Life happens when you are young: Reminiscence bump in cultural life scripts regardless of

number of events

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Abstract

Cultural life scripts are representations of a prototypical life course within a culture, consisting of a shared understanding of culturally important transitional events and their timing. Cultural life scripts contain a "bump" for events in adolescence and early adulthood, mirroring the *reminiscence bump* in autobiographical memory. However, the bump in the cultural life script might be due to the typical methodology used, namely generating only the *seven* most important events in a prototypical life, thus prioritizing early events. Here, we tested whether expanding the number of events would level the bump in the cultural life script. Four groups of 100 participants each generated a cultural life script with four, seven, 15 or 25 events. Across groups, there was a clear bump in adolescence and early adulthood, showing that the bump in cultural life scripts is highly robust and not an artefact of methodology.

*Keywords:* cultural life script; reminiscence bump; important memories; autobiographical memory

General Audience Summary

When people are asked to generate a cultural life script, that is, to indicate the most important life events that they think will happen in a newborn's life and to estimate when these events will occur, they usually come up with a list of events that contains a "bump" for events in adolescence and early adulthood. This indicates that people expect most important events in a typical life to happen before the early thirties. At the same time, older people have a *reminiscence bump,* remembering more events from their adolescence and early adulthood when they look back across their lives. It has been proposed that people remember more from this period because they use the cultural life script as a kind of "search machine" for important memories. But the bump in cultural life scripts might simply be due to the fact that so far, in research investigating the cultural life script, people are usually asked to only mention the *seven* most important events. Here, we found that cultural life scripts showed a clear bump in adolescence and early adulthood, even if we asked people to come up with 15 or 25 events. Thus, it seems, people expect life to happen when you are young, regardless of how many events they are asked to name. This provides more evidence for the idea that people use cultural life scripts as a "search machine" for important memories from their lives. These findings also support the notion of a general youth bias, whereby individuals expect most important events – whether autobiographical events, as in the current study, or even important public events – to occur in one's adolescence or early adulthood.

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Our cultural context influences the events we remember and how we understand them (Fivush, Habermas, Waters, & Zaman, 2011; Harris, Paterson, & Kemp, 2008). One way this occurs is via cultural life scripts: culturally shared representations of a typical life, reflecting semantic knowledge rather than personal experience. Cultural life scripts consist of important transitional events that are expected to happen in a set temporal order in a typical life course (Berntsen & Rubin, 2004; Rubin & Berntsen, 2003). They are usually studied by asking participants to imagine a newborn child of their own gender and culture, before listing the seven most important life events that will happen in this person's life and estimating the ages at which these events will happen (Berntsen & Rubin, 2004). The majority of important events are expected to occur before age 30. The cultural life script contains a clear "bump" in adolescence and early adulthood, with the peak located in the decade from 20-30 years of age. This distribution of events within the cultural life script has been replicated across different age groups (Bohn, 2010; Bohn & Berntsen, 2008; Janssen & Rubin, 2011; Tekcan, Kaya-Kızılöz, & Odaman, 2012) and cultures (Clark & Daggett, 2015; Coleman, 2014; Erdogan et al., 2008; Habermas, 2007; Haitagblu & Habermas, 2016; Janssen, Uemiya, & Naka, 2014; Ottsen & Berntsen, 2013; Rubin, Berntsen, & Hutson, 2009; Zaragoza Scherman, Saldago, Shao & Berntsen, 2017).

The cultural life script influences human cognition. Most prominently, there is considerable evidence that cultural life scripts structure recall of important autobiographical memories. The cultural life script provides one of the best-supported explanations of the *reminiscence bump*: the phenomenon that older adults recall more events from youth and early adulthood than from the surrounding years (Rubin, Wetzler & Nebes, 1986). The reminiscence bump for autobiographical memories is found both when asking participants to list important memories (mirroring the

methodology of the cultural life script) and when asking participants to generate memories in response to cue words (Koppel & Berntsen, 2016b; Rubin & Schulkind, 1997). In both cases, the bump appears to hold regardless of how many memories participants are asked to cite, though the bump or peak for important memories is later and more pronounced than the bump for word-cued memories (for a review, see Koppel & Berntsen, 2015a).

