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The Reminiscence Bump Reconsidered

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The Reminiscence Bump Reconsidered:

Children's Prospective Life Stories Show a Bump in Young Adulthood

Abstract

The *reminiscence bump*—the reporting of more memories from young adulthood than from other stages of life—is considered a hallmark of autobiographical memory research. The most prevalent explanations for this effect assume that events in young adulthood are favored because of the way they are encoded and maintained in long-term memory. Here we show that a similar increase of events in early adulthood is found when children narrate their personal futures. In Study 1, children wrote their future life stories. The events in these life stories were mostly life-script events, and their distribution showed a clear bump in young adulthood. In Study 2, children were prompted by word cues to write down events from their future lives. The events generated consisted mostly of non-life-script events, and those events did not show a bump in young adulthood. Our findings challenge prevailing explanations of the reminiscence bump and suggest that the cultural life script forms an overarching organizational principle for autobiographical memories and future representations across the life span.

When people over the age of 40 are asked to remember their lives, they report more memories from young adulthood (15–30 years of age) than from the surrounding time periods (Rubin, Wetzler, & Nebes, 1986). This *reminiscence bump* is considered a hallmark of autobiographical memory research and is featured in almost all textbook accounts of the field. Here we show that a similar increase of events in early adulthood is found when children narrate their personal futures. This finding challenges prevailing explanations of the reminiscence bump and suggests that the cultural life script forms an overarching organizational principle for autobiographical memories and future representations across the life span.

Traditionally, autobiographical-memory researchers have focused on past events. Recently, however, a number of studies have compared the ability to remember the personal past with the ability to imagine the personal future. Such studies have found that the two processes are highly similar in their neural underpinnings (e.g., Addis, Wong, & Schacter, 2007; Botzung, Denkova, & Manning, 2008; Okuda et al., 2003; Szpunar, Watson, & McDermott, 2007) and in how they are affected by a range of factors, including various behavioral manipulations (e.g., for reviews, see Berntsen & Bohn, 2010; Szpunar, 2010), aging (Addis, Wong, & Schacter, 2008), childhood development (Atance, 2008; Suddendorf & Corballis, 2007), and mental disorders (D'Argembeau, Raffard, & van der Linden, 2008; Williams et al., 1996).

Remembered past events and imagined future events show similar effects of temporal distance. For both, the frequency of word-cue-generated events declines systematically with distance to the present, a pattern consistent with the standard forgetting curve (Ebbinghaus, 1885). The distribution of future events fits the reverse of the power function for the retention of past events (Spreng & Levine, 2006). In both temporal directions, ratings of details and sensory vividness decline, and life-story

relevance increases, with greater temporal distance (Berntsen & Bohn, 2010). These parallel findings suggest that remembering the past and imagining the future involve similar cognitive processes.

Consequently, researchers should expect some symmetry between the way adults reconstruct their pasts and the way children imagine their futures. Given findings on the reminiscence bump, we expected that children asked to imagine their futures would construct disproportionately more imagined events referring to their young adulthood than to the surrounding age periods, producing a bump parallel to the bump for past events found among older adults.

However, such symmetry would contradict prevailing explanations of the reminiscence bump in the literature. The most prevalent explanations assume that events in young adulthood are favored because of the way they are encoded or maintained in long-term memory. This encoding-maintenance advantage may reflect biological factors (i.e., the rise and fall of cognitive abilities across life; Conway, 2005; Janssen & Murre, 2008; Rubin, Rahhal, & Poon, 1998), cognitive factors (e.g., reduced proactive interference due to the fact that many novel events are encountered during this particular life period; e.g., Rubin et al., 1998), or the development of an adult identity (Erikson, 1950). Therefore, according to the prevalent explanations of the reminiscence bump, events from this life period should be better maintained in memory (e.g., Conway, 2005; Fitzgerald, 1996). Because imagined future events have not yet taken place, (please delete of course) such encoding and maintenance factors cannot be operating when children are asked to generate imagined future events in their lives. Consequently, children's representations of possible future events should not show a bump. Instead, the temporal distribution of these events should form a mirror image of the standard forgetting function for past events (e.g., Crovitz & Schiffman, 1974), as has been found for future projections in adults (Spreng & Levine, 2006).

