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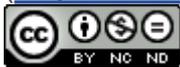
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## Adults' reports of their earliest memories: Consistency in events, ages, and narrative characteristics over time

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### Abstract

Earliest memories have been of interest since the late 1800s, when it was first noted that most adults do not have memories from the first years of life (so-called *childhood amnesia*). Several characteristics of adults' earliest memories have been investigated, including emotional content, the perspective from which they are recalled, and vividness. The focus of the present research was a feature of early memories heretofore relatively neglected in the literature, namely, their consistency. Adults reported their earliest memories 2 to 4 times over a 4-year period. Reports of earliest memories were highly consistent in the events identified as the bases for earliest memories, the reported age at the time of the event, and in terms of qualities of the narrative descriptions. These findings imply stability in the boundary that marks the offset of childhood amnesia, as well as in the beginning of a continuous sense of self over time.

### Keywords

autobiographical memory; childhood amnesia; consistency; earliest memories; narrative; self

## 1. Introduction

Earliest memories have been a focus of research since the late 1800s, when it was first noted that most adults lack memories from the first 3 to 4 years of their lives (Henri & Henri, 1898; Miles, 1893), a phenomenon later labeled *infantile* or *childhood amnesia* (Freud, 1905/1953). Though there is wide variation about the mean, across methods and cohorts, the average age of adults' earliest memories is 3½ years (e.g., Dudycha & Dudycha, 1941; Rubin, 1982; Tustin & Hayne, 2010; Waldfogel, 1948; West & Bauer, 1999). A number of characteristics of earliest memories have been investigated. Relatively neglected among the features that have been examined is the within-subject consistency of earliest memories. That is, there are very few data to address whether over repeated recall attempts, individuals

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retrieve the same memory as their “earliest,” whether they date the event as having taken place at the same time in the past, and whether there is consistency in the qualities of the narrative descriptions of the earliest memory. The relative lack of data on consistency of earliest memories is striking in light of the substantial weight they bear in explanations of childhood amnesia (e.g., Freud, 1905/1953; Pillemer & White, 1989) and in theories of autobiographical memory and its development (e.g., Bauer, 2007, 2008, 2014; Nelson & Fivush, 2004), as well as their implications for a continuous sense of a self (e.g., Bluck & Alea, 2008; Conway & Pleydell-Pearce, 2000; Habermas & Köber, 2014; Howe & Courage, 1993; Wilson & Ross, 2003). The purpose of the present research was to address this void by examining the consistency of adults’ earliest memories over time.

Childhood amnesia is virtually universal. Nevertheless, there is both individual and group variability in the age of earliest memory. In terms of individual differences, at the young end of the distribution, samples typically include reports of earliest memories from age 2 years or younger (e.g., Henri & Henri, 1898; Jack & Hayne, 2010; Rubin, 2000; Usher & Neisser, 1993; West & Bauer, 1999). Conversely, samples typically include individuals for whom the earliest memory is from age 6 to as late as 8 years of life (e.g., Bauer, Stennes, & Haight, 2003). The density of early memories also differs: some adults recall many early memories, whereas others remember only a few (e.g., Jack & Hayne, 2010; Weigle & Bauer, 2000; West & Bauer, 1999). In terms of group differences, a consistent finding is that women have memories from earlier in life than men. In some cases the differences are statistically reliable (e.g., Cowan & Davidson, 1984; Mullen, 1994, Study 2; Orlofsky & Frank, 1986; Waldfogel, 1948) and in others they are not (e.g., Mullen, 1994, Studies 1 and 3; West & Bauer, 1999). Even when the differences are statistically significant, they tend to be small in magnitude (see Rubin, 2000, for an illustration). Birth order also relates to age of earliest memory. First born children have earlier memories than children who are later born (Mullen, 1994). There also are culture-group differences. For example, individuals of Maori New Zealand descent have younger earliest memories than individuals of European descent, who in turn have younger earliest memories than individuals of Asian descent (MacDonald, Uesiliana & Hayne, 2000; see also Mullen, 1994; Wang, 2001). Great accessibility of early memories also is reported for individuals with secure versus insecure attachment status (see Pillemer, 1998, for discussion).

There also has been substantial research on adults’ ratings of the qualities of their earliest memories. One focus has been emotionality, addressing the question of whether earliest memories are devoid of emotion (as predicted by Freud, 1899/1962) or emotionally charged, and if emotionally charged, whether they are predominantly negative or positive. Based on adults’ ratings, early memories frequently are of events that engendered strong emotional reactions (e.g., Dudycha & Dudycha, 1933a, 1933b; Howes, Siegel, & Brown, 1993; Kihlstrom & Harackiewicz, 1982). In some studies pleasant memories outnumber unpleasant ones (e.g., Kihlstrom & Harackiewicz, 1982), whereas other studies indicate a preponderance of negative affect (e.g., Howes et al., 1993; Bauer et al., 2003). The perspective individuals have on their memories also has received attention with some investigations indicating that third-person perspective is prevalent (e.g., Freud, 1899/1962; Henri & Henri, 1898) and others indicating prevalence of first-person perspective (e.g., West & Bauer, 1999). Whether earliest memories are perceptually detailed also has been of

interest. In some research, adults rate their earliest memories as containing a good deal of perceptual information (e.g., Henri & Henri, 1898; Howes et al., 1993; Miles, 1893), whereas other studies suggest under-representation of such information (e.g., Johnson, Foley, Suengas, & Raye, 1988). In sum, in the 100-plus years since childhood amnesia was first reported in the literature, a number of characteristics of adults' earliest memories have been examined, yielding a rich—if not entirely consistent—picture of the nature of these first recollections.

