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# **The Reminiscence Bump in Autobiographical Memory and for Public Events: A Comparison Across Different Cueing Methods**

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### **Author Note**

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### **Abstract**

The reminiscence bump has been found for both autobiographical memories and memories of public events. However, there have been few comparisons of the bump across each type of event. In the current study, therefore, we compared the bump for autobiographical memories versus the bump for memories of public events. We did so between-subjects, through two cueing methods administered within-subjects, the *cue word method* and the *important memories method*. For word-cued memories, we found a similar bump from ages 5 to 19 for both types of memories. However, the bump was more pronounced for autobiographical memories. For most important memories, we found a bump from ages 20 to 29 in autobiographical memory, but little discernible age pattern for public events. Rather, specific public events (e.g, the Fall of the Berlin Wall) dominated recall, producing a chronological distribution characterized by spikes in citations according to the years these events occurred. Follow-up analyses suggested that the bump in most important autobiographical memories was a function of the cultural life script. Our findings did not yield support for any of the dominant existing accounts of the bump as underlying the bump in word-cued memories.

## The Reminiscence Bump in Autobiographical Memory and for Public Events: A Comparison Across Different Cueing Methods

### **The Reminiscence Bump in Autobiographical Memory**

The *reminiscence bump* in autobiographical memory, whereby memories from adolescence and early adulthood (e.g., ages 15 to 30) are disproportionately represented in the distribution of memories over the lifespan (Rubin, Wetzler, & Nebes, 1986), has been established as a robust finding. The most common technique used to cue memories, in studies exploring the temporal distribution of autobiographical memories, has been the *cue word method*, in which participants report autobiographical memories in association to cue words (e.g., Conway & Haque, 1999; Jansari & Parkin, 1996; Janssen & Murre, 2008; Janssen, Rubin, & St. Jacques, 2011; Kawaski, Janssen, & Inoue, 2011; Maki, Janssen, Uemiya, & Naka, 2013; Rubin et al., 1986; Rubin & Schulkind, 1997; Rybash & Monaghan, 1999; Schuman & Corning, 2014).

While the cue word method is intended to produce a relatively unbiased sampling of autobiographical memories (Crovitz & Shiffman, 1974), other cueing methods have focused on particularly important or meaningful memories. For instance, in the *important memories method*, researchers have asked participants to report  $x$  number of important memories (or the  $x$  most important memories) in their lives (Glück & Bluck, 2007; Haque & Hasking, 2010; Rubin & Schulkind, 1997). Similarly, researchers have asked participants to report the memories they consider to be most central to their life story (Bohn, 2010; Thomsen & Berntsen, 2008), or to simply freely recall autobiographical memories, which appears to yield a focus on important memories (Conway & Holmes, 2004; Demiray, Gülgöz, & Bluck, 2009; Howes & Katz, 1992; Rabbit & Winthorpe, 1988).

**Mechanisms underlying the bump in autobiographical memory.** Although the bump consistently has been found through all of these cueing methods, there is some indication that it may be found later and be more pronounced when memories are culled through some variation of the important memories method than when memories are culled through the cue word method. For instance, Rubin and Schulkind (1997) found that the bump for important memories peaked

from 20 to 29, whereas the bump for word-cued memories peaked from 10 to 19, while also being larger than the bump for important memories. Another divergence between the temporal distributions for word-cued versus important memories is that, in addition to the bump, there is also generally a recency effect in word-cued memories, but not for important memories (Rubin & Schulkind, 1997).

A number of theories, which are not necessarily mutually exclusive of one another, have been offered to explain the reminiscence bump in autobiographical memory. Rubin, Rahhal, and Poon (1998) reviewed the three classic explanations of the mechanisms underlying the bump. These include the *identity formation account*, the *cognitive account*, and the *cognitive abilities account*. In the identity formation account, the importance of the bump period in the formation of an adult identity is held to lend many events of this period a high degree of relevance to the self, thereby enhancing their memorability (Conway & Pleydell-Pearce, 2000; Fitzgerald, 1996; Holmes & Conway, 1999); in the cognitive account, the novelty of events from the bump period, – given that it is a time of rapid change – in combination with the subsequent increased rehearsal for these events, is held to render them particularly memorable (Pillemer, 2001; Robinson, 1992); and, in the cognitive abilities account, the optimal cognitive functioning evident in the bump period is held to lead to enhanced encoding in this period in general, including for autobiographical events (Janssen & Murre, 2008).

More recently, two alternative accounts of the bump have been proposed since Rubin et al.'s (1998) review. First, in the *life script account* of the bump, Berntsen and Rubin (2004; see also Rubin & Berntsen, 2003) contended that cultures have their own unique cultural life scripts, referring to culturally shared representations of the order and timing of major transitional life events (e.g., getting married, having children). Berntsen and Rubin argued that cultural life scripts structure recall from autobiographical memory by serving as a search description for events that are included in the script. This produces the bump inasmuch as life script events cluster in the bump period. As we elaborate on below, one salient distinction between the life script account and the other accounts is that, whereas the other accounts (with the exception of the cognitive abilities account) suggest that the memories which comprise the bump possess a special set of characteristics which aid in their encoding and retention, the life script account

posits that these memories' accessibility in recall is primarily a function of the life script serving as an aid in their retrieval.

Second, in the *life story account* of the bump Glück and Bluck (2007; see also Bluck & Habermas, 2000, for the initial theoretical formulation of the life story concept, and Demiray et al., 2009, for an elaboration of the life story account) extended the life script account by integrating it with lifespan developmental theory. Glück and Bluck argued that, whereas the life script account suggests that a life script event will be highly memorable simply by virtue of its connection to the life script, events also need to play an important role in one's individual life story to be preferentially recalled. Glück and Bluck contended that events which attain this significance to the life story tend to be events which (1) represent age-normative events of their period in the lifespan, and (2) are later viewed by the individual as having a large influence on their development. According to Glück and Bluck, the age-normative events of the bump period are those in which the individual takes control of his or her life, by making choices about one's life (e.g., choices about one's career or childbearing). As such events are typically considered to be positive, the life story account therefore predicts that the bump is produced, in particular, by positive events over which the individual had a large degree of perceived control.

***Evaluating these proposed mechanisms.*** There are varying degrees of evidence for these theoretical accounts of the reminiscence bump. Furthermore, there is some indication that the mechanisms underlying the bump may vary across the cue word versus important memory methods (e.g., Rubin & Schulkind, 1997). There is considerable evidence, for instance, that the life script underlies, at least in part, the bump in important memories. This evidence largely takes the form of the bump in important memories tracking with the bump in life scripts. For example, Rubin and Berntsen (2003) found a bump in both cultural scripts and autobiographical memory for positive events (e.g., the happiest moment of one's life), but generally not, in either case, for negative events (e.g., the saddest moment of one's life; for related findings, see also Berntsen & Rubin, 2002; Berntsen, Rubin, & Siegler, 2011; Collins, Pillemer, Ivcevic, & Gooze, 2007; Dickson, Pillemer, & Bruehl, 2011; Haque & Hasking, 2010).

There is also some evidence for the life story account, as applied to the bump in important memories. Most notably, in looking at memories of important events, Glück and

Bluck (2007) found that, similar to Berntsen and Rubin (2003), only positive events evinced a bump. However, in particular support of the life story account, the bump was only found in positive events over which the individual had a high level of perceived control (for related findings, see Demiray et al., 2009). One limitation of this finding, though, is that, as Glück and Bluck's framework suggests, emotional valence and perceived control are not strictly independent dimensions, as events over which the individual had a high level of perceived control were disproportionately positive.

At the same time, though, as Berntsen and Rubin (2004) noted in their theoretical formulation of the life script account, it appears unlikely that the life script plays a substantial role in producing the bump in word-cued memories, in that requests for word-cued memories would not be expected to trigger the life script to the same extent as requests for important memories. This contention has been borne out in subsequent empirical work, in which researchers have coded for the percentage of either word-cued and/or important memories which represent life script events (Alea, Ali, & Marcano, 2014; Berntsen & Bohn, 2010; Berntsen & Jacobsen, 2008; Bohn, 2010; Glück and Bluck, 2007; Thomsen & Berntsen, 2008).