Furthermore, illustrating the role of the life script in producing the bump in important memories specifically, both the distribution of important memories and their contents have been found to overlap highly with cultural life script events (Berntsen & Bohn, 2010; Bohn, 2010; Collins, Pillemer, Ivcevic, & Gooze, 2007; Glück & Bluck, 2007; Koppel & Berntsen, 2016b; Rubin et al., 2009; Thomsen & Berntsen, 2008). When people are asked to recall important autobiographical memories, they tend to generate "life script" events from the reminiscence bump period (e.g. graduating high school, starting university, getting married), again, independent of the number of recalled memories. This is likely because they use the cultural life script as a framework to search for such memories (Berntsen & Rubin, 2004; Bohn & Berntsen, 2013).

The robustness of the bump in life scripts has yet to be tested, due to a lack of methodological variation in most studies to date. That is, the "bump" of events in adolescence and early adulthood in cultural life scripts might simply be due to the typically-used instructions to generate the *seven* most important events. For instance, reflecting the nature of scripts in general (Schank & Abelson, 1977), participants tend to generate life script events in chronological order (Berntsen & Rubin, 2004; Bohn, 2010; Ece & Gülgöz, 2014, 2017; Erdogan et al., 2008). Thus, when restricted to only seven events, participants might "run out" of events before reaching the 4th decade of life. In this case, the bump in the cultural life script would merely represent an artefact of number of events requested.

Only few studies have manipulated cultural life script instructions. Ece and Gülgöz (2017) report a study finding that participants who were asked for a life script for a "person" instead of a "newborn", reported fewer events from early life, but the bump was unchanged. Erdoğan et al. (2008) asked participants for a life script either for a newborn or a 90-year-old. They found that the life script for the newborn contained more early life events, whereas the life script for the 90-year-old contained more events later in life. However, both life scripts showed a clear bump in adolescence and early adulthood. These results suggest that the bump in cultural life scripts is robust, regardless of instruction. Ece and Gülgöz (2014) instructed Turkish participants to generate a life script, but without including any of the ten most frequently mentioned events from the Turkish life script (Erdogan et al., 2008). This resulted in a less pronounced bump, with an increase of events between 16-20 and 31-35 years of age, but not in the core bump years of 21-30. This suggests that the bump in life scripts is not due to running out of events, as there was an increase in events both directly before and after the bump period. It also suggests that, if individuals are asked to generate life scripts with more than seven events, this might yield a more extended bump, as individuals draw upon events from outside the core 20-30 decade, but still with a focus on the early part of the life course.

In the only study asking adults for more than 7 events, Bohn and Berntsen (2008) asked participants to generate 10 cultural life script events. A reanalysis of these data yielded no evidence that asking for more events changed the location or size of the bump. Rather than citing events from earlier or later in life, participants instead often split previously mentioned life script events expected in adolescence and early adulthood into subcategories, such as "high school" into "beginning" and "finishing high school" (Bohn & Berntsen, 2013).

Additionally, recent research has found a more general "youth bias", whereby important *public* events are expected to occur in adolescence or early adulthood (Koppel & Berntsen, 2014,

2016a). For instance, Koppel and Berntsen (2014) asked participants to estimate when the most important public event of a typical person's life would most likely occur. Most participants expected this event to occur in adolescence or early adulthood, despite the fact that important public events are equally likely to occur at any point across the life span. Although these findings concern the expected timing of important public events, they suggest a broad focus on adolescence and early adulthood in human cognition. We argue that this focus on the early part of the life course is reflected in cultural life scripts as well, and that the bump in life scripts therefore holds regardless of the number of events requested.