In contrast, a bump for (please change back to original) future events generated by children would be consistent with a more recent explanation of the reminiscence bump based on the notion of *cultural life scripts*—that is, culturally shared expectations concerning the order and timing of life events in a prototypical life course (Berntsen & Rubin, 2004; Rubin & Berntsen, 2003). The cultural life script is conceptually distinct from the life story. Life stories consist of autobiographical memories recalled by an individual; cultural life scripts consist of semantic knowledge that is learned apart from personal experience. Thus, rather than focusing on the level of the individual and how individuals encode or retrospectively make sense of personal events (as in standard explanations of the bump), the life-script explanation assumes that the period of young adulthood plays an especially salient role in how people culturally conceptualize the life span. Therefore, this period also plays a central role in individuals' understanding of their personal lives and consequently in the search descriptions they generate when they are asked either to recall events from their past or to imagine events in their future. (“search” needs to stay here, because people use the cultural life script to search for those events that they think should be included in their life stories).

According to the life-script explanation, the reminiscence bump found in the recollections of older individuals should be paralleled by a bump in young adulthood when children are asked to imagine possible events in their personal futures, because both processes would reflect the operations of life scripts, and because previous research has established that children as young as 9 years old have acquired a basic cultural life script (Bohn & Berntsen, 2008). This effect can have two forms. The life script can either furnish the life story with events directly derived from the life script (e.g., getting married), or it can provide a clustering of less distinctive events in the life story around salient life-script events (e.g., dinner with one's future spouse; Berntsen & Rubin, 2004).

The idea that the reminiscence bump is due to the life script is consistent with empirical findings. First, when people produce cultural life scripts by generating and dating important events that are likely to happen in a prototypical life course within their culture (Berntsen & Rubin, 2004), they generate considerably more events from young adulthood than from any other period in the life span (Berntsen & Rubin, 2004; Bohn, in press; Erdoğan, Baran, Avlar, Taş, & Tekcan, 2008; Rubin, Berntsen, & Hutson, 2009). Second, when older adults recall personal life-story memories, most of these memories (74%) are of events from the cultural life script, and the great majority of these scripted personal memories cluster (thought it needed to be singular because of “the majority”?) in the period of the bump (Bohn, in press; see also Thomsen & Berntsen, 2008). Third, when adults recall important or emotionally charged autobiographical memories, only positive memories form a clear bump in young adulthood. A similar dominance of positive events in young adulthood is found in the cultural life script (Berntsen & Rubin, 2004; Bohn, in press).

Although they are consistent with the life-script explanation of the reminiscence bump, these findings do not rule out competing explanations, such as enhanced encoding of memories from young adulthood. One important purpose of the present studies was to disentangle these conflicting views by examining children’s representations of possible events in their personal futures. We asked children across different age groups to imagine their personal future lives. On the basis of evidence that cultural life scripts provide adults (e.g., Bohn, in press; Rubin et al., 2009) and children (Bohn & Berntsen, 2008) with a narrative structure when they recall life-story memories, and on the basis of the hypothesis that cultural life scripts provide children with a narrative structure for imagining their future, we expected that we would find a clear bump in early adulthood in the children’s prospective

life stories and that this bump would largely consist of events corresponding to transitional events in the cultural life script.

Study 1

Participants and procedure

Participants were 162 Danish middle-class children with socioeconomically homogeneous backgrounds. They were from Grades 3, 5, 6, and 8 (mean ages from 10.01 years, $SD = .49$, in third grade to 14.62 years, $SD = .30$, in eighth grade; 51% male, 49% female).

Children wrote their future life stories during regular 45-min classes. The instructions were modeled on instructions from a study on children's recall of their past life stories (Bohn & Berntsen, 2008).