Relatively neglected in the list of characteristics for which adults' earliest memories have been evaluated is consistency in the memories. It is clear that the average age of earliest memories among adults is consistent: as reviewed above, many studies have identified 3½ years as the average age of earliest memory among Western adults. Yet little is known about *within-subject* consistency across reports. Within-subject consistency of reports has not been ignored in the autobiographical memory literature as a whole. One case in point are studies of flashbulb memories (Brown & Kulik, 1977), for which questions of consistency have been of substantial interest (e.g., Neisser & Harsch, 1992; Pillemer, 1984; Rubin, 1992; Winningham, Hyman & Dinnel, 2000). Other literatures that have focused on consistency of memory reports are those concerning the reliability of eyewitness testimony (e.g., Brewer, Potter, Fisher, Bond, & Luszcz, 1999; Smeets, Candel, & Merckelbach, 2004), and the stability of memories over changes in the status of relationships (Drivdahl & Hyman, 2013), for example. In contrast to these areas of the memory literature, with few exceptions, individuals' earliest memories are sampled only once. As a result, we do not know whether (a) adults nominate the same event as their earliest memory time after time, (b) the age of the earliest memory is the same time after time, or (c) the narrative qualities of the memory reports are the same time after time.

The question of within-subject consistency is adults' earliest autobiographical memories is of special significance because of the role these memories play in establishing a stable sense of self over time (e.g., Habermas & Köber, 2014). In general, the ability to remember one's self in the past is a precondition for a sense of personal continuity (e.g., Prebble, Addis, & Tippett, 2013). Indeed, one of the three major functions of autobiographical memory is self-definition (social connective and directive functions being the other two: e.g., Bluck, Alea, Rubin, & Habermas, 2005; Pillemer, 2003). As the very first memory of a personally experienced event, earliest memories occupy a position of particular importance. Prior to the date of earliest memory, individuals have a physical presence, to be sure, but they lack a remembered self. Moreover, the observation of a rather sparse distribution of autobiographical memories for several years after the earliest memory (until age 6 or 8 years: e.g., Bauer et al., 2003; Jack & Hayne, 2010; West & Bauer, 1999; Weigle & Bauer, 2000), means that earliest memories bear a substantial portion of the burden for ensuring a stable sense of self over time and place for virtually the entire period of early childhood. By definition, there are no memories that predate them, and for most individuals, there are relatively few personal memories for years thereafter. These facts bring into stark relief the importance of the question of whether earliest memories are consistent over time. In effect, because we know relatively little about the stability of the memory that marks the beginning

of self-continuity, we know little about the stability of the onset of a temporally continuous self.

There are theoretical reasons to expect either inconsistency or consistency in earliest memory. On one hand, because earliest memories—like other personal memories—are reconstructions that reflect the integration of social context, beliefs, and personal identity, they may change over time, reflecting individuals' changing perspectives on themselves and their lives (e.g., Conway, 2005; Hooker & McAdams, 2003; Hyman, 1999; McAdams et al., 2006). On the other hand, personal memories that are told and retold become more consistent over time (Barnier, Hung, & Conway, 2004; Stone, Barnier, Sutton, & Hirst, 2010). Applied to earliest memories—which often are the subject of retelling (Larkina & Bauer, 2012)—the prediction would be of consistency across retrieval attempts.

There are few empirical reports that address the question of consistency in earliest autobiographical memories. To our knowledge, only Peterson, Warren, and Short (2011) addressed all three questions of whether, time after time, the same earliest memory is retrieved, the age of the earliest memory is the same, and the narrative qualities are the same. The study was with children 4 to 13 years of age, and revealed little within-subject consistency. When queried twice, two years apart, only 7% of 4- to 5-year-olds nominated the same earliest memory, whereas 12- to 13-year-olds were consistent 39% of the time. When the events were the same, the children were inconsistent in their estimates of their ages at the time of the events. Between queries, the estimated age of earliest memories increased from 32 to 39.6 months. The children also were inconsistent in their descriptions of the events: the reports featured less than half of the narrative content in common. Consistency was especially low for the youngest children (35% overlap in content vs. 56% for the oldest children). This research suggests that at least for children, earliest memories are not especially consistent.

The few studies of repeated recall of earliest memories among adults indicate greater consistency, relative to children. However, none provides a full picture of the extent of consistency. Kihlstrom and Harackiewicz (1982) queried high-school students' earliest memories twice, 3 months apart. Almost 60% of the sample reported the same "earliest memory" at Time 1 and Time 2. When different memories were reported, the second memory tended to be earlier in developmental time, relative to the event originally nominated as the "earliest" (3.5 vs. 4.0 years, respectively). Similarly, Jack and Hayne (2010) interviewed six 19-year-olds two times with one week between interviews. At both interviews, participants were asked to provide memories from each of the first 6 years of their lives. One of the participants provided a different "earliest" memory at Time 2 relative to Time 1. The newly nominated event was from a few months earlier, relative to the event initially identified as the earliest. In summary, individuals who reported on earliest memories over a shorter space of time (1 week) were more consistent than individuals who experienced a longer delay between reports (3 months; 83% vs. 58% consistent, respectively). When inconsistency in the age of earliest memories was apparent, newly-reported events tended to be from a younger age, relative to the first-reported event; this trend is in the opposite direction of that observed among the children in Peterson et al.

(2011). Notably, neither adult study featured analysis of consistency in the narrative descriptions of earliest memories.

Finally, in a psychoanalytic case study, Josselson (2000) reported high levels of consistency among adult women who reported on their two earliest memories at each of ages 21, 33, and 43 years. The largely qualitative report indicates that one-third of participants repeated at least one memory at all time points. Consistency was even higher between adjacent reports: 54% repeated a memory at 21 and 33 years; 58% repeated a memory at 33 and 43 years. Josselson provided no information about the consistency of participants' ages at the times of the events, and there was no examination of the narrative content of the memory reports. Thus these features have yet to be evaluated for consistency over extended periods of time.