However, to date, no one has collected life scripts consisting of more than 10 events. Thus, it has yet to be established whether the preponderance of events from the early part of life in cultural life scripts accurately reflects individuals' semantic representations of the typical distribution of important transitional events, or whether this is the result of the limited number of events requested. Here, we tested whether the bump in cultural life scripts is an artefact of the instruction to generate only the seven most important events. Specifically, we asked four groups of participants to generate life scripts consisting of four, seven, 15, or 25 events. Based on the literature reviewed above, we predicted that participants in all four conditions would produce a bump in adolescence and early adulthood. Further, based on Ece and Gülgöz (2014), we expected that participants asked to generate more events would mention a higher proportion of events from outside the core bump period of the 20-30 decade. Lastly, we tested whether there was still as strong a temporal order to cultural life scripts even as individuals were asked to generate more events.

**Method**

**Participants and Procedure**

The study was conducted through Amazon's Mechanical Turk website. Four groups of 100 participants each provided four, seven, 15 or 25 life script events, and gave the probable age at occurrence of these events. All participants were based in the United States. Participants were paid varying amounts depending on the number of events requested. Across the groups, they were compensated $3.20 an hour on average. Participants who did not follow instructions (e.g., reported seven identical events and/or ages) were excluded from the analyses. Therefore, the final numbers of participants per group were 100 (four events), 96 (seven events), 99 (15 events), and 96 (25 events). The four experimental conditions will be called the 4-, 7-, 15- and 25 event condition in the following.

Participants provided their age, gender, ethnicity and educational level. There were no significant differences between the four groups for these demographic variables. Overall, 68.4 % of participants were women, and the mean age was 33.28 (SD = 12.69); 82.9% of participants identified as Caucasian, 6.7 % as Asian, 4.7 % as African American, 1.6% as Hispanic, 0.8% as Pacific Islanders, 0.5 % as Native American, and 2.8% as Other. Education levels were as follows: 34.6 % of participants had a Bachelor's Degree, 18.9% some college, 14.4% a Master's Degree, 10.1 % were currently in college, 9.1% had a high school degree, 6.3% an Associate's degree, 3% an MD or PhD, 1.8% had not finished high school, and 1.8% did not specify their educational level.

The instructions for the cultural life script task followed Berntsen and Rubin (2004, p. 434), and were as follows: "This study deals with our expectations of an ordinary life course within our culture (i.e., the United States). Your task is to decide which events are expected to take place in a typical life course. You should therefore not think about your own personal life when answering the questions, but a prototypical life. There are no right or wrong answers. We are interested in your intuition about these questions. Imagine a quite ordinary infant of your own gender. It cannot be a specific infant that you know, but a prototypical infant in our culture with a quite ordinary life

course ahead. Your task is to write down the 4 (7/15/25, depending on condition) most important events that you imagine are most likely to take place in this prototypical infant's life, from birth to death. Write the events in the same order as they come to your mind. Give each event a short title that specifies its content. "

## Results

Figure 1 shows the distribution of events across the life span by experimental condition. Confirming our first hypothesis, there was a clear bump in all conditions for events occurring in adolescence and early adulthood.

*Figure 1:* Distribution of cultural life script events across the life span (in decades) by experimental condition
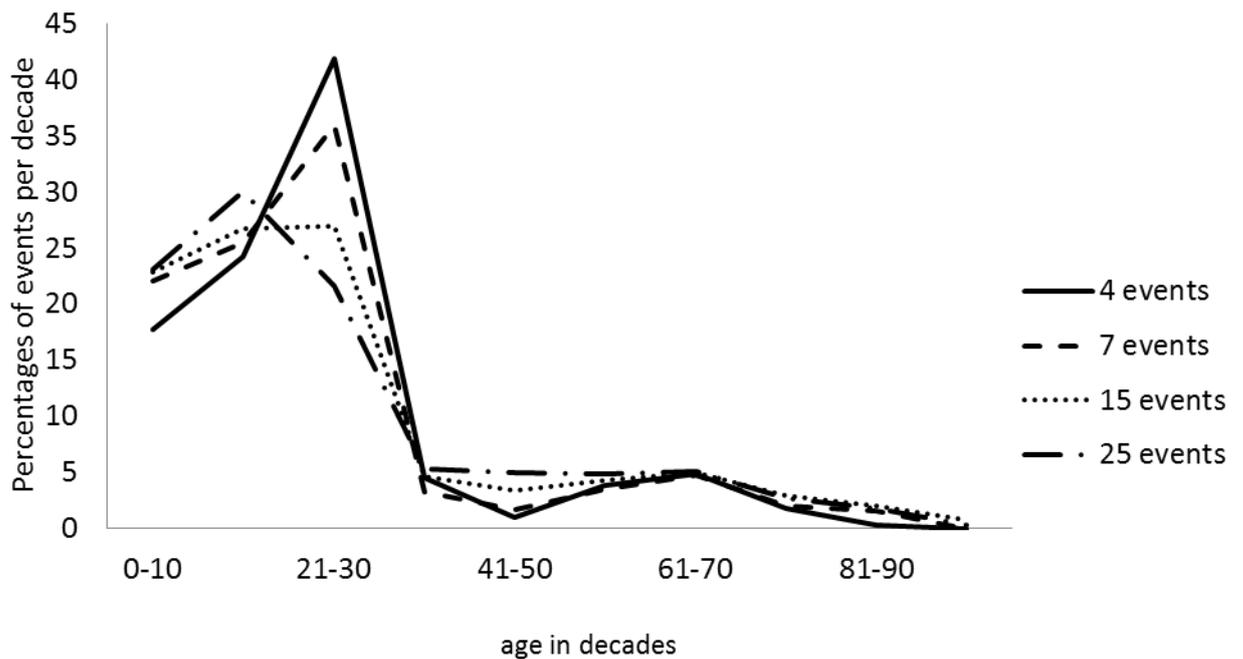


Participants in all four conditions expected the large majority of important life events to occur within the first three decades of life – even if they could mention 25 events. Confirming our second hypothesis, the fewer events participants were asked to generate, the significantly greater was the proportion of events expected to happen between the ages of 21-30 years (41.5 % in the 4-event

condition, 33.9% in the 7-event condition, 26.7 % in the 15-event condition, and 21 % in the 25 event condition; $\chi^2(3)=104.56$; p < .0001).

Further, reflecting this greater concentration of events in the core bump years of 21-30 when participants were asked to provide fewer events, Figure 1 also shows that the location of the bump shifted to earlier as participants were asked to provide more events. This finding of a shift in the bump to an earlier age with the increase of events is further supported by differences, across the four conditions, in mean age at event for those events expected to occur in the first 30 years of life ($F(3,3806) = 20.51$, $p < .0001$). Post hoc tests showed that age at event was significantly lower in the 15- and 25-event conditions than in the 7-and 4-event conditions, and significantly lower in the 7-event condition than in the 4-event condition ($M_{4-event} = 18.80$, $SD = 9.00$; $M_{7-event} = 16.89$, $SD = 9.50$; $M_{15-event} = 15.48$, $SD = 9.37$; $M_{25-event} = 14.89$, $SD = 8.88$; $p$s from .015 to <.0001). These findings are in direct contrast with the hypothesis that the youth bias in cultural life scripts could be driven by participants running out of events as they list them chronologically.

Lastly, to test whether participants in the four conditions varied in the extent to which they generated events in chronological order, we ranked, individually for each participant, each event according to (1) the position in which it was mentioned in the life script (e.g., the first event mentioned), and (2) the position it occupied in the chronology of events according to their expected age at occurrence (e.g., the earliest event in the life script). We then computed Spearman rank correlations between these two sets of rankings, again individually for each participant. These correlations were uniformly high across all four conditions ($m\ rho$ 4 event condition = .91, $SD$ = .31; $m$ $rho$ 7 event condition = .91, $SD$ = .24; $m\ rho$ 15 event condition = .83, $SD$ = .33; $m\ rho$ 25 event condition = .85, $SD$ = .24). A one-way ANOVA revealed no significant differences in the correlations across the four

conditions ($F(3, 214) = 2.05$, $p = .11$.[1] ). That is, participants mostly used chronological order regardless of how many events they were asked to list.

## Discussion

This study presents clear evidence for a "bump" in adolescence and early adulthood in the cultural life script, regardless of the number of events participants generated. This indicates that the bump in life scripts reflects an accurate and robust representation of the expected timing of important transitional events in a typical person's life within one's culture, rather than a methodological artefact of the number of events elicited.

Consistent with Ece and Gülgöz (2014), who did not find an increase of cited events in the core bump decade of 20-30 when participants were asked to exclude the ten most frequently mentioned life script events, participants in the 4- and 7-event conditions showed a stronger, steeper bump between the ages of 21-30 years than participants in the 15- and 25-event conditions. As participants cited more events, they drew upon a greater proportion of events from outside the core bump period. However, there was no evidence that this increased events from the *later* decades of life. Instead, the bump shifted on average to *earlier* as individuals cited more events, demonstrating that participants drew on additional events from childhood rather than later adulthood. Further, participants generally mentioned events in chronological order, that is, even participants in the 15- and 25-event conditions systematically mentioned events in the order in which they were expected to occur. Thus, participants held a well-specified, temporally delineated cultural life script, even up to 25 events.

Overall, our results are consistent with the youth bias that Koppel and Berntsen (2014, 2016a) identified  regarding the expected timing of important public events, in that we likewise

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[1] The degrees of freedom are depressed in this analysis because the homogeneity of variance assumption was violated.

found a focus on adolescence and early adulthood, regardless of the number of events elicited. That said, though important public events occur at random through the life span, this is not necessarily the case for important transitional autobiographical events. Therefore, the youth bias for public events is objectively irrational and has no basis in reality, but this is not unequivocally true of the youth bias in life scripts. Additionally, the youth bias for public events does not represent a delineated script regarding the timing and sequence of specific types of public events (Koppel & Berntsen, 2015b). Still, this general youth bias for both important public and autobiographical events may reflect a cultural idealization of youth and youthfulness. It may therefore be less pronounced in Eastern cultures, due to stronger values of respect for the elderly (Ng, 1998; Sung, 2001).

Additionally, the finding that the bump shifted location to an earlier average age with the increase in the number of events fits well with studies showing that the reminiscence bump for word-cued memories is located earlier than the bump for important memories (Koppel & Berntsen, 2015a). That is, as more mundane memories are elicited, earlier memories are reported. As we asked participants to list up to 25 events, they presumably began to include less important events. However, participants did not rate the importance of events, so future research will have to test this interpretation of the data.

Despite the robust bump in cultural life scripts found in this study, the question remains whether other instruction manipulations might diminish this bump. Manipulating the age of the hypothetical person in the life script task has been found only to have a small effect on the distribution of events early and late in life, but not on the bump (Erdoğan et al., 2008). But would the bump remain even when asking for 100 events? We can only hypothesize what effect this might have. However, research on older adults' views of their personal futures (Grysman, Prabhakar, Anglin, and Hudson, 2014) suggests that asking for many more events may lead to a second bump

in midlife, as older participants often mentioned their children's life script events when imagining their personal futures.

In conclusion, this study provides further evidence that the cultural life script represents a robust, chronologically organized understanding of how a typical life proceeds. Our findings support the notion that cultural influences guide the recollection of autobiographical memories and enhance our understanding of how people's cognition is embedded within a broader social and cultural context that prioritizes youth.

Authorship contributions

The three authors conceived and designed the study together, JK collected the data; AB and JK analyzed and interpreted the data, AB wrote the first draft of the manuscript, which JK revised and commented upon, AB revised the second draft, which JK and CBH revised and commented upon. AB wrote the final version of the manuscript which all three authors agreed upon.

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## Conflict of Interest Statement

The authors report no conflict of interest.

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