lifeline.

Younger adults. The procedure for younger adults was the same as that for older adults, with three exceptions. First, as reimbursement for participation younger participants were offered extra-credit they could apply to a course they were taking that semester. Second, data were collected in a sound attenuated room located within the Psychology Department at Radford University. Third, younger participants completed the prospective version of the lifeline task.

Results

The Frequency Distribution of Life Events From Retrospective Lifelines of Older Adults

The 25 older participants reported a total 273 life events, with an average of 10.92 life events reported per person (*SD* = 4.47). For older adults, 208 life events were perceived to be positive (76%) and 65 were perceived to be negative (24%). Life events were assigned to categories, each representing a decade of life (0-9 years, 10-19 years, etc.). Because the oldest life event reported was 89, life events were collected into nine decades. Figure 1 displays a histogram of the frequency of life events reported to occur in each decade. A reminiscence bump effect is clearly visible in these frequency counts of life events. The number of events occurring per decade between the ages of 10 and 29 (127 events/2 decades = 63.5 events/decade), the reminiscence bump period, was noticeably greater than the number of events per decade occurring in other decades of life (146 events/7 decades = 20.66 events/decade). This reminiscence bump effect was also obtained when positive and negative life events were examined separately.

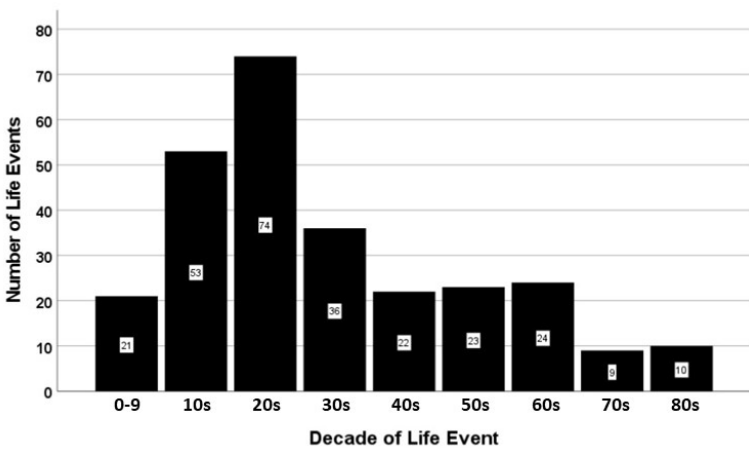

Figure 1. Histogram of the number of life events recalled by older adults.

The Frequency Distribution of Life Events From Prospective Lifelines of Younger Adults

Because the oldest life event reported by an older adult was 89, only life events anticipated by younger adults to occur at 89 years of age or younger were included in these analyses. The 65 younger participants reported a total of 601 life events, with an average of 9.25 life events reported per person (*SD* = 2.26). For younger adults, 358 life events were perceived to be positive (59.57%) and 243 were perceived to be negative (40.43%).

Figure 2 displays a histogram of the frequency of life events reported as occurring in each decade. No anticipated life events were reported for the first decade of life because participants were all in their late teens to early twenties when they provided data. An anticipation bump effect for events occurring in the decades between 10 and 29 years of age is clearly visible in these frequency counts of life events. The number of events occurring per decade between the ages of 10 and 29 (305 events/2 decades = 152.5 events/decade), the reminiscence bump period, was noticeably greater than the number of events per decade occurring in other decades of life. This pattern was observed for both positive and negative life events.

Comparison of Frequency Distributions of Life Events Reported by Older and Younger Adults

A chi-square analysis was conducted to assess whether the frequency pattern of a reminiscence bump observed for older adults is significantly different from the pattern of an anticipation bump observed for younger adults. Because the college-age younger adults in this study were not in a position to anticipate life events occurring before the age of 18 and because older adults did not note life events occurring past the age of 89, only life events in the seven-decade period between 20 and 89 years of age were used for this analysis. Two-hundred and four cases were available for older adults and 539 cases were available for younger adults. A depiction of the frequency distributions for both age groups is presented in Figure 3. The frequency distribution of life events recalled by older adults was significantly different from the frequency distribution of life events anticipated by younger adults, X^2 (1, N = 743) = 10.59, p = .001, Cramer's V = .12. Specifically, younger adults reported a significantly higher percentage of anticipated life events from the reminiscence bump period (the decade of the 20s, 262/539 events = 58.60%) than did older adults when they recalled events from their past (72/204 events = 35.29%).