In the present research, we examined the within-subject consistency of adults' reports of their earliest memories annually for at least two and as many as four years. At each interview, we determined whether the event that was the subject of the earliest memory was the same as in prior years. For consistent events, we compared the reported ages of the participants at the time of the events. For both of these variables, given the personal significance of the "earliest memory" to a continuous sense of self over time as well as the reasonably high rate of consistency in earliest memory observed in prior reports (Jack & Hayne, 2010; Josselson, 2000; Kihlstrom & Harackiewicz, 1982), we anticipated generally high levels of consistency.

We also used multiple measures to examine whether the narrative qualities of the reports were the same across time. Specifically, we examined the (a) breadth or completeness of the earliest memory narratives, (b) narrative coherence of the reports, and (c) content of the reports. We predicted that with retelling, the breadth and coherence of the reports would stay the same or increase (reflecting more complete and better organized narratives), but would not decrease. Moreover, because breadth and coherence are features of narrative production that likely reflect trait-like narrative style (e.g., Fivush, 2014; Haden, 1998; Reese, Haden, & Fivush, 1993), we predicted high levels of individual consistency on these variables over time. In contrast, because memory reports are constructed anew each time they are produced, we predicted that the amount of information participants provided about the events, and the specific elements they included in the reports, likely would vary from time to time. Finally, we examined possible predictors of consistency over time. Because narrative completeness and coherence index the integrity of memory traces (e.g., Pillemer, 1998; Reese, Haden, Baker-Ward, Bauer, Fivush, & Ornstein, 2011), we expected that they would predict consistency in earliest memories. We tested consistency in earliest memories in a sample of convenience: adult women whose children were participants in a longitudinal study.

## 2. Method

### 2.1. Participants

Thirty-six women were recruited ( $M$  age = 37.9 years,  $SD$  = 4.38; range = 27.5–46.0 years) from a sample of families with children in a longitudinal study. The women and their children visited the laboratory annually for four years. While children engaged in

experimental tasks, their mothers were interviewed about their own earliest memories. Because the women also were involved in tasks with their children, not all participated in earliest-memory interviews at all sessions. To be included, the women had to participate in at least two adjacent earliest-memory interviews (e.g., Years 1 and 2, or Years 2, 3, and 4; interviews in Years 1 and 3, but not Year 2, were not included, to equate between-interview delay). The final sample was 34 with at least two earliest-memory reports, 29 (of the 34) with at least three earliest-memory reports, and 17 (of the 34) with four earliest-memory reports. The mean between-session delays were 338 days for Reports 1 and 2, 348 days for Reports 2 and 3, and 356 days for Reports 3 and 4 ( $SDs = 26, 21, 14$  days). Participants provided written informed consent. The methods were approved by the Institutional Review Boards of the University of Minnesota (where the data were collected) and Emory University (where the data were analyzed).

## 2.2. Procedure

All interviews were initiated with the open-ended prompt, “Please tell me your earliest memory.” The only additional prompt was for the participant’s age at the time of her earliest memory; this prompt was given only if age information was not provided spontaneously. Six interviewers were involved in data collection across the years of the study; participants were interviewed by a different person at each session. At Report 1, participants were not informed they would be requested to provide their earliest memories at any time in the future. In subsequent years, no mention was made of the previous earliest-memory interviews. Interviews were recorded on DVDs and later transcribed; transcriptions were checked for accuracy.

## 2.3. Coding

**2.3.1. Consistency of the event**—We first assessed whether the event that was the subject of the earliest memory was the same at each report. Events were considered the “same” when reports featured overlap in the major actions. All comparisons were to the earliest memory nominated in the participants’ first report.<sup>1</sup> Thus if the same event was nominated in Reports 1 and 2, the earliest memory was considered consistent. This comparison was possible for all 34 participants with two (or more) adjacent interviews. Participants with three (or more) adjacent interviews ( $N = 29$  of the 34) were considered consistent if they reported the same event in Reports 1, 2, and 3, and participants with all four interviews ( $N = 17$  of the 34) were considered consistent if they reported the same event all four times. Two raters independently judged the consistency of events across all participants; disagreements were resolved through discussion. Subsequent coding was on consistent events only. Examples of reports judged to be consistent at the level of the event are provided in the Appendix.

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<sup>1</sup>Although participants were asked to report their “earliest memory,” in their initial reports, five participants (15% of the sample) described two memories. In two of these cases, both memories were repeated in subsequent reports. To maximize the amount of data available for analysis, we targeted the memory with the most content ( $n = 1$ ) and the memory that was featured in the most reports (4 vs. 3 reports,  $n = 1$ ). In the other three cases, one but not the other memory was featured in subsequent reports and thus was included in the analyses.

**2.3.2. Age of earliest memory**—For consistent events, we determined whether at each interview, the participant indicated that she was the same age when the event took place; all comparisons were to the age indicated in the first report. Ages were considered consistent if the nominal age (in years) indicated at the first and subsequent reports was the same. When participants provided a single age at one report and a range of ages in another, age was considered consistent if the single age was included in the range. For example, “3 years” and “3 or 4 years” were considered consistent (see Appendix, Subject 2), whereas “3 years” and “4 to 5 years” were not. Two raters independently judged the consistency of ages; disagreements were resolved through discussion.

**2.3.3. Narrative qualities: breadth, coherence, and content**—We determined the breadth (or completeness) of the narratives using the coding scheme in Table 1 (Bauer, Burch, Scholin, & Güler, 2007; Bauer & Larkina, 2013). Participants were given 1 point for each of the narrative categories represented in the narrative. The total number of categories included was the measure of narrative breadth (max = 8.0). Reliability of coding for narrative breadth was established between two independent raters on 28% of the sample. Average reliability was 92.5%. The principal rater’s judgments were used in analyses.

We determined the coherence of the narratives on the three dimensions of the Narrative Coherence Coding Scheme (NaCCs; Reese et al., 2011): Context, Chronology, and Theme (see Table 2). Reliability of coding for narrative coherence was established between two independent raters on 20% of the sample. Interclass correlations were .82, .91, and .87 for the dimensions of Context, Chronology, and Theme (respectively). The principal rater’s judgments were used in analyses.