Ratings

Two raters read each individual life story and independently identified the events mentioned in the stories. They agreed on 72.5% of all events. Only the 708 events that both raters agreed on were included in the analyses. The raters also categorized events as either life-script events or non-life-script events. Life-script events were defined as all events that corresponded to the adult life-script categories in Bohn and Berntsen (2008, p. 1143, Table 3), such as *having children, starting school, or begin daycare*. All other events were categorized as non-life-script events. Interrater agreement was 97.9%. The raters estimated independently how old participants probably would be when they experienced the events mentioned in the life stories. Interrater reliability for these estimates was high (Cronbach's $\alpha = .986$). The final probable age for each future event was calculated by using the average of the two ages given by the raters, except that if a child's story mentioned the age for an event, that age was used.

Results

The majority of the events in the children's future life stories were cultural life-script events (79%) that clustered in the period of the bump, a pattern consistent with findings on older adults' recollections of their past (e.g., Bohn, in press). Figure 1 shows the distribution of life-script events and non-life-script events in the children's prospective life stories. The bump is more pronounced for life-script events (top panel) than for non-life-script events (bottom panel), which again is consistent with adults' recollections (Bohn, in press). A 4 (grade) \times 2 (type of event) repeated measures analysis of variance (ANOVA) on the proportion of events within the bump period showed a significant effect of type of event, $F(1, 65) = 4.71, p < .05, \eta_p^2 = .14$. No other effects were found.

Fig. 1.

Results from Study 1: distribution of life-script events ($n = 559$; top panel) by grade and distribution of non-life-script events ($n = 149$; bottom panel) by grade. The line for the youngest group is labeled with the actual percentages; all other groups are offset by 20.0 from the next group to make all plots visible.

One reason why non-life-script events also show a bump (albeit a smaller one) might be that the cultural life script, which is used as a narrative outline to tell one's life story, attracts the inclusion of non-life-script events around the same time period into the prospective life story. Autobiographical memories are often arranged in clusters—that is, one memory from a certain time period (and about a certain topic) is often associated with another causally and temporally related memory (Brown & Schopflocher, 1998). This phenomenon fits well with the hierarchical structure of the life script, in which many specific episodes are nested under major transitional events. Thus, when children imagine major life-script events in their futures, they might also imagine specific episodes that are closely related to these events. The events mentioned in the future life stories in Study 1 suggest that this is the

case. For example, children often mentioned getting a dog when imagining the life-script event *buying a house*. Also, life-script events often define beginnings and ends of chapters in personal life stories (Thomsen & Berntsen, 2008). It is thus likely that the cultural life script gives children an outline for their future life stories and thereby facilitates the imagination of other, non-life-script events that are causally and temporarily related to the imagined life-script events.

To explore this issue, we conducted a second experiment. If the bump for non-life-script events in the children's prospective life stories was due to the narrative structure provided by cultural life scripts, then this bump should disappear when this structure is removed from the task of imagining the future. Therefore, we used a random-sampling technique—word cues—to elicit future-event representations in Study 2.

Study 2

Participants and procedure

Twenty 8th graders (54.70% male, 45.30% female; mean age = 14.77 years, $SD = 0.40$) imagined future events from their own lives in response to 10 word cues, such as *book*, *chair*, and *telephone* (for properties of the words, see Berntsen & Bohn, 2010). After participants had written down all future events, they were asked to date them.

Results

The distribution of all word cued future representations showed a strong recency effect with 42% of all events expected to happen within the next week, and the number of events declining with distance to the present, a pattern consistent with the distribution of future events generated to cue words found in adults (Spreng & Levine, 2006). As expected, only a few of the word-cued events (7%) were

life-script events. Figure 2 shows the distribution across the life span of these life-script representations compared with the distribution of non-life script representations. There is a clear bump for life-script events, but not for non-life-script events, $\chi^2(1, N = 200) = 22.15, p < .001$. In two ways, Study 2 supports the hypothesis that cultural life scripts provide the scaffolding necessary for the bump in children's future life stories. First, when future-event representations were elicited without activating the life script (via word cues), the bump disappeared, a finding that parallels adult findings that the reminiscence bump is much less pronounced for word-cued memories than for important memories (Fitzgerald, 1988; Rubin & Schulkind, 1997). Second, only word-cued future representations that were cultural life-script events formed a bump.