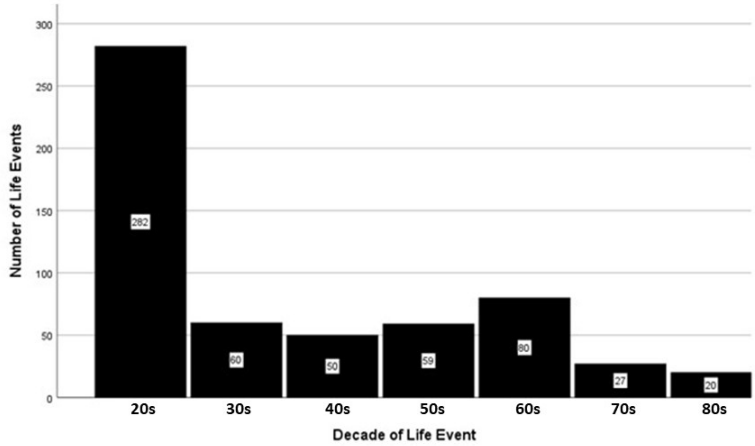

Figure 2. Histogram of the number of life events anticipated by younger adults.

Comparison of Age Groups on the Percentages of Life Events Perceived as Positive and Negative

To compare the younger and older groups on the percentage of life events they perceived as positive and negative, analyses were restricted to life events for the age range the two age groups shared in their respective lifelines, 20-89 years. A significantly higher percentage of life events anticipated by younger adults were negative (234/539 events = 43.41%), compared to the percentage of negative events recalled by older adults (36/204 events = 17.64%), X^2 (1, N = 743) = 42.69, p < .001, Cramer V = .24.

Discussion

The primary goal of this study was to compare the pattern of life events anticipated by younger adults to that of life events recalled by older adults. Both anticipated and remembered life events demonstrated a similar reminiscence bump period of life (late teens through the early thirties). However, younger adults anticipated a disproportionately higher percentage of life events from this period than older adults recalled. The frequency distributions of life events anticipated by younger adults and recalled by older adults show that life events identified by both age groups are disproportionately concentrated in the decade when participants are in their twenties—the decade of life at the heart of the reminiscence bump period. However, the shapes of these frequency distributions differed significantly from each other, with younger adults anticipating a significantly higher percentage of events occurring in the decade of their twenties (58%) than older adults recalled as occurring in their past (42%) in this same decade of life. Thus, the "bump" effect was significantly stronger when anticipating life events in the future than when recalling life events from the past, although it should be noted that, statistically, this was a weak effect.

This finding of parallel reminiscence/anticipation bumps is consistent with both the empirical findings of Bohn and Berntsen (2011) and the theoretical predictions of Berntsen and Rubin (2002) who hypothesized that cultural life scripts held by younger persons at the beginning of adulthood promote the early development of associative networks within which to embed these events in episodic memory. These associations are thus created before the events actually occur and serve as placeholders for those events deemed most likely to happen later in life, thus guiding episodic future thinking. This head-start on the formation of associations between anticipated events and cues for those events makes it especially likely that events anticipated to occur later in life will be those with the densest networks of associative cues surrounding them. The frequent recall of reminiscence bump period events by older adults can therefore be described as a "self-fulfilling prophecy," whereby the events anticipated to occur later in life become the very events most readily encoded throughout adulthood and recalled by older adults.

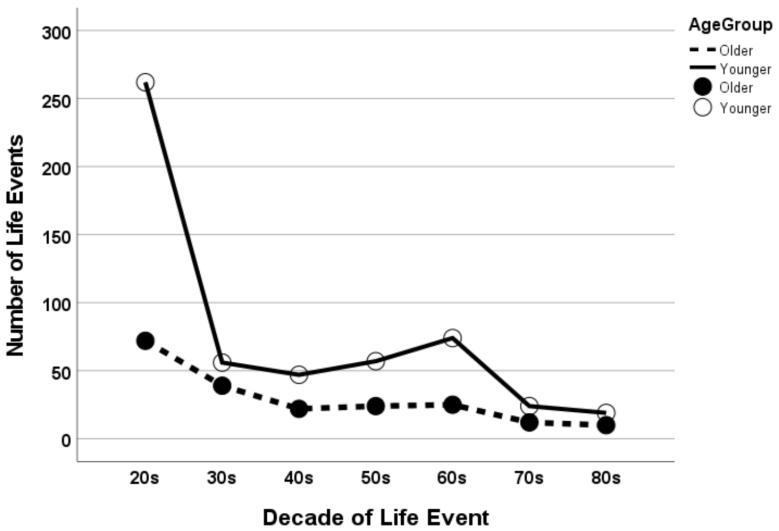

Figure 3. A comparison of the frequency distributions of life events recalled by older adults and anticipated by younger adults.

The possible life-script influence on events recalled by older adults constitutes only one of a number of potential and possibly co-occurring explanations for the reminiscence bump effect. While the pattern of results reported here is consistent with a life-script account, the results are also consistent with theories focusing on identity formation, in that events

anticipated to occur later in the life of a younger adult form episodic milestones in the life of the person they expect to become. Indeed, cultural life scripts may influence people's experience of identity formation, specifically emphasizing the teen and young adult period. In addition, the concept of life scripts also falls squarely within the range of constructs and processes employed in the field of cognition.

The significantly larger reminiscence bump in younger adults' anticipated life events relative to older adults' remembered events may be due to the temporal closeness of the younger adults to the reminiscence bump period, creating a type of recency effect. As events increase in temporal distance (both past and future), they increasingly rely on one's cultural life script (Berntsen & Bohn, 2010; Berntsen & Jacobsen, 2008). For younger adults, events past their twenties are both remote and have fewer cultural life script milestones to help guide their retrieval, and therefore fewer of these events could be generated. In contrast, for older adults, life events that occurred in their later years are not remote and therefore are less dependent on the cultural life script for recall. They were therefore able to generate more events occurring later in adulthood than younger adults were able to anticipate.

This study extends the findings of Bohn and Berntsen (2011) by demonstrating that the anticipation bump effect identified by Bohn and Berntsen in children is also observed in late adolescents and young adults. Our data also showed that the anticipation bump effect is observed in adolescents and younger adults when they are asked to provide important life events using the lifeline technique, in addition to the written life story technique used by Bohn and Berntsen.

Finally, we found that younger adults anticipated a higher percentage of events in their future to be negative, compared to the percentage of life events recalled by older adults as negative. This suggests that older adults' memory positivity bias is stronger than the positivity bias for anticipated future events. One possible explanation for this difference may be that older adults were more dependent on their cultural life scripts to generate a larger proportion of their remembered events because events from their reminiscence bump period were so remote. Positive events are more likely than negative events to be maintained by one's cultural life script (Rubin & Berntsen, 2003), which may increase the positivity bias in older adults.

One limitation of our data is that the link between the anticipation bump in future life events reported by younger adults and the reminiscence bump in events recalled by older adults is only indirect because different participants from different age cohorts provided life event data for the two distributions. The best test of the life script account of the reminiscence bump would be a decades-long longitudinal study in which researchers could determine if the life events anticipated by participants in childhood and adolescence comprise the bulk of events recalled by these same participants decades later when they are in their seventies or eighties. In the absence of these data, the field will have to be satisfied that the results of quasi-experimental studies like ours and that of Bohn and Berntsen (2011) are *consistent* with the life script account of the reminiscence bump, but that they cannot be said to have *demonstrated* it.

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