To determine the total content in each report, participants received 1 point for each token in each category in Table 1. To determine consistency of the content, we examined the specific tokens in the first report and assigned 1 point for each token repeated in a subsequent report. We coded both omissions (e.g., Report 1: “My brother and my foster brother...”; Report 2: “My brother...”; see Appendix, Subject 1) and additions (e.g., Report 1: “...getting to the middle and getting scared...”; Report 2: “getting to the middle and getting scared, ‘cause it got dark and there were lights in the middle and kids would block...”; see Appendix, Subject 1). The category of *how-description* was omitted from this analysis, on the grounds that the omission or addition of objective modifiers (e.g., “I was wearing a jacket...” vs. “I was wearing a *blue* jacket...”) did not fundamentally change the event being described. Reliability of content coding was established between two independent raters on 28% of the sample. Average reliability was 83.6%. The principal rater’s judgments were used in analyses.

### 3. Results

We first describe the characteristics of the earliest memory reports provided in the initial interview. We next examine consistency of earliest memories. At the level of the event, we asked whether participants identified the same memory as their “earliest” at each session. When the events were different, no further analyses were conducted. When the event was the same, we then determined whether participants were consistent in their reports of how

old they were at the time of the event, and in the narrative descriptions they provided of the events. We examined both the qualities of the narratives (breadth, coherence) and their content (total tokens and repeated tokens). Finally, we used variables from the first report of earliest memory to predict consistency in earliest memory over time.

### 3.1 Characteristics of Earliest Memories

Statistics describing participants' initial reports of their earliest memories are in Table 3, Panel a. As reflected in the table, the average age of earliest memory reported in the initial interviews was 38.9 months. The average age fits comfortably within the range identified in prior research with Western samples (i.e., 36–48 months; see Bauer, 2008, 2014, for reviews). The range in age—from 9 to 60 months—also is comparable to prior research (e.g., Bauer et al., 2003; Jack & Hayne, 2010; West & Bauer, 1999), with some participants' memories from before age 2 years (12% of the sample) and other earliest memories from age 5 years (15% of the sample). The average age of earliest memory did not change over time: average ages for Reports 2, 3, and 4 were 37.9, 39.8, and 38.6 years ( $SDs = 12.24, 12.99, 9.94$ ).

The majority of events reported were neutral to positive, such as family outings (camping, trips to the zoo or park, visits with relatives) and positive life transitions (birth of a sibling, own birthday party, first day of kindergarten). Some events were more negative in emotional tone, including reports of a broken arm or other accidental injury and memory for a tree falling in a major storm.

As captured by the Breadth variable in Table 3, Panel a, the reports were relatively complete, featuring almost 6 of the possible 8 narrative categories (see Table 1). The narrative categories that participants tended to omit from their reports were those indicating *why* the events unfolded as they did and evaluative comments about the experiences (*how-evaluation*). As reflected in the Content variable, there was wide variability in the amount of information featured in the narratives, ranging from as few as two unique bits of information about the events to as many as 45. In terms of the coherence of the narratives, the reports were generally high on the Context dimension, indicating that the participants typically located their earliest memories in both time and place, and frequently elaborated upon the temporal information, the location information, or both. Scores on the Chronology dimension were low, reflecting the fact that whereas participants located the events in time (as reflected in the Context dimension), the actions within the events were not necessarily temporally ordered from the beginning to the end of the event. Finally, scores on the Theme dimension were relatively low, reflecting negligible development of the topic in terms of causal linkages among actions, personal reactions or evaluations, and elaborations of actions.

### 3.2 Consistency of Earliest Memories

For most analyses, we compared Reports 1 and 2 for all participants ( $N = 34$ ), Reports 1, 2, and 3 for the participants who had three (or more) sessions ( $N = 29$ ), and Reports 1, 2, 3, and 4 for the participants who had all four sessions ( $N = 17$ ).

**3.2.1. Event**—In Table 4, Panel a are descriptive statistics on consistency at the level of the event. Reflected are the number (and percentage) of earliest memories in Report 1 that also were identified in Report 2; Reports 2 and 3; and Reports 2, 3, and 4 (i.e., all comparisons were made to Report 1). Over time, the participants were highly consistent, nominating the same event as their “earliest memory” twice (82%), three times (72%), and even four times (82%). In most cases of inconsistency, a new “earliest memory” was introduced in Report 2, relative to Report 1; some of the Report 2 “earliest memories” were featured in subsequent reports whereas others were not (memories newly introduced in Report 2 and repeated in subsequent reports are not considered “consistent” because all comparisons are to Report 1). In one case, a participant provided different “earliest memories” in each of her three reports. All subsequent analyses were based on consistent events only.

**3.2.2. Age of earliest memory**—As reflected in Table 4, Panel b, participants were highly consistent in the age estimates they provided for their earliest memories. Indeed, across Reports 1 and 2, consistency was 100%. For participants with three (or more) adjacent reports, across Reports 1, 2, and 3, participants were consistent 85% of the time. Participants who had reports at all four years were consistent 79% of the time. In total, there were six instances of inconsistency in the reported age of the earliest memory. In two of the cases, later reports indicated older ages relative to Report 1, and in four cases, later reports indicated younger ages relative to Report 1. Thus there was not a systematic trend for the direction of change in age over time. Although there was a trend toward less consistency as the number of reports increased, the change in level of consistency was not statistically significant.

**3.2.3. Narrative qualities**—Scores for narrative breadth and coherence (contextual, chronological, thematic) of consistent earliest memories are reflected in Table 3, Panel b. To compare the scores across reports, for each variable, we conducted one-way analyses of variance (ANOVAs), with 2 (Reports 1 and 2), 3 (Reports 1, 2, and 3), or 4 (Reports 1, 2, 3, and 4) levels of report. With the exception of thematic coherence, none of the analyses was statistically significant. Thus at the group level, participants’ reports had comparable breadth and contextual and chronological coherence, regardless of the number of times they were provided. For the dimension of thematic coherence, main effects emerged. For participants with two (or more) reports,  $F(1, 27) = 5.03, p < .05$ , three (or more) reports,  $F(2, 42) = 3.58, p < .05$ , and all four reports,  $F(3, 40) = 4.25, p < .05$ , the thematic coherence of Report 2 was higher than Report 1 (Tukey-Kramer adjustment HSD,  $p < .05$ ). For participants with all four reports, the thematic coherence of Report 4 also was higher than Report 1 ( $p < .05$ ).

As reflected in Table 5, there also was substantial within-subject consistency. That is, for most variables, observations were correlated over time. Exceptions were Report 4 for Breadth and the coherence dimension of Context, in which there was little within-subject consistency.

**3.2.4. Narrative content**—One-way ANOVAs with 2 (Reports 1 and 2), 3 (Reports 1, 2, and 3), or 4 (Reports 1, 2, 3, and 4) levels of report revealed no differences in the total content participants included in their narrative descriptions. Thus the amount of information that participants included in their narratives did not differ over time.

Finally, we evaluated the percentage of specific tokens provided in the first report that were repeated in later reports. The amount of specific content repeated across narratives was strikingly similar whether compared across adjacent (Reports 1 and 2) or more distant (Reports 1 and 3, and Reports 1 and 4) reports: 55%, 52%, and 55%, respectively. As reflected in Table 6, participants produced comparable percentages of omissions and additions, and the percentages did not differ as a function of the length of delay between the reports that were compared. Specifically, between 45% and 47% of the content included in Report 1 was omitted from Reports 2, 3, or 4. Conversely, between 43% and 50% of the content featured in Reports 2, 3, and 4 was new, relative to Report 1. Thus although participants were highly consistent at the level of the event, they were not as consistent in the specific elements included in their narrative descriptions. There was not a consistent direction of difference in the content provided (i.e., omissions vs. additions), and consistency of specific content was not related to delay.

### 3.3 Predicting Consistency in Earliest Memory

We tested whether consistency in earliest memory from Report 1 to Report 2 was predicted by variables from Report 1. We confined the analyses to consistency across Reports 1 and 2 only because analyses of consistency across Reports 1, 2, and 3, and Reports 1, 2, 3, and 4 would have been underpowered, due to the smaller number of participants available for these comparisons ( $Ns = 29$  and  $17$ , respectively). The specific measures of consistency across Reports 1 and 2 that we attempted to predict were the (a) event (same/not the same), and (b) amount of content that was consistent across reports. Although it also would have been interesting to predict consistency in reported age at the time of the event, we were unable to do so, because 100% of age estimates were consistent from Report 1 to Report 2. The Report 1 variables that we examined as possible predictors were (a) the age of the participant at the time of the event that formed the basis of the earliest memory, (b) the breadth of the narrative provided about the earliest memory, (c) the coherence of the narrative report (on the dimensions of Context, Chronology, Theme), and (d) the total amount of content in the narrative report.

#### 3.3.1. Consistency in the event that was the basis of the earliest memory—

Logistic regression revealed a significant negative relation between participants' estimates of their ages at the times of their earliest memories and consistency at the level of the event between Reports 1 and 2:  $\chi^2 = 4.19, p < .05$ ; predictor age beta =  $-.088, p = .064$ . Participants who were consistent in the events that gave rise to their earliest memories ( $N = 28$ ) averaged 37.1 months of age at the time of the events whereas participants who were not consistent between Reports 1 and 2 ( $N = 6$ ) averaged 49.2 months of age at the time of the events. There were no other statistically significant relations. Thus neither the breadth, the content, nor any dimension of the coherence of memory narratives at Report 1 predicted consistency at the level of the event.

**3.3.2. Consistency in the content of earliest memory reports—**There were no statistically significant relations between the measure of consistency in the content of earliest memory reports from Report 1 to Report 2 and any of the possible predictor variables.

## 4. Discussion

In the more than 100 years of research on childhood amnesia, relatively little attention has been paid to whether adults nominate the same event as their earliest memory time after time, whether the reported age of the earliest memory is the same time after time, and whether the narrative qualities and content of earliest memory reports are essentially the same time after time. The lack of attention to these questions in the literature is conspicuous in light of the amount of research effort that has been devoted to investigating other characteristics of earliest memories (e.g., age, emotional quality, perspective, amount of perceptual detail), and the importance earliest memories play in explanations of autobiographical memory and its development (see Bauer, 2007, 2014; Nelson & Fivush, 2004, for discussions). Earliest memories also are an important source of “evidence” for a temporally continuous sense of self. That is, we recognize ourselves as the same person over time because we remember the events of our past (e.g., Bluck & Alea, 2008; Conway & Pleydell-Pearce, 2000; Habermas & Köber, 2014; Howe & Courage, 1993; Wilson & Ross, 2003). The fact that we know relatively little about the stability of the memory that marks the beginning of self-continuity means that we also know little about the stability of the onset of a temporally continuous self.

The findings of the present research on consistency of earliest memories in adult women were clear. The participants were highly consistent over time in the memories they identified as their “earliest.” They also were highly consistent in their estimated ages at the time of the event, and in the narrative qualities of their descriptions. At the group level, over as many as four reports, earliest-memory narratives did not differ in breadth, on the Context or Chronology dimensions of coherence, or in the amount of content included. There was some tendency for the thematic coherence of earliest-memory reports to increase over time. At the individual level, there was a moderate to high degree of correlation across reports in the breadth of narratives, the Chronology and Theme dimensions of coherence, and in the amount of content featured; there was less consistency in the Context dimension of coherence. The one exception to the pattern of consistency in participants’ narrative reports was in the specific content included. Across reports, the participants repeated the same content just over 50% of the time. Thus regardless of the amount of time between reports—whether 1 year or 4 years—almost 50% of the specific content provided was different, relative to the initial report.