Fig. 2.

Results from Study 2: Cue-word future representations across the life span by life-script events ($n=14$) and non-life-script events ($n = 186$) in percent for each category of event.

General Discussion

Study 1 is the first to show that children's prospective life stories exhibit a bump for events in early adulthood that mirrors the well-documented reminiscence bump in memories of older adults. The existence of this bump in children's future life stories challenges explanations attributing the reminiscence bump to extraordinary encoding and maintenance processes specific to this period of life. Because children's future lives, by definition, have not yet been experienced, the bump in their prospective life stories cannot reflect age-specific encoding and maintenance processes. The cultural life-script explanation, however, can account for both the reminiscence bump in older adults and the bump in children's future life stories, given the assumption that adults' autobiographical recall and

children's imaginings of the future tap the same psychological processes. Cultural life scripts are semantic knowledge about an entire life span and are acquired across childhood and adolescence (Bohn & Berntsen, 2008). Thus, life scripts contain a strong future dimension: They inform children about (I put in the "which" for emphasis – to emphasize that not any event can be included in the life story but that it is chosen from the "life script list") events that are expected to occur in life stories and about the expected timing of these events. Consequently, when asked to produce their prospective life stories, children use the cultural life script as a narrative scaffold. This hypothesis was further supported by Study 2: When given word cues to imagine their futures, children mostly imagined events very close in time, a finding consistent with the marked recency effect for word-cued memories in adults (Rubin & Schulkind, 1997). An exception was found for the few future-event representations matching the cultural life script: These formed a clear bump in young adulthood, a finding consistent with the claim that the life script "drives" the bump.

Our findings do not preclude the possibility that the reminiscence bump observed in adults and the future bump we observed in children's life stories are due to different mechanisms. However, the notion of the cultural life script provides a parsimonious explanation for both bumps, as well as for why they are similarly differentially affected by requests for life stories versus requests for word-cued memories. Children rely on cultural life scripts to provide an outline for what events to expect, and when, in their future life stories (a process that produces a future bump), and adults rely on cultural life scripts as an outline for the types of events to include in their life stories (a process that produces the reminiscence bump). Thus, the reminiscence bump seems to be driven by the way people organize their life stories to follow the guidelines of the cultural life script, not by memory processes per se.

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Declaration of Conflicting Interests

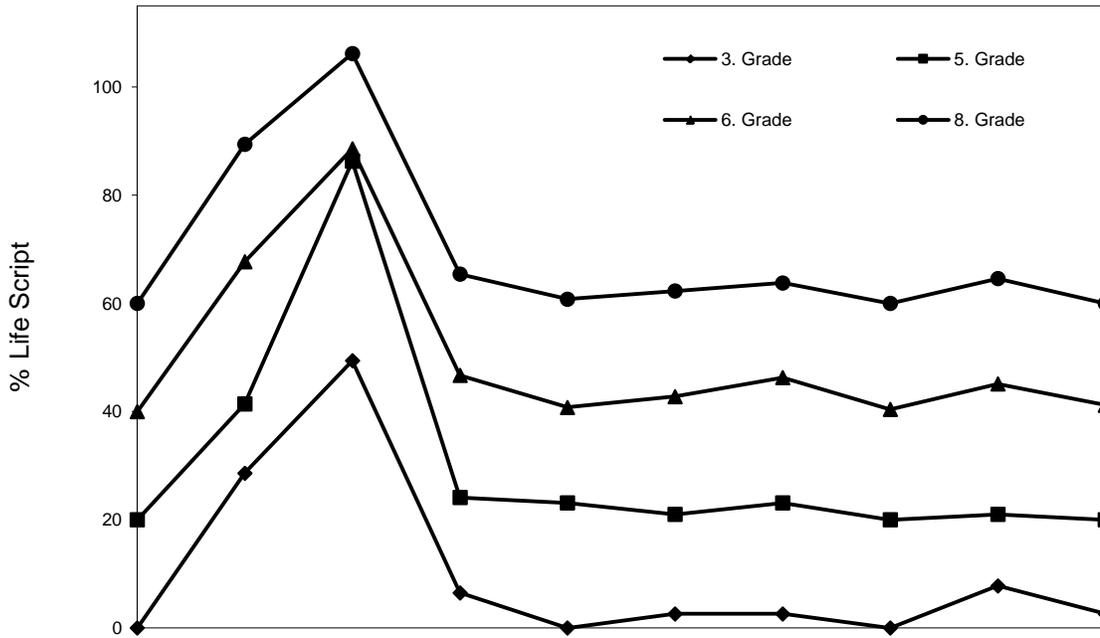
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Figure 1

a



b

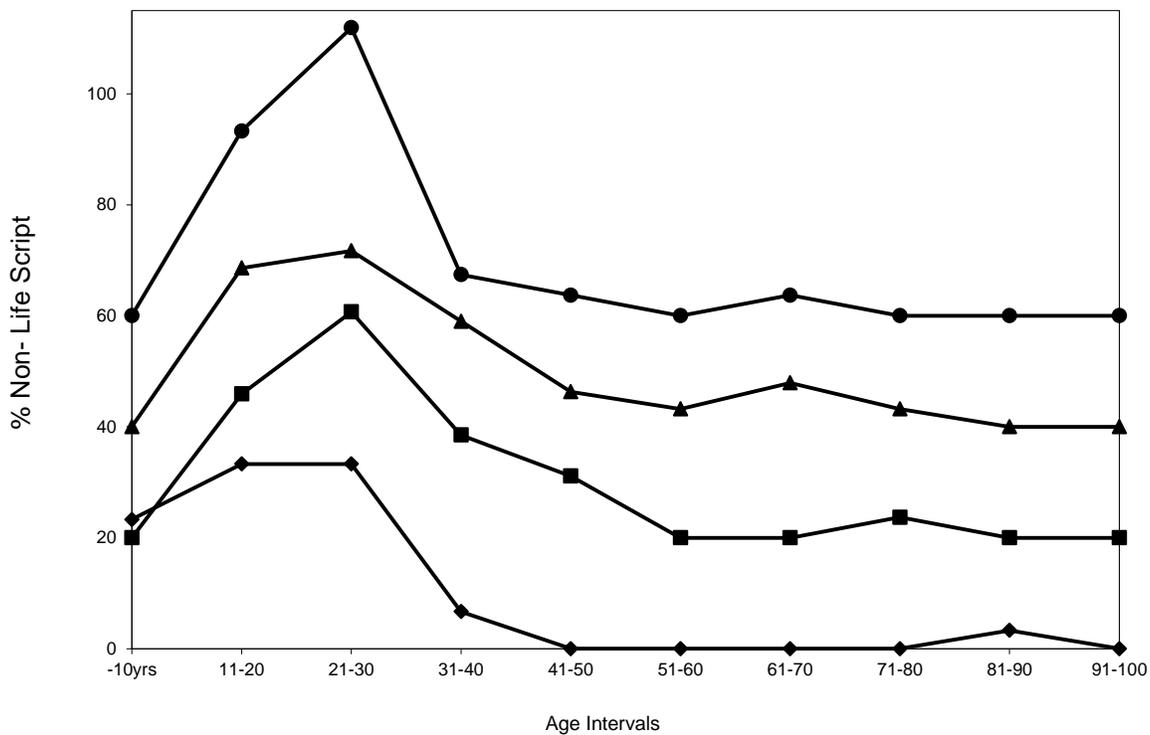


Figure 2