Furthermore one challenge to the identity formation, cognitive, and life story accounts of the bump, as applied to the bump in either word-cued or important memories, stems from each account's prediction that memories recalled from within the bump period should possess a special set of characteristics. That is, in several prior cue word studies (Conway & Haque, 1999; Jansari & Parkin, 1996; Janssen & Murre, 2008; Rubin & Schulkind, 1997), as well as studies focusing on important memories (Conway & Holmes, 2004; Demiray et al., 2009; Rubin & Schulkind, 1997; Thomsen & Berntsen, 2008), researchers have tested the identity formation, cognitive, and/or life story accounts by having participants rate the characteristics of each memory on dimensions relevant to one or more accounts (e.g., each memory's importance, importance to identity, novelty, emotional intensity, and/or levels of rehearsal attached to the memory). Whereas these accounts predict that memories from within the bump period would be rated more highly on some of these characteristics (although the precise characteristics about which they make this prediction varies across the three accounts; see Demiray et al., 2009), these studies have generally failed to attain effects along these lines (but see Demiray et al., 2009).

The cognitive abilities account, for its part, is undermined as an explanation of the bump found in either word-cued or important memories by the differential temporal locations of the bump across these cueing methods: To the extent that the bump is due to an inflection point in cognitive functioning at a certain point in the lifespan, one would expect its location to be consistent across cueing method. Therefore, this account can only serve, at best, as a partial explanation of the bump in either method. Alternatively, the cognitive abilities account may apply to the bump found through one method (most likely, the cue word method), but hold little relevance to the bump found through the other method.

In sum, then, there is support for the life script account as underlying the bump in important memories, though not in word-cued memories. There is also some support for the life story account in the case of important memories, though the evidence is more mixed in this case. Likewise, there is cause to be skeptical of the other main accounts of the bump, as applied to either word-cued or important memories.

### **The Reminiscence Bump for Public Events**

In addition to the reminiscence bump in autobiographical memory, there is a smaller literature demonstrating a similar effect in memory for public events (for a review, see Koppel, 2013). Here researchers have shown that, just as autobiographical memories of adolescence and early adulthood are more accessible in recall, so are public events of the same period. The most common way researchers have probed for the age distribution of memory for public events is similar to the important memories method in the autobiographical memory literature. That is, in what we will refer to as the *important events method*, participants are asked to name what they consider to be the most important  $x$  number of public events over a given period (generally, over the last 50-80 years; e.g., Corning, Gaidys, & Schuman, 2013; Jennings & Zhang, 2005; Schuman & Corning, 2012; Schuman & Corning, 2014; Schuman & Scott, 1989; Schuman, Vinitzky-Serousi, & Vinokur, 2003; Scott & Zac, 1993). However, though the bump for public events appears to be a legitimate effect, it is nonetheless less robust than the bump in autobiographical memory, in that researchers often find exceptions to it as well (Koppel, 2013).

**Mechanisms underlying the bump for public events.** The most commonly proposed theoretical account of the reminiscence bump for public events parallels the identity formation account of the bump in autobiographical memory, that is, that public events of the bump period receive heightened encoding due to their salience to identity formation (Holmes & Conway, 1999; Schuman & Scott, 1989). As an alternative explanation, Janssen, Murre, and Meeter (2008) argued that the cognitive abilities account may apply to the bump for public events as well. However, in contrast to the relatively extensive testing of the proposed accounts of the bump in autobiographical memory, there has been little direct testing of these proposed accounts of the bump for public events.

### **Comparisons of the Reminiscence Bump Across Autobiographical and Public Events**

One question that researchers have largely not addressed is whether the bump is more pronounced for one type of event than the other (e.g., for autobiographical events compared to public events). A possible reason for this neglect is that the unit of analysis typically differs across the two types of studies: In autobiographical memory studies, researchers collapse across all memories in calculating, within a given sample, the distribution of autobiographical memories over the lifespan. In public event studies, however, researchers have generally analyzed the temporal distributions for individual events. In the important events method, for instance, they have compared the proportion of citations of individual events across cohorts.

There have, in fact, been only two previous studies in which the authors directly compared the age distribution of autobiographical memories versus the distribution of memories for public events, by collapsing across all events in analyzing the temporal distribution of memory for both types of events.<sup>1</sup> In the first study, Howes and Katz (1992) compared the

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<sup>1</sup> Schuman and Corning (2014) also compared the age distributions of recall for word-cued autobiographical memories versus recall for important public events. However, the units of analysis they employed in looking at each type of event did not parallel one another: For autobiographical memories, Schuman and Corning

distribution of autobiographical memories versus memories of public events in two different samples, an older-aged sample and a middle-aged sample. They employed two different memory assessments – the cue word method and a free recall method. Howes and Katz's findings varied across the type of memory task and specific sample. In the cue word method, neither sample demonstrated a reminiscence bump in either autobiographical memory or memory for public events, with the most notable effect being a recency effect that was more pronounced for public events than for autobiographical events.<sup>2</sup>

In the free recall method, conversely, the older-aged sample did not demonstrate a bump for autobiographical memories, but did demonstrate a bump for memories of public events, with an increase in events cited from the ages 16 to 30; the authors hypothesized that this bump for public events may have been due to the 16-30 age range coinciding, in this age group, with the occurrence of World War II. By their reasoning, then, what may have appeared to represent an age effect was, rather, driven by the greater inherent memorability of events which happened to take place in the bump period. The middle-aged sample, for their part, exhibited a bump in

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collapsed across all events, while, for public events, they followed the conventional procedure of analyzing the proportion of citations of individual events.

<sup>2</sup> Though this lack of a bump in word-cued autobiographical memories is unusual, there are two possible explanations for it. One possibility is that Howes and Katz's (1992) use of relatively large 15-year bins in plotting and analyzing the data may have obscured a more localized spike in recalled memories, as has been shown to occur when large age bins are employed (Janssen et al., 2011). Another possibility is that the lack of a bump may have been due to the authors employing a somewhat unconventional constrained procedure in both the cue word and free recall methods: For the word-cued memories, participants were instructed to think of an event within a given 15-year interval (e.g., ages 16-30) in association to each cue word; similarly, in free recall, participants were instructed to use the same 15-year windows in recalling as many autobiographical events and public events, respectively, as possible within a five-minute span (see Rabbit & Winthorpe, 1988, for the use of a similar constrained procedure in culling autobiographical memories, which likewise failed to produce a bump).

autobiographical memory, but not in memory for public events, with recall for public events marked instead by a sizable recency effect.

In the second study comparing the age distributions of memory for autobiographical versus public events, Holmes and Conway (1999) had participants free-recall as many important autobiographical and public events, respectively, as they could over a 10-minute period. Holmes and Conway found a reminiscence bump for both types of events, but the specific temporal location of the bump varied according to event type, with the bump in autobiographical memory located between the ages of 20 and 29, and the bump in memory for public events located between the ages of 10 and 19.

Taken together, then, the limited research comparing the age distributions in recall of autobiographical versus public events has yielded mixed results. Holmes and Conway's (1999) findings suggest that the main difference between the distributions of each type of event is that the bump for public events is earlier than that for autobiographical events. Conversely, Howes and Katz (1992) did not find any evidence to this effect. Rather, their findings suggest that, for word-cued memories, the most notable difference is that memory for public events is characterized by a stronger recency effect; in free recall, by contrast, their findings suggest that when collapsing across all events, the bump in autobiographical memory may not only be more robust than the bump for public events, but that the temporal distribution of recall for public events may be driven more by the inherent memorability of individual events than by age effects. Such an effect, we should note, would not be inconsistent with the frequent finding of the bump when comparing citations of individual events across cohorts, inasmuch as the attainment of the bump in one unit of analysis does not presuppose a bump in the other unit of analysis (see also Schuman & Corning, 2012, for a discussion of the role of event importance in recall for public events).

### **The Current Study**

In the current study, we compared, between-subjects, the size and location of the reminiscence bump for autobiographical versus public events. To allow for this comparison, we followed Howes and Katz (1992) and Holmes and Conway (1999) in calculating the temporal

distribution of recall for public events by collapsing across all events, as is customary in treating autobiographical memory data. In order to investigate whether any differences in the size or temporal location of the bump varied across cueing method, we carried out this comparison separately using two different cueing techniques: (1) the cue word method, and (2) the important memories/important events method.

We also wanted to address the mechanisms underlying any bump we found in recall for autobiographical and/or public events. Therefore, for memories generated through the cue word method, we collected ratings on a number of characteristics of these memories, such as their emotional intensity, the levels of rehearsal attached to them, and their novelty. Following the previous autobiographical memory studies noted above (Conway & Haque, 1999; Conway & Holmes, 2004; Demiray et al., 2009; Jansari & Parkin, 1996; Janssen & Murre, 2008; Rubin & Schulkind, 1997; Thomsen & Berntsen, 2008), we used these ratings to compare the characteristics of memories from within the bump period versus memories from outside the bump period. In doing so, it is noteworthy that our study represents the first instance in which the characteristics of word-cued memories for public events were assessed, and, therefore, in which a comparison along these lines could be carried out for such events.

One utility of the further data collected here on the comparison of the reminiscence bump for autobiographical versus public events is that any differences in the magnitude or robustness of the bump would be of great theoretical interest. For instance, of the five theories reviewed above which have been offered to explain the bump in autobiographical memory, three of them – the identity formation, cognitive, and cognitive abilities accounts – appear to be applicable to both autobiographical and public events. Therefore, to the extent that each account applies equally to both types of events, they would predict that the bump for each type of event should be similar in magnitude and robustness. Conversely, the life script and life story accounts apply exclusively to the bump in autobiographical memory. Consequently, to the extent that either or both of these accounts underlie the bump found therein, one would expect the bump to be stronger in autobiographical memory, or to be confined exclusively to autobiographical memory.

We expected that we would find a bump for word-cued autobiographical memories, in light of the sizable literature testifying to the robustness of the bump in this domain (e.g.,

Kawasaki et al., 2011; Rubin et al., 1986; Rubin & Schulkind, 1997; Schuman & Corning, 2014). However, in the case of word-cued memories for public events, the only direct precedent was Howes and Katz (1992). Though Howes and Katz did not find a bump in word-cued memories of public events, it was unclear how applicable their findings were to the present study, given that the constrained procedure they employed (see Footnote #2) diverged both from the bulk of the word-cued autobiographical memory literature and from the procedure we would use. Therefore, we took a more exploratory approach in this case.

As to recall for important events, similar to word-cued memories, we expected that we would find a bump in autobiographical memory, in light of the numerous prior studies yielding a bump for important autobiographical memories (e.g., Glück & Bluck, 2007; Holmes & Conway, 1999; Rubin & Schulkind, 1997). However, in the case of recall for important public events, given Howes and Katz's (1992) findings in free recall, we expected that the distribution of memories for important public events may be structured around the occurrence of particularly notable public events, rather than age effects.

## Method

### Participants, Recruitment, and Procedure

The sample was comprised of 42 Danish adults in each of the *autobiographical* and *public event* conditions. All participants were aged 40 years or older. Each participant completed, through the mail, the relevant questionnaire – that is, either the autobiographical event questionnaire or the public event questionnaire. Participants received a gift voucher of 100 Danish kroner (approximately 18 US dollars) in return for their participation. To facilitate comparison of the temporal distributions of recall for autobiographical versus public events, participants in each condition were age-matched as much as possible (see below). The mean age of participants in each condition, then, was 57.93 years in the autobiographical event condition (range = 41-69;  $SD = 8.21$ ) and 57.90 years in the public event condition (range = 40-69;  $SD = 8.15$ ). In terms of gender, 31 participants (73.81%) in the autobiographical event condition were female; in the public event condition, 34 were female (80.95%).

This sample of 42 participants in each condition was culled from a larger group of participants who completed the surveys. In total, 59 individuals completed the autobiographical event questionnaire, and 50 individuals completed the public event questionnaire (both questionnaires had been mailed to a total of 80 individuals, taken from a database of potential respondents). In order to age-match the participants across conditions (and thus avoid having the age of participants as a confounding variable), we yoked each respondent in each condition to a respondent within one year of their age in the other condition. Where one of the thusly created pairs was of unequal ages, we balanced out their age difference with another pair (e.g., for each pair in which the respondent in the autobiographical event condition was one year older than the respondent in the public event condition, we created one pair in which the public event respondent was one year older). Where no such match could be found, we dropped the participant from the sample. Finally, we dropped one yoked pair from the final sample, because one participant had failed to date any of their word-cued memories. Since the participants in this pair had been of unequal ages, the two groups in the final sample had negligibly different overall ages.

## Surveys

The autobiographical and public event questionnaires paralleled one another. They each consisted of three components: (1) an elicitation of word-cued memories, (2) probes of the characteristics of the word-cued memories, and (3) an elicitation of most important memories.

**Elicitation of word-cued memories.** The word-cued memories consisted of the memories participants offered in response to each of 10 cue words. For the cue words, we selected nouns which: (1) following Janssen and colleagues (e.g., Janssen et al., 2011), were rated at a 6.00 or above on concreteness, imagery, and meaningfulness in Paivio, Yuille, and Madigan (1968); (2) rated, on a Likert scale of 1 to 7, at a 4.00 or above on pleasantness in

Rubin (1980);<sup>3</sup> and (3) in pilot testing, were effective in eliciting memories of both autobiographical and public events.

The final 10 cue words, then, were the Danish translations of *money, water, child, clothing, church, woman, street, fire, kiss, and city*. In ordering the cue words, we created 10 random orders, with each order being followed in one-tenth of the questionnaires we mailed to potential respondents. The instructions for the autobiographical event questionnaire were the Danish translation of the following: *We will now ask you to give a brief description of the first personal event from your life that comes to mind in association to each of the following 10 cue words. The event you think of does not have to be important; it does not have to be interesting; it can come from any point in time in your life, from as recently as this morning to as far back as you can remember.* These instructions were modeled after those typically employed in cue word studies on autobiographical memory (e.g., Rubin & Schulkind, 1997), with the one exception that we did not specifically instruct participants to retrieve a *specific* event (e.g., an event taking place within a 24-hour period); this is because we wanted the instructions across both conditions to be as similar as possible, and it seemed illogical to include an instruction along these lines in the public event condition, in that many public events are more extended in nature.

The instructions for the public event questionnaire were similar, except that participants were asked to provide a description of the first *public event or change* from within their lifetime that came to mind in association to each of the cue words. The addition of the phrase *or change* was included to follow the phrasing that has most often been used in eliciting memories of public events (e.g., Schuman & Scott, 1989).

After participants had completed generating the 10 memories in response to each of the cue words, they were asked to date each memory according to the month and year in which it occurred. As, again, we did not instruct participants to retrieve specific events in particular, we

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<sup>3</sup> Our exclusion of negatively valenced cue words would not be expected to skew the subsequent age distributions of recalled memories: Though the reminiscence bump for important memories applies primarily to memories of positive events (e.g., Rubin & Berntsen, 2003), the bump in word-cued memories is not disproportionately comprised of positive events (Janssen & Murre, 2008; Rubin & Schulkind, 1997).

anticipated that some of the events would have taken place over a range of time. In these cases, we instructed participants to provide the range of dates over which the event occurred.<sup>4</sup>

**Characteristics of word-cued memories.** In addition to dating of each of the 10 word-cued memories, participants were also asked, after generating the memories, to rate each memory on a number of characteristics relevant to identity formation, the cognitive processing of each memory, and/or its relevance to the life story. These questions are represented in Table 1. As the table demonstrates, where appropriate, the dimensions along which the memories were rated varied across the autobiographical and public event questionnaires.

**Elicitation of most important memories.** After participants generated, dated, and rated the 10 word-cued memories, they were asked to name their three most important memories. Participants in the autobiographical event condition were asked to name their three most important personal events; those in the public event condition, the three most important public events or changes which occurred in their lifetime.

After participants had completed generating the three most important memories, they were asked to date each memory according to the same method as the word-cued memories, that is, to name the month and year in which it occurred. Where events had occurred over a span of time, we again instructed participants to provide the appropriate range.

Lastly, we should reiterate that we did not collect ratings of the characteristics of participants' most important memories, as we were concerned about overtaxing participants.

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<sup>4</sup> Although we asked participants in the public event condition to date both the word-cued and important events they cited, we disregarded their dating where it conflicted with the actual date of the event. However, where we could not confirm the date of an event, we simply followed the participant's dating. Events whose dates we could not confirm were typically either obscure local events (e.g., a development in the participant's local school district or government, a local crime, or a local fire), or were events which the participant described too vaguely for us to confirm the data (e.g., a reference to the Pope kissing the ground, or referring to a forest fire without specifying where or when the forest fire took place).

## **Content-Coding of the Surveys**

In addition to the measures included as part of the survey, we were also interested in content of the recalled memories, specifically, the proportion of memories which reflected life script events. Therefore, we coded each of the word-cued and most important memories according to whether it represented one of the 35 events in the Danish life script in Berntsen and Rubin (2004). An initial coder first coded all memories as a life script event or non-life-script event, with 25% of the memories subsequently dual-coded by a second, independent coder. The coders demonstrated a high level of agreement, with a kappa of .79 for word-cued memories, and .87 for important memories.

## **Results**

We divide the results into two sections. First, we compare the age distributions of word-cued and important memories across autobiographical versus public events. Second, for both autobiographical memories and memories of public events, we compare the characteristics of memories from within the bump period versus memories from outside the bump period.

### **Age Distributions of Memories**

We divide our comparisons on the age distributions of memories into (1) a comparison of the age distributions of word-cued memories, and (2) a comparison of the age distributions of most important memories.

**Word-cued memories.** For events that participants dated as taking place over a range of time, we used the midpoint of that range in calculating the participant's age at the time of the event. Where an event took place over too extended a period of time to reasonably be located at a particular date (i.e., over more than 20 years), we did not attach an age to this event, and this memory effectively served as missing data in the following analyses. Likewise, we did not attach an age to autobiographical events which the participant failed to date, or public events which were undated and which we could not date ourselves. Overall, then, the following

analyses draw upon 389 memories in the autobiographical event condition and 360 memories in the public event condition; the remaining memories (31 in the autobiographical event condition and 60 in the public event condition) were either missing, took place over too extended a span of time to be included in the analyses, were undated, or referred to an inappropriate type of event (e.g., where a participant in the public event condition referred to an autobiographical event).

Figure 1 illustrates the age distributions of the word-cued memories in both the autobiographical and public event conditions. To facilitate demonstration of the age distributions of both types of memories, we created separate plots for participants in their 40's and 50's on the one hand, and participants in their 60's on the other.<sup>5</sup> In both conditions, there were 20 participants in the younger age group and 22 participants in the older group. In the autobiographical event condition, this comprised 186 memories in the younger group and 203 memories in the older group which could be applied towards the following analyses; in the public event condition, there were 176 such memories in the younger group and 184 memories in the older group. Additionally, we only plotted the age distributions for the younger group through the last decade for which we had data from all participants, namely, the 40's.

Despite this, we still needed to correct for the fact that participants in their 40's would, on average, have lived through only about half of this decade, and would consequently have had less opportunity to form memories between the ages of 40 and 49. Likewise, in plotting the distributions for participants in their 60's, we needed to correct for these participants not having fully lived through their 60's. Therefore, following a procedure employed in Berntsen and Rubin (2002), we prorated the number of memories participants in their 40's and 60's reported, respectively, over the 40-49 and 60-69 decades. That is, we extrapolated from the number of memories participants reported within that interval to estimate how many memories they would have reported had they lived through the full decade. To do so, we first calculated, separately for each condition, the mean age of participants in their 40's and 60's, respectively, by taking their mean reported age and adding six months (given that, on average, participants reporting an age of  $x$  years would actually be expected to have lived  $x$  years + six months). We then calculated

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<sup>5</sup> However, we collapsed across both age groups in all inferential analyses, both for the word-cued data and the important memory data.

how many memories, in total, these participants reported per year within either the 40-49 or 60-69 age ranges, and finally multiplied by 10 to simulate how many memories they would have reported if they had lived through the full decade. In plotting the memories within the five-year bins of Figure 1, we assumed these memories were evenly distributed over the two five-year bins that made up participants' 40's or 60's.<sup>6</sup>

As Figure 1 illustrates, there was a bump early in life in both conditions. For the purpose of comparing the two conditions, we will define the bump as being located within the 5-19-year age range in both conditions, though, in the autobiographical event condition, the bump could also be more narrowly defined as extending from the ages 5 to 14.<sup>7</sup> To test the significance of the bump in each condition, we calculated, for each participant, the proportion of memories which occurred in the bump period of the ages 5 to 19, as well as from 20 to 34. Given that one would expect, simply on the basis of recency effects, that participants would recall more memories from the later age period, a higher proportion of memories from the bump period would be strong evidence for the existence of a bump (see Rubin et al., 1998, for a similar approach to testing for the presence of a bump). Therefore, we conducted paired-samples *t*-tests comparing, separately for each condition, the proportion of memories from each of these age periods. These analyses confirmed that, in each condition, participants recalled significantly more memories from the 5-19-year period than the 20-34-year period [autobiographical event condition:  $M_{5-19} = .59$  ( $SD = .25$ ) to  $M_{20-34} = .15$  ( $SD = .14$ ),  $t(41) = 8.30$ ,  $p < .001$ ,  $d = 1.28$ ; public event condition:  $M_{5-19} = .35$  ( $SD = .28$ ) to  $M_{20-34} = .17$  ( $SD = .16$ ),  $t(41) = 3.50$ ,  $p = .001$ ,  $d = .54$ ].

However, as Figure 1 also illustrates, the age distribution of recalled events varied across the autobiographical and public event conditions. Most critically for our purposes, the bump was more pronounced in the autobiographical event condition, as tested through an independent-

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<sup>6</sup> This correction, and the similar correction we applied to the important memory data, was only employed for illustrative purposes; in all inferential analyses, we used the raw, uncorrected data.

<sup>7</sup> These age distributions remain similar if we exclude the memories generated in association to any individual cue word. Therefore, the distributions were not predominantly driven by any one word in particular.

samples *t*-test comparing the proportion of memories occurring during the bump period of the ages 5 to 19,  $M_{\text{autobiographical}} = .59$  ( $SD = .25$ ) to  $M_{\text{public}} = .35$  ( $SD = .28$ ),  $t(82) = 4.23$ ,  $p < .001$ ,  $d = .92$ . Correspondingly, there was a stronger recency effect in the public event condition, as measured by the proportion of memories occurring with the last ten years for each participant,  $M_{\text{autobiographical}} = .14$  ( $SD = .18$ ) to  $M_{\text{public}} = .38$  ( $SD = .33$ ),  $t(64) = -4.28$ ,  $p < .001$ ,  $d = .97$  (the degrees of freedom were depressed because equality of variance across conditions could not be assumed).

**Most important memories.** Table 2 illustrates the events cited by at least two participants (4.76%) as among their most important memories. The event categories were generated by an initial coder. Subsequently, 25% of the memories were dual-coded by a second, independent coder, with agreement in 93% of cases. Overall, participants generated 124 memories in the autobiographical event condition (with two memories missing) and 119 memories in the public event condition (with seven memories missing or referring to a personal event). For descriptive purposes, the data presented in Table 2 draws upon this pool of memories. As with the word-cued memories, we again did not attach an age to events that took place over a period of more than 20 years, or which, in the autobiographical event condition, the participant failed to date. Similarly, we did not attach an age to citations of public events which referred to broad societal changes that are difficult to isolate at a particular point in time (e.g., the Development of the Internet/Other Recent Changes in Technology and the Women's Movement). This left us with 117 memories in the autobiographical event condition which could be dated, and therefore included in the following inferential analyses; in the public event condition, there were 90 such memories. One public event listed in Table 2, the Protests of the 1960's, could reasonably be dated at different points in time. We dated it at 1968, under the reasoning that 1968 represented the height of public attention for this event.

Figure 2 illustrates the age distributions of the most important memories for both autobiographical and public events. We plotted these distributions in 10-year intervals, rather than the five-year intervals we employed for the word-cued memories, due to the smaller number of memories in this case. As with the word-cued memories, we plotted the distributions separately for participants in their 40's and 50's on the one hand, and those in their 60's on the

other. Here, in the autobiographical event condition, the younger group had a total of 55 memories which could be applied towards the following analyses, and the older group had a total of 62 such memories; in the public event condition, the corresponding figures were 40 memories in the younger group and 50 memories in the older group. And we again plotted the distributions for the groups in their 40's and 50's only through the most recent decade for which we had data from all participants (i.e., the 40's), correcting again for participants in their 40's not having fully lived through the 40-49 decade, and participants in their 60's not having fully lived through the 60-69 decade, as explained in reference to Figure 1.

As can be seen in Figure 2, in the autobiographical event condition, we found a fairly typical bump in both age groups, with a particular peak in the 20-29 age range, though, in the younger group, this peak was more broadly extended from ages 20 to 39. We tested the significance of the bump from 20 to 29 by comparing the proportion of memories, within each participant, occurring within the bump period of 20 to 29 versus the 10-year interval with the second-highest proportion of memories, that is, 30 to 39. This test confirmed the significance of the bump,  $M_{20-29} = .33$  ( $SD = .27$ ) to  $M_{30-39} = .21$  ( $SD = .25$ ),  $t(40) = 2.03$ ,  $p = .049$ ,  $d = .32$ .<sup>8</sup>

Participants in the public event condition, conversely, demonstrated no consistent peak across the two age groups. Nor did they evince any other consistent, discernible age pattern. This lack of a consistent age pattern was confirmed through a chi-square test probing for whether citations of important public events were evenly distributed across the ten-year intervals illustrated in Figure 2,  $\chi^2(3, N = 58) = 1.86$   $p = .60$  (the degrees of freedom were depressed because we only included the age intervals through the 30-39 range, so as to exclude the period where our  $n$  starts to decrease).

***Chronological distribution of most important public events.*** The lack of a consistent, discernible pattern in the age distribution of most important public events raises the question of whether there is another recognizable pattern to the distribution of cited events. Table 2 gives a hint to the answer, in the dominance of two particular events in participants' citations, that is, the Fall of the Berlin Wall and the terrorist attacks of September 11, 2001 (9/11). The frequency

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<sup>8</sup> The degrees of freedom for this analysis were 40, rather than the 41 it would have been with the full sample, because one participant did not date any of their most important autobiographical memories.

with which these events were cited, combined with the lack of a consistent pattern in the overall age distribution of citations, indicates that, across age groups, some events simply dominated participants' recall for public events. If this were the case, then we would expect to find a statistically significant pattern in the chronological distribution of cited events, not according to participant age at the time, but according to the date of the event.

To examine this possibility, we plotted the citations of events by the year of their occurrence. This plot is illustrated in Figure 3. We plotted the distribution of citations back to 1968, so as to (1) encompass a period over which the bulk of our participants were alive over the entire range (and, therefore, could have cited an event at any of the years illustrated in the figure), while (2) including the most recent years for which we had a sizable number of citations. We used one-year bins in this case, to more precisely locate each specific event within the graph.

As the figure illustrates, there were three discrete spikes in citations: (1) 1989, corresponding to the Fall of the Berlin Wall; (2) 2001, corresponding to 9/11; and (3) 2008, which included both the Economic Crisis of 2008 and the Election of Barack Obama as US President. We tested the significance of these increases through binomial tests comparing the proportion of citations for each of these years to the other years in the graph. There were significantly more citations for each of these three years than for all but, at most, three other years in the figure,  $p \leq .012$ .

### **Characteristics of Bump Versus Non-Bump Memories**

This section focuses on whether memories from the bump period varied from memories from other periods. We look first at the characteristics of word-cued memories, then turn to the characteristics of most important memories.

**Word-cued memories.** We divide our analyses of the characteristics of bump versus non-bump word-cued memories into (1) analyses addressing whether memories from the bump period varied from memories from other periods in terms of the questions presented in Table 1, and (2) analyses addressing, in the autobiographical event condition, whether the bump was driven by life script events.

***Likert-rated characteristics and novelty.*** For the Likert-rated characteristics of autobiographical memories and memories of public events, we calculated, for each participant, the mean rating of, respectively, memories from the bump period of 5-19 and memories from outside the bump period. For the ratings of novelty, we simply calculated the overall percentage of memories, both from within and outside the bump period, which were rated as the first event of their type which the individual had experienced (in doing so, we excluded responses of *don't know*). In contrast to our tests for the bump itself, each of these comparisons were made between memories from within the bump period versus *all* other memories, since the purpose was to examine whether the memories comprising the bump differed from all other memories, and not just from those which were dated as occurring in the period immediately after the bump.

For participants in the autobiographical event condition, the corresponding descriptive statistics, and comparisons for memories from within versus outside the bump period, are presented in Table 3; Table 4 presents the same information for the public event condition. The identity formation, cognitive, and life story accounts of the bump predict that memories from within the bump period would be rated more highly on several of the assessed characteristics (although the specific characteristics about which they make this prediction would vary; Demiray et al., 2009). However, as the tables illustrate, where we found significant differences, it was most often memories from *outside* the bump period which were rated more highly, in contrast to these predictions. The only respects in which memories from within the bump period were rated more highly were in the public event condition, wherein memories from within the bump period were rated as more positive and as representing a novel experience (i.e., a first-time experience) a higher proportion of the time.

In sum, these analyses yielded scant evidence that, for either autobiographical memories or memories of public events, the reminiscence bump could be attributed to either the cognitive or identity formation accounts of the bump.

***The proportion of autobiographical memories representing life script events.*** In the Introduction, we posited that a more pronounced reminiscence bump for autobiographical memories, compared to memories of public events, may support either the life script and/or life story accounts of the bump. Since we did find a stronger bump for autobiographical memories,

we thus wanted to examine whether this was because the cultural life script, in particular, contributed to this bump.

Consistent with Berntsen and Rubin's (2004) theoretical formulation of the life script, relatively few word-cued memories (22.11%) were for life script events. Of the life script events that participants did recall, they were no more likely to have occurred during the bump period than were non-life-script events. In fact, non-life-script events were more likely to have taken place in the bump period, with 63.04% of non-life-script versus 47.67% of life script events occurring in the bump period. Similarly, when contrasting memories from within the bump period versus outside the bump period, a smaller proportion of memories from within the bump period referred to life script events, with 17.67% of memories from the bump period doing so compared to 28.66% of memories from outside the bump period. We failed to find support, then, that the life script was responsible for the bump in word-cued autobiographical memories.

**Most important memories.** Though we did not collect ratings of the characteristics of most important memories, we could nonetheless again analyze the proportion of such memories, across the bump and non-bump periods, which represented life script events.

*The proportion of autobiographical memories representing life script events.* As with the word-cued memories, we tested whether the reminiscence bump for most important autobiographical memories was driven by life script events. Towards that end, we conducted the same analysis as for the word-cued memories, comparing the proportion of life script events versus non-life-script events which occurred during the bump period. Overall, 60.69% of participants' most important autobiographical memories were of life script events. Of these life script events, a significantly greater proportion of them took place during the bump period of 20 to 29 than did non-life-script events (47.89% to 8.70%;  $p < .001$  in a binomial test).<sup>9</sup> Likewise, a

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<sup>9</sup> We employed this nonparametric analysis, rather than calculating the proportion of life script and non-life-script events taking place in the relevant age interval, as we did in previous analyses, due to the small number of memories from which we could construct such means: Once the three most important memories are divided into life

higher proportion of memories from within the bump period referred to life script events than did memories from outside the bump period, 89.50% to 46.84%,  $p < .001$ .

To illustrate the temporal distributions of life script versus non-life-script events, we plotted their respective distributions in Figure 4. In doing so, we again plotted these distributions separately for participants in their 40's and 50's on the one hand, and participants in their 60's on the other, again correcting for the drop-off in the sample in the last decade for each age group, as explained earlier. As the figure reveals, when looking at life script events taken alone, the bump from 20 to 29 held,  $p < .001$  in a binomial test when compared to the 10-year interval with the second-highest proportion of memories, that is, ages 30 to 39. However, if we look at non-life-script events taken alone, the bump disappears, with the distribution characterized by a non-significant spike in cited memories in the 30-39 interval,  $p = .21$  in a binomial test compared to the proportion of memories in the second-most frequently cited 10-year interval of ages 0-9. For our purposes, then, the main conclusion we draw from this analysis is that the bump in autobiographical memories of most important events was driven by life script events.

## Discussion

In the present research, when using the cue word method, we found a similar reminiscence bump from ages 5 to 19 for both autobiographical memories and memories of public events. However, this bump was more pronounced for autobiographical memories. Correspondingly, and consistent with Howes and Katz's (1992) findings for word-cued memories, we attained a larger recency effect in recall for public events.

One divergence between the distribution we attained for word-cued autobiographical memories and the distributions that have typically been attained in prior studies concerns both the size of the bump and recency effects. That is, the bump we attained was larger than the bump which has generally been found in most prior cue word studies (e.g., Kawasaki et al., 2011; Rubin et al., 1986; Rubin & Schulkind, 1997; Schuman & Corning, 2014).

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script and non-life-script events, 13 of the 42 participants (30.96%) have zero exemplars from one of the two categories, with the remainder having only one exemplar from one of the categories.

Correspondingly, the sizable recency effect which is characteristic of word-cued autobiographical memories (Rubin & Schulkind, 1997) was considerably less prominent in our case. These differences are most likely due to our omission of the typical instruction to retrieve specific events in particular, as there may have been a larger semantic component to participants' memories than in studies which include this instruction, and this may have produced a greater focus on early memories. The omission of this instruction may also have been partially responsible for the relatively early location of the bump we attained for word-cued memories. As we noted in the Introduction, though, the cue word method appears to yield an earlier bump than the important memories method (Rubin & Schulkind, 1997). There is considerable precedent, then, for the bump in word-cued memories to be found in a similar age range as the one we attained, even in studies in which this instruction was included (Jansari & Parkin, 1996; Janssen et al., 2011; Kawasaki et al., 2011; Rybash & Monaghan, 1999; Schuman & Corning, 2014).

In the important memories/important events method, conversely, we found a bump from 20 to 29 for autobiographical memories. Again, this later bump for important autobiographical memories than for word-cued memories is consistent with prior research (Rubin & Schulkind, 1997). However, there was little discernible age pattern in participants' citations of the most important public events of their lifetimes. Rather, just as Howes and Katz (1992) found some indication that the temporal distribution of freely recalled public events may be primarily driven by the inherent memorability of individual events, these citations were dominated by specific events, such as the Fall of the Berlin Wall and 9/11. This led to peaks in citations corresponding to the years in which these events occurred, rather than participants' ages at the time they took place. Therefore, recall for important public events was predominantly event-driven, rather than characterized by age effects.

Our findings for public events in the important events method may appear to run counter to prior research on the age distributions of citations of most important public events of recent history, as researchers have often found a bump for such events (e.g., Schuman & Scott, 1989; but see Koppel, 2013, for a delineation of exceptions to this effect through the literature). However, our results are not necessarily inconsistent with these prior findings, in that, again, our

unit of analysis differed from the unit of analysis typically employed in these prior studies. That is, we collapsed across all events in calculating the temporal distribution of cited events within our entire sample, rather than comparing the proportions of citations of individual events across cohorts.

One may wonder whether this lack of a bump for public events is sensitive to the specific number of public events participants are asked to cite. On the one hand, in looking at judgements of the five best football players of all time, though Janssen, Rubin and Conway (2012) generally found an overall bump in judgements of individual players as among the best in history, evidence for the bump was more mixed in judgements of the three most frequently mentioned players in particular (Johan Crujff, Pelé, and Diego Maradona). This suggests that the bump for public events may be concentrated among less memorable events, and therefore that we may have attained a bump had we asked participants to cite more events, which likely would have yielded less memorable events. However Schuman and Corning (2012) reported that, in a split-sample national experiment, manipulating the number of requested events had no appreciable impact on cohort effects.

### **Implications for Theoretical Accounts of the Bump**

The results for important memories serve as straightforward support for the life script account. First, whereas the cognitive, identity formation, and cognitive abilities accounts appear to apply to both autobiographical and public events, and would therefore predict a bump in both cases, we only found a bump for most important autobiographical events. At the very least, then, these findings demonstrate that factors relevant to these accounts are vulnerable to being overridden by other factors, such as, in the case of public events, the memorability of individual events.

Second, the bump in important autobiographical memories was a function of the high proportion of life script events which occurred during the bump period; when we looked at non-life-script events taken alone, the bump disappeared. This result suggests that the bump in important autobiographical memories is driven by the life script. Both the identity formation and life story accounts stress similar formative experiences as underlying the bump (regarding the

identity formation account, see, e.g., Holmes & Conway, 1999; regarding the life story account, see Glück & Bluck, 2007), but both of these accounts also predict that memories from within the bump period should possess a special set of characteristics which support their encoding and retention. However, researchers examining important memories have usually found no difference in the characteristics of memories from within versus outside the bump period (Conway & Holmes, 2004; Rubin & Schulkind, 1997; Thomsen & Berntsen, 2008; but see Demiray et al., 2009). There is, therefore, a lack of consistent support for this contention. This null finding, however, is consistent with the life script account's premise that the bump in important memories is instead due to a retrieval strategy centered around events of this period.

In the word-cued data, and similar to our findings for most important memories, the disparity in the size of the bump across both conditions appears to contradict the identity formation, cognitive, and cognitive abilities accounts, since they would predict similarly-sized bumps in each condition. The disparity in the size of the bump, therefore, indicates that, even if these accounts do play a role in producing the bump, the extent of this role varies according to the influence of other factors on recall; in the case of public events, for instance, the strong recency effect we attained served to reduce the size of the bump.

Furthermore, the identity formation, cognitive and life story accounts were additionally undermined as explanations of the bump in word-cued memories by the more direct tests of the characteristics that they would each predict for memories comprising the bump. That is, for the word-cued memories, we collected ratings on a number of characteristics relevant to one or more accounts (e.g., the emotional intensity of each event, degree of rehearsal for it, and whether it was novel), and contrasted these ratings for memories from within the bump period versus memories from outside the bump period. These tests did not yield consistent support for any of these accounts. That is, where we found differences across memories from within versus outside the bump period, it was generally memories from outside the bump period which were rated more highly. Although our study represents the first instance in which an analysis along these lines was conducted for word-cued memories of public events, our results were similar to the findings of prior cue word studies in autobiographical memory (Conway & Haque, 1999; Jansari & Parkin, 1996; Janssen & Murre, 2008; Rubin & Schulkind, 1997). These findings suggest

that, as in important memories, the bump in word-cued memories is not due to memories from the bump period possessing particularly high levels of factors relevant to identity formation, cognitive processing, or (in the case of autobiographical memories) the life story.

As to the whether the life script was responsible for the bump we attained for word-cued memories, unlike in the data for most important events, there was no indication that this was the case; if anything, the bump was stronger for non-life-script events than life script events. Similarly, a lower proportion of memories from the bump period referred to life script events than did memories from outside the bump period. Consistent with Berntsen and Rubin's (2004) theoretical formulation of the life script, the life script does not seem to be responsible for the bump in word-cued autobiographical memories.

## **Conclusions**

Taken together, our findings suggest that the reminiscence bump is both more pronounced and more robust in autobiographical memory than in memory for public events. Intriguingly, our results also indicate that the mechanisms underlying the bump may vary according to the method being used to elicit memories. Specifically, the current findings suggest that, in autobiographical memory, the bump in the important memories method is due to the life script. However, in the case of word-cued memories it appears that none of the dominant existing accounts can adequately explain the bump found therein.

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**Table 1**

*Characteristics of Word-Cued Memories Assessed Across Autobiographical and Public Event Conditions*

Item	Autobiographical Event Condition	Public Event Condition
<i>Importance</i> : When you think about this event, you think of it as being: rated on a 1-5 scale, 1 = not at all important, 5 = very important	X	
<i>Importance for You</i> : When you think about this event, you think of it as being, <i>for yourself</i> : rated on a 1-5 scale, 1 = not at all important, 5 = very important		X
<i>Importance for Your Family and Friends</i> : When you think about this event, you think of it as being, <i>for your family and friends</i> : rated on a 1-5 scale, 1 = not at all important, 5 = very important		X
<i>Importance for Your Country</i> : When you think about this event, you think of it as being, <i>for your country</i> : rated on a 1-5 scale, 1 = not at all important, 5 = very important		X
<i>Importance at the International Level</i> : When you think about this event, you think of it as being, <i>at the international level</i> : rated on a 1-5		X

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scale, 1 = not at all important, 5 = very important

*Emotional Intensity:* The emotions you have when you recall this event are: rated on a 1-5 scale, 1 = not at all intense, 5 = very intense

X

X

*Emotional Valence:* The emotions you have when you recall this event are: rated on a 1-5 scale, 1 = very negative, 5 = very positive

X

X

*Conversation:* Please indicate how much you have talked about this event since it took place: rated on a 1-5 scale, 1 = never, 5 = very frequently

X

X

*Thinking:* Please indicate how much you have thought about this event since it took place: rated on a 1-5 scale, 1 = never, 5 = very frequently

X

X

*Media Attention:* Please indicate how much you have watched, read, or listened to media about this event since it took place: rated on a 1-5 scale, 1 = never, 5 = very frequently

X

*Novelty:* Please indicate whether this was the

X

X

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first event of its type that you had ever  
experienced: *yes, no, or don't know*

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*Note.* An *X* indicates that a particular question was asked in the corresponding condition.

**Table 2**

*Events Cited as Most Important Autobiographical and Public Events by at Least Two Participants*

Autobiographical Events			Public Events		
Event	Number of Citations	Mean Age at Event ( <i>SD</i> )	Event	Number of Citations	Mean Age at Event ( <i>SD</i> )
Children	26 (20.97%)	28.60 (4.09)	Fall of the Berlin Wall (1989)	13 (10.92%)	34.62 (10.27)
Marriage	14 (11.29%)	24.93 (6.34)	September 11, 2001	11 (9.24%)	44.00 (9.07)
Parent's Death	10 (8.06%)	22.50 (10.96)	Development of the Internet/Other Recent Electronic Technology (N/A)	7 (5.88%)	N/A
Long Trip	6 (4.84%)	20.17 (3.13)	Women's Movement (N/A)	7 (5.88%)	N/A
Second Child	4 (3.23%)	32.50 (2.89)	Economic Crisis of 2008	7 (5.88%)	53.42 (12.32)
Divorce	3 (2.42%)	41.67 (9.02)	Assassination of John F. Kennedy (1963)	4 (3.36%)	13.75 (5.50)
First "Real" Job/Beginning of Career	3 (2.42%)	26.50 (2.12)	Denmark Joining the European Union (1973)	4 (3.36%)	17.25 (9.03)

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Graduating From High School	3 (2.42%)	18.67 (.58)	Moon Landing (1969)	4 (3.36%)	9.25 (11.53)
Grandchildren	3 (2.42%)	51.00 (7.81)	Protests of the 1960's (1968)	4 (3.36%)	15.75 (9.36)
Parents' Divorce	3 (2.42%)	21.00 (14.00)	Election of Barack Obama as US President (2008)	3 (2.52%)	47.00 (9.85)
Adopting a Child	2 (1.61%)	38.00 (4.24)	Election of First Female Danish Prime Minister (2011)	3 (2.52%)	52.00 (11.36)
Changing Career/New Job	2 (1.61%)	54.00 (2.83)	Opening of the Øresund Bridge (2000)	3 (2.52%)	45.00 (8.66)
Leaving Home	2 (1.61%)	24.50 (6.36)	Abolition of Corporal Punishment of Children in Denmark (1997)	2 (1.68%)	49.50 (.71)
Mental Illness	2 (1.61%)	39.50 (9.19)	Cuban Missile Crises (1963)	2 (1.68%)	15.50 (3.54)
Moving	2 (1.61%)	34.00 (4.24)	Legalization of Same-Sex	2 (1.68%)	60.50 (12.02)

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		Marriage in Denmark (2012)			
Serious Physical Illness	2 (1.61%)	25.75 (35.29)	Ruling That a Woman Could Ascend to Danish Throne (1953)	2 (1.68%)	6.50 (2.12)
Other's Death	2 (1.61%)	32.50 (13.44)	2004 Tsunami	2 (1.68%)	46.50 (2.12)
Other	35 (28.29%)	30.68 (20.17)	Other	39 (32.78%)	25.08 (15.20)

*Note.* The percentage of citations for each individual event represents the total percentage of citations which that event accounted for, rather than the percentage of participants citing that event. This is because, in the autobiographical event condition, some participants cited having children more than once (e.g., if they had two children, they cited the birth of each child as an individual event).

Table 3

*Mean Values for Memory Characteristics of Bump Versus Non-Bump Word-Cued Memories: Autobiographical Event Condition*

	Bump	Non-Bump	<i>t</i> -value
Importance	3.43 (.73)	3.73 (.72)	1.90+
Emotional Intensity	3.48 (.81)	3.89 (.56)	2.95**

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Emotional Valence	3.58 (.65)	3.64 (.83)	.43
Conversation	2.44 (.72)	2.94 (.83)	4.32***
Thinking	2.96 (.76)	3.31 (.72)	3.12**
Novelty	62.68%	66.23%	N/A

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+  $p < .10$ ; \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

*Note.* Novelty data was categorical, while the remaining ratings were on a 1-5 interval scale.

The novelty data is expressed as the proportion of events rated as novel (excluding *don't know* responses), while the interval data is expressed as a mean rating across all participants. Standard deviations are in parenthesis

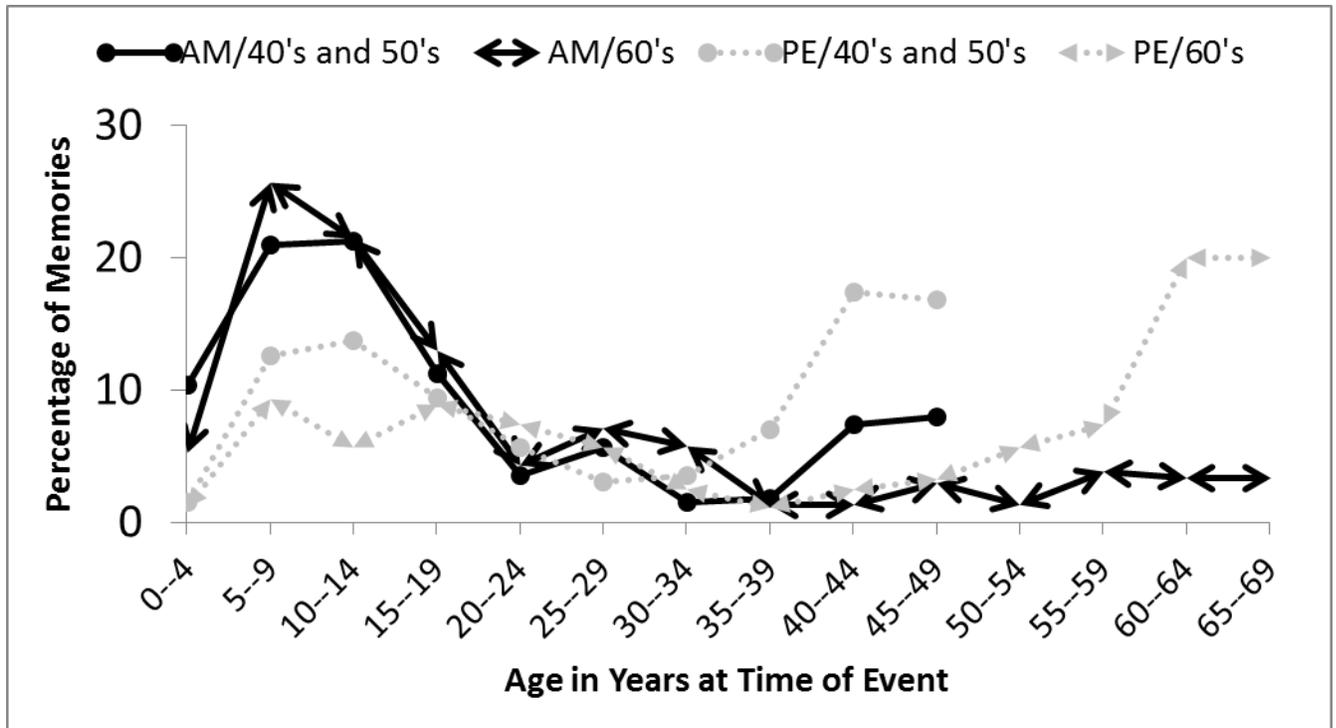
**Table 4**

*Means Values for Memory Characteristics of Bump Versus Non-Bump Word-Cued Memories: Public Event Condition*

	Bump	Non-Bump	<i>t</i> -value
Importance for You	2.74 (.91)	2.86 (.76)	.72
Importance for Your Family and Friends	2.38 (.96)	2.58 (.83)	1.19
Importance for Your Country	2.91 (.93)	3.39 (.84)	2.03+
Importance at the International Level	2.54 (1.06)	2.88 (.77)	1.71+
Emotional Intensity	2.99 (.99)	3.25 (.73)	1.23
Emotional Valence	3.38 (.95)	2.85 (.79)	2.51*
Conversation	2.52 (.71)	2.85 (.69)	2.10*
Thinking	2.63 (.69)	2.91 (.68)	1.91+
Media Attention	2.73 (.96)	3.26 (.76)	3.43**
Novelty	79.81%	49.54%	N/A***

+  $p < .10$ ; \* $p < .05$ ; \*\* $p < .01$

*Note.* Novelty data was categorical, while the remaining ratings were on a 1-5 interval scale. The novelty data is expressed as the proportion of events rated as novel (excluding *don't know* responses), while the interval data is expressed as a mean rating across all participants. Standard deviations are in parenthesis.



*Figure 1.* Age distributions of word-cued memories. *AM* signifies *autobiographical memory* and *PE* signifies *public events*.

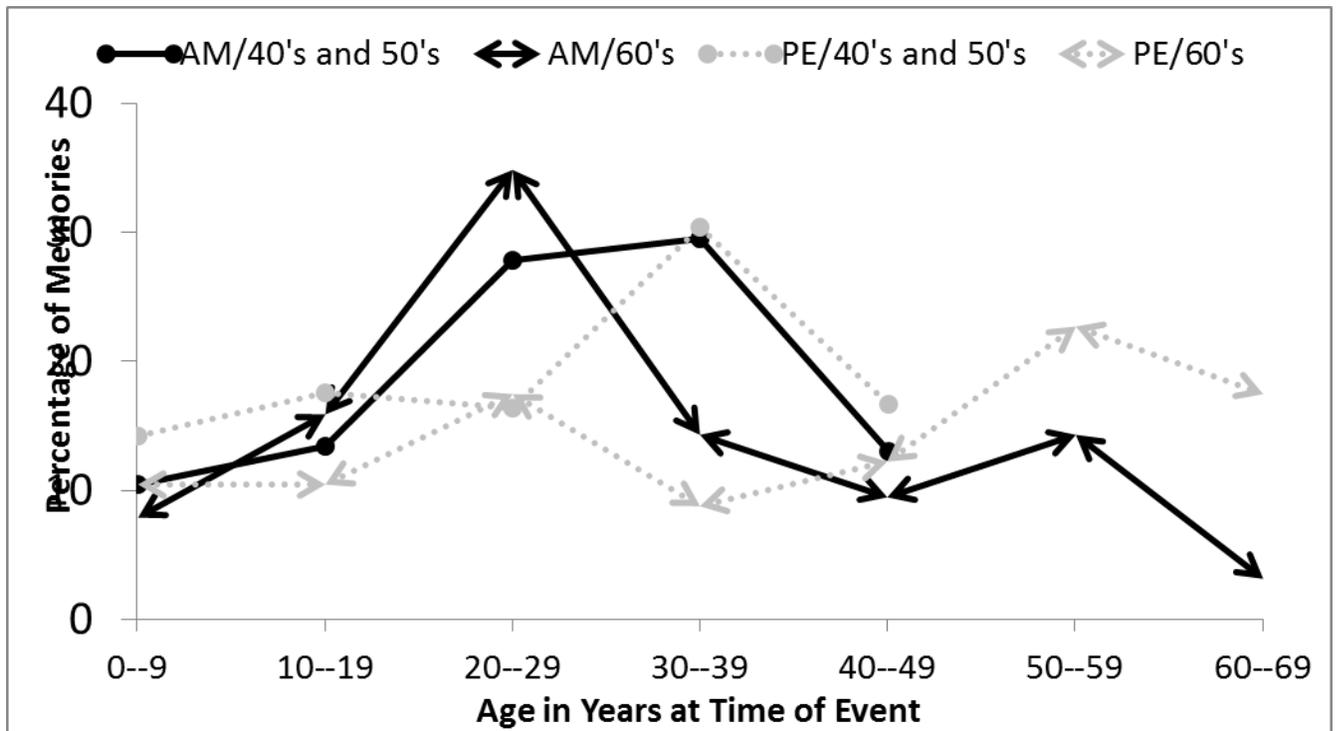
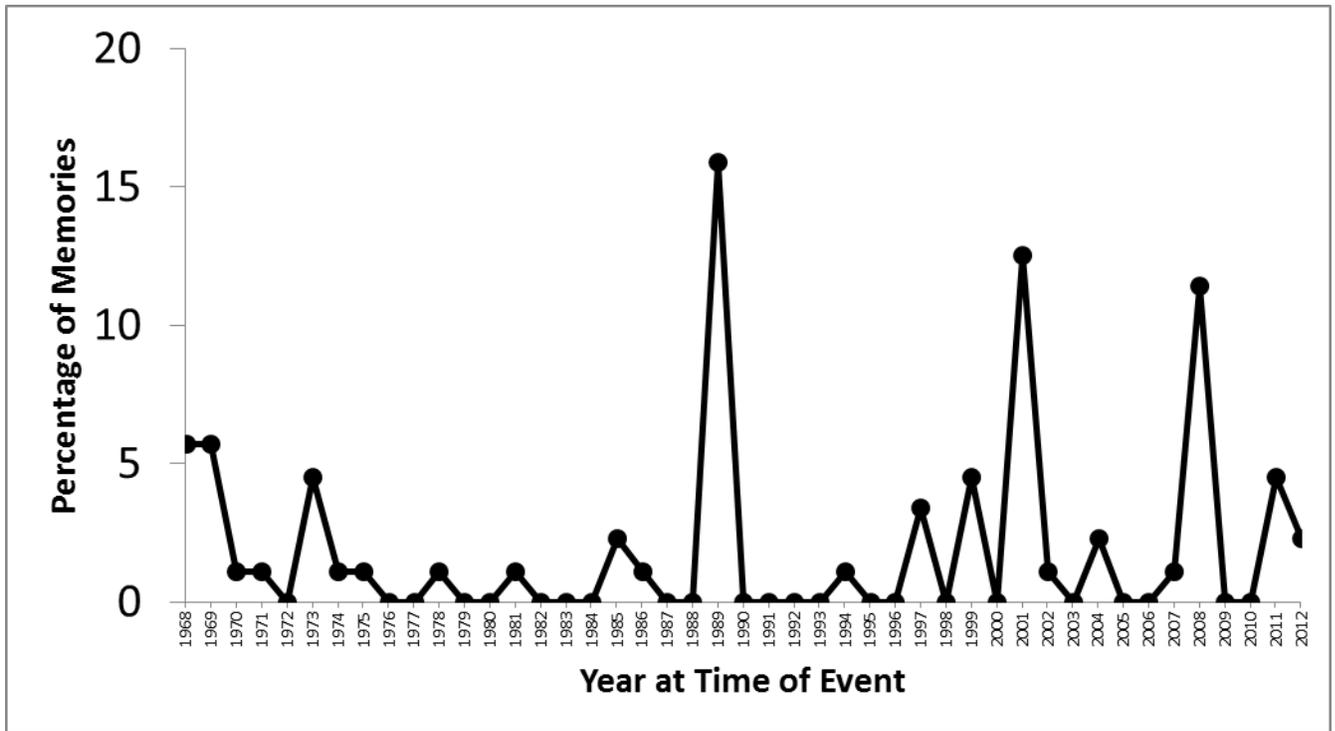


Figure 2. Age distributions of most important memories. *AM* signifies autobiographical memory and *PE* signifies public event



*Figure 3.* Chronological distribution of most important public events. The spike in citations in 1989 reflects citations of the Fall of the Berlin Wall; the spike in citations in 2001 reflects citations of the terrorist attacks of September 11, 2001; and the spike in citations in 2008 reflects citations of the Economic Crisis of 2008 and the Election of Barack Obama as US President.

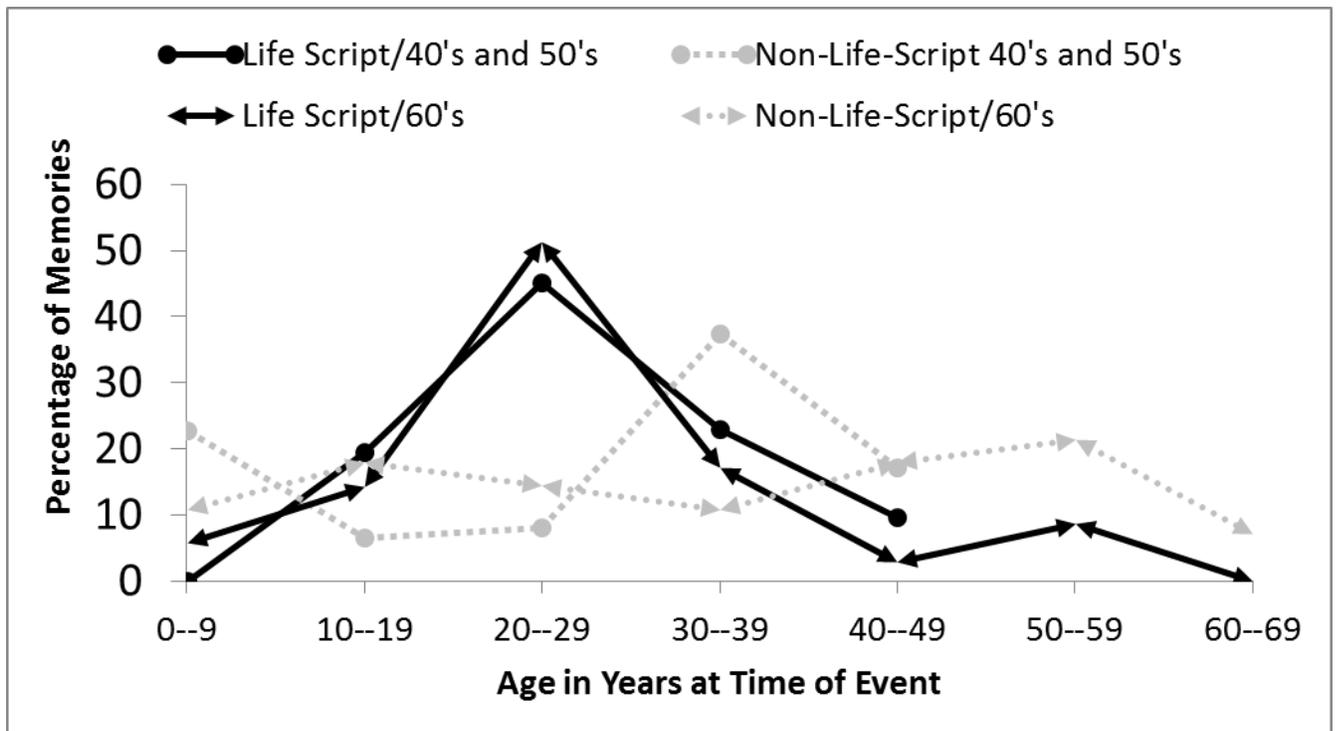


Figure 4. Age distributions of life script versus non-life-script most important autobiographical memories.