The level of consistency in the events that are the subject of earliest memories in the present research is on par with some and higher than others in the handful of other studies that have addressed the issue. In Jack and Hayne (2010), five of the six young adults (83%) identified the same earliest memory in each of two interviews 1 week apart. This value is comparable to the present research, in which consistency ranged from 72% (over 3 years) to 82% (over two and four years). In contrast, the estimates of consistency derived from the other two reports in the corpus are lower. Among the high-school students in Kihlstrom and Harackiewicz (1982), 58% identified the same earliest memory in each of two surveys 3 months apart. In Josselson (2000), 54% of participants repeated a memory at ages 21 and 33 years, and 58% repeated a memory at ages 33 and 43 years. There are numerous differences in the methods used across these studies making it impossible to determine the source (or

sources) of the difference estimates of consistency. Nevertheless, it seems reasonable to postulate that the difference between the estimate based on high-school students relative to college students and the middle-age adults in the present research is due to developmental differences in the stability of the autobiographical memory corpus more generally (Bauer & Larkina, 2013), and to adolescents' relatively underdeveloped life story (e.g., Bluck & Habermas, 2000; Habermas, 2007). The lower level of consistency among middle-aged adults in Josselson (2000) relative to the present research likely is due to the longer between-interview intervals in the earlier (12–10 years) than the present (1–3 years) report. A longer interval could lead to lower consistency as a result of reconstructive processes associated with individuals' changing perspectives on themselves and their circumstances (e.g., Hooker & McAdams, 2003; McAdams et al., 2006). In future research it will be important to examine different age groups of participants for consistency over varying intervals to test for and inform the reasons for differences in relative levels of consistency in earliest memories over time and development.

Adults' consistency in the present research was higher than observed among children in Peterson et al. (2011). Children 4 to 13 years of age were not highly consistent in the memories they nominated as their "earliest." Consistency was positively correlated with age, yet even among the oldest children, only 39% of earliest memories were repeated at Times 1 and 2. Over the 2 years between interviews, children's estimates of how old they were at the time of the events systematically increased. In Kihlstrom and Harackiewicz (1982) and Jack and Hayne (2010), the age of earliest memory decreased over time (3 months and 1 week, respectively). Systematic change in estimations of age was not observed in the present research.

What might account for the differential consistency at the level of the event and in age of earliest memories among adults and children? Differential rates of forgetting in the two populations is a candidate explanation. As demonstrated in Bauer et al. (2007), and Bauer and Larkina (2013), children experience an accelerated rate of forgetting of personal memories, relative to adults. For adults, the distribution of personal memories over most of the lifespan is best fit by the power function (e.g., Bauer & Larkina, 2013; Rubin, 1982; Wetzler & Sweeney, 1986). This implies that over time, an initially fast rate of forgetting slows to asymptote, resulting in a relatively stable corpus (Wixted, 2004, for discussion). In contrast, at least through the first decade of life, the distribution of children's memories is best fit by the exponential function (Bauer et al., 2007; Bauer & Larkina, 2013), implying a constant half-life and thus that forgetting does not slow over time. The functional outcome of a constant rate of forgetting is that memories that survive the initial ravages of time may nevertheless eventually succumb to forgetting, resulting in an ever-shrinking pool of memories available for recollection. In an ever-shrinking corpus, inconsistency is to be expected. Moreover, as memories are lost from the corpus, the age of those retrieved is likely to increase. Over time, the smaller pool would contribute to the appearance of a "childhood amnesia component" in the distribution of personal memories across the lifespan (e.g., Pillemer & White, 1989; Wetzler & Sweeney, 1986).

The suggestion that the pool of early memories continues to shrink throughout childhood aids in understanding of the pattern of prediction of consistency at the level of the event

observed in the present research. Specifically, the one significant predictor of consistency at the level of the event was the participant's age at the time of the event. Individuals who were consistent in the events that gave rise to their earliest memories averaged younger earliest memories relative to individuals who were less consistent (37.1 months and 49.2 months, respectively). It seems likely that the effect stems from differential density of memories earlier versus later in childhood (e.g., from the third or fourth versus the fifth or sixth year of life). There is a smaller pool of memories from earlier in life, making it more likely that the same event would be sampled over time. In contrast, there is a larger pool of memories from later in life, making it more likely that a different event would be sampled, resulting in a lack of consistency (see Bauer & Larkina, 2013, for discussion).

Other aspects of consistency in earliest memories examined in the present research were the narrative qualities of breadth and coherence, and the content of the narratives, both in terms of overall amount of content and the specific content elements. On the first three of these attributes, the participants were highly consistent. That is, over time, the breadth, coherence, and total amount of content in the narratives varied little. It is likely that a major source of consistency on these variables is trait-like narrative style. The developmental literature features evidence of stylistic differences among adults in the manner in which they narrate and converse about personal experiences (e.g., Haden, 1998; Reese et al., 1993). Individuals differ in the length of their narratives and the amount of detail they include in them, as well as in features that contribute to narrative coherence (e.g., temporal and causal connections; see Fivush, 2014, for a review). Thus consistency in narrative breadth, coherence, and total amount of content in reports of earliest memories may stem from the stable trait-like quality of the narrative style of the individual. It will be left for future research to test this suggestion directly by, for example, comparing narratives of the same events with narratives of different events within the same individuals.

On the final narrative attribute examined, namely, the specific content included in the reports, the participants in the present research were only moderately consistent. The amount of specific content they repeated across reports varied from 52% to 55%; they had comparable levels of omission and additions. This finding is suggestive of the nature of the representations of earliest memories. If the content were fully consistent across reports, we might suspect that earliest memories were actually nothing more than dusty stories that participants took off the shelf from time to time and read off in a routinized manner. There would be no change in the reports because the representations that gave rise to them were not the dynamic, living representations that we typically associate with autobiographical memories. Conversely, if the content were entirely new at each report, we might suspect that the memory trace was severely impoverished, made up of little more than the covers of a story from the past. The process of filling in the skeletal frame would be relatively unconstrained by the stored elements of the trace, resulting in little consistency in the features included at each retelling. Instead, the adults in the present research repeated just over 50% of the narrative content at each retelling. This finding is consistent with the suggestion that the same representation was retrieved each time and that different aspects of the experience—or different subsets of the available elements—were included or excluded from one narrative description versus another. Variety in the elements reported might stem from differences in the social context of retrieval (participants were interviewed by different

experimenters each time) as well as changes in self-perception over time (Hyman, 1994; and Conway, 2005; Conway, Singer, & Tagini, 2004, respectively). Interestingly, the estimate of overlap in content derived from the present research is consistent with that from the oldest children in the only other study to examine the question, namely, Peterson et al. (2011). Whereas the amount of overlap in the content of narrative descriptions provided by the younger children (4- to 5-year-olds) in Peterson et al.'s sample was only 35%, for the oldest children (12- to 13-year-olds), it was 56%. This suggests that the same general processes are in operation as early as the beginning of the second decade of life. These speculations are deserving of future research attention.

Notable features of the present research are the length of time over which consistency was examined and the number of reports over which the examination was based. Specifically, consistency was assessed over a minimum of 1 year and as many as 4 years; 34 participants provided two (or more) reports, 29 provided three (or more) reports, and 17 provided four reports; each report was one year apart. The high degree of similarity between the level of consistency observed in Jack and Hayne (2010) after 1 week and in the present research after 1 year is striking (83%, based on  $N = 6$ , and 82%, based on  $N = 34$ , respectively).

Whereas the fact that the present research featured multiple reports is on the one hand a strength, it also could be a source of potential concern. Specifically, it raises the possibility that participants were consistent because they expected to be asked about their earliest memories each time they visited the laboratory, and thus strived for consistency in their reports. We do not view this as a serious concern. First, participants were tested by different interviewers at each session and no mention was made of future or previous earliest-memory interviews. Thus the participants had no explicit reason to attempt to be consistent across reports. Second, levels of consistency were largely the same over time—and thus with repeated reports. The only measure that showed an increase over reports was the thematic dimension of coherence. Third, as just discussed, participants were not especially consistent in the specific content they reported over time. These patterns are not suggestive of intentional behavior to be consistent across interviews.

Finally, we note two limitations on the generalizability of the findings from the present research. The first stems from the fact that the research featured women only. Because women engage in past-event conversations more frequently than men (e.g., Ross & Holmberg, 1990)—and repeated retellings may contribute to consistency (e.g., Barnier et al., 2004; Stone et al., 2010; Winningham et al., 2000)—women's earliest memories may be more consistent than men's. This and other possible gender group differences should be examined in future research. Second, because we used only one memory elicitation method, it is unknown whether the level of consistency observed in the present research also would be observed with other methods, such as cue word elicitation, for example (e.g., Bauer & Larkina, 2013; Rubin, 1982). The possibility that different conclusions about consistency would be drawn based on different methodological approaches should be examined in future research.

In conclusion, the present research yielded evidence of substantial within-subject consistency in adults' earliest memories. Over repeated interviews, the participants tended to

nominate the same event as that which gave rise to their earliest memory, they tended to provide the same date for their earliest memory, and the qualities of their earliest-memory narratives were largely the same. These findings indicate a robust mnemonic “survivor” from the period of life during which memories are highly vulnerable to forgetting (e.g., Bauer & Larkina, 2013). Consistency in the earliest memory implies stability in the boundary that marks the offset of childhood amnesia and thus the anchor point for the first recollected life period. In turn, it indicates a stable beginning of a continuous sense of self over time and a reliable opening to the first chapter of one’s life story or personal past.

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## Appendix

### Three Examples of Consistent Events: Reports 1 and 2

#### Subject 1

##### Report 1

I remember a vacation, and we went to this Flintstone World place in South Dakota, and I remember crawling through this crocodile, it was like a play area tunnel thing and I remember getting to the middle and getting scared. And I remember getting stuck in there, and I remember my brother sticking his face in at one side of the tunnel saying “Come on its okay, come over here.” And we had a foster brother also, who was at the other end trying to say “Go ahead, it’s alright, it’s not scary.” And that’s the only thing I remember about that whole place is being, like getting freaked out as soon as I got in the tunnel. And by looking at family pictures and things, and which foster brother, and stuff, I was three.

##### Report 2

The earliest memory, we were at, we were going to the Black Hills, and there’s a Fred Flintstone World somewhere over there. And I remember being there, I remember crawling through like a ceramic alligator, crocodile one of those dinosaur type things, and getting to the middle and getting scared, ‘cause it got dark and there were lights in the middle and kids would block. And I remember getting scared in the middle and crying, and then my brother was at one end, you know, telling me “to come on, it would be alright.” I specifically remember that ‘cause I was scared, I remember being scared. And it was green, and it was like a tube, just like a tunnel to crawl through but it was some sort of animal and I got scared. And they had to convince me to come out.

#### Subject 2

##### Report 1

You know, I have fleeting like almost snapshots of our backyard, which seemed huge. It was either Crystal or New Hope, I don’t know, that area. We had a tree and we used to climb the tree right outside the steps coming out of the house, and I remember that, and I had to be maybe three. And I remember snakes going under the fence and under the tree, and that’s kind of vaguely what I recall.

##### Report 2

You know, I vaguely remember tiny bits about a house we had when I was three or four... I’m trying to think when we moved, it was somewhere between three and four. I also remember a backyard, we had a cherry tree and, uh, climbing it, and I remember snakes coming under a fence, and that’s all I can remember.

## Subject 3

### Report 1

I feel like I was four because my sister was in school and I wasn't. I remember going in the basement of my, which was the playroom, of my parents house and we had the Fisher Price garage, the old one and I remember playing with that and what I was playing was Partridge Family and I had my Fisher Price little people that were each of the people in the Partridge family and I remember setting their beds, the garage was their house, setting their beds up different places and I remember playing it all day. And I remember that when my dad got home that night, when we were having dinner, my mom told my dad that I'd been a little angel that day I remember the line. And then I remember the next day trying to play it again, and we had a house where you cleaned up everything every night before you went to bed and I couldn't get things set up quite the same way ever again and I remember being frustrated by that.

### Report 2

I remember a time when my sister was in school, and I either wasn't in school at all or I was in half day kindergarten, I can't remember which, so I was somewhere between the ages of three and five. And I remember playing with my little people in the basement of our house, our playroom was in the basement, and I was paying Partridge Family, and playing with the Fisher Price garage, but setting it up to be everybody's bedrooms 'cause there was three boys in the Partridge family, and the two girls and the mom. So there were two separate bedrooms and got the beds all arranged that so they fit. And I remember that the next day I couldn't make them fit anymore, and I was very upset because I couldn't remember how I did it from the day before. And at my house you cleaned up all your toys every single night, I couldn't leave it out so that I could play with it the next day. But I remember my mom telling my dad that night I had been a little angel all day.

### Highlights

- Adults' earliest memories are highly consistent over time
- Consistent earliest memories provide a stable boundary for a continuous self
- Earliest memories are a robust "survivor" from the period of rapid forgetting

**Table 1**

## Categories used to Determine Narrative Breadth and Content

<b>Narrative category</b>	<b>Definition</b>	<b>Example</b>
Who	Specific people or the gender or class of people present for or participated in the event	"Grandpa came," "There were clowns"
What-object	Specific objects or things present in the event or activity	"I gave him a boat"
What-action	Activities (perceptual and nonperceptual), performed by a character or object in the narrative	"I ran...," "I saw...," "She said..."
When	Reference to time, including information about the relative sequential order of event or sub-events; placement of the event in time	"It was summer," "Then..."
Where	Mention of the location in which an event occurred or a preposition indication place	"I played at park," "...on top of..."
Why	Words or statements used to illustrate the dependency of different aspects of the event	"Because...," "...in order to..."
How-description	Adjectives, adverbs, and prepositional phrases that described an activity, person, or object	"It was blue"
How-evaluation	Indication of personal evaluation of the event, through use of an intensifier, a subjective modifier, or mention of internal state (i.e., mental states, physiological states, and emotions of the speaker or of another person)	"It was very, very hot," "She was nice," "Cake was really good." "I was sad." "It was fun."

**Table 2**

## Scoring Criteria for the Narrative Coherence Coding Scheme (NaCCs)

<b>Score</b>	<b>Context</b>	<b>Chronology</b>	<b>Theme</b>
0	Neither time nor location information is provided	No information about temporal order within the event is provided	Narrative is off topic or described by several distracters that makes identification of the topic difficult
1	Time point or location at any level of specificity	Some events on the timeline and fewer than half of the temporally relevant actions can be ordered on a timeline with confidence	Topic is identifiable and the narrative includes negligible development of the topic with causal linkages, personal evaluations and reactions, or elaborations of actions
2	Time and location are provided and one of these dimensions is specific	Between 50–75% of the relevant actions on a timeline can be placed but not reliably order the entire story from start to finish with confidence	The narrative includes interpretations and/or elaborations of previously reported actions
3	Time and location information is specific	Almost all of the temporally relevant actions can be ordered	In addition to the requirements for score 2, memories are connected to other autobiographical experiences, future plans, or self

**Table 3**

Means (and Standard Deviations) for Earliest Memory Reports

Variable	Report			
	Panel a: All participants	Panel b: Participants with consistent reports		
	Report 1	Report 2	Report 3	Report 4
<i>N</i>	<b>34</b>	<b>28</b>	<b>21</b>	<b>14</b>
Age of Earliest Memory (mths)	38.90 (13.02)	37.85 (12.24)	39.78 (12.99)	38.60 (9.94)
Narrative Breadth	5.76 (1.74)	6.21 (1.47)	5.86 (1.42)	6.29 (1.38)
Narrative Coherence				
Context	2.26 (0.86)	2.04 (0.74)	2.48 (0.75)	2.43 (0.85)
Chronology	1.07 (1.36)	1.36 (1.41)	1.65 (1.32)	1.83 (1.40)
Theme	1.32 (0.59)	1.57 (0.63)	1.38 (0.59)	1.57 (0.64)
Total Content	15.53 (11.07)	16.82 (11.03)	14.81 (10.74)	15.43 (9.72)

**Table 4**

Percentage of Participants Who Were Consistent at the Level of the Event (Panel a) and in Age of Earliest Memory (Panel b)

Number of Reports Provided		Reports		
		1 and 2	1, 2, and 3	1, 2, 3, and 4
Panel a: Consistency at the level of the event				
	Sample Size	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)
Two	<i>N</i> = 34	28 (82%)	---	---
Three	<i>N</i> = 29	23 (79%)	21 (72%)	---
Four	<i>N</i> = 17	15 (88%)	14 (82%)	14 (82%)
Panel b: Consistency in age of earliest memory				
Two	age estimate available	<i>N</i> = 26 (of 28)	---	---
	<i>N</i> (%) consistent	26 (100%)	---	---
Three	age estimate available	<i>N</i> = 22 (of 23)	<i>N</i> = 20 (of 21)	---
	<i>N</i> (%) consistent	22 (100%)	17 (85%)	---
Four	age estimate available	<i>N</i> = 15 (of 15)	<i>N</i> = 14 (of 14)	<i>N</i> = 14 (of 14)
	<i>N</i> (%) consistent	15 (100%)	12 (86%)	11 (79%)

*Note:* In both panels, values on the diagonal represent the level of consistency across all available reports. Consistency in age of earliest memory (Panel b) was examined only when there was consistency at the level of the event (Panel a). In some cases, participants with consistent events did not provide age estimates for all reports; the number of age estimates available for each comparison is provided in the table. When participants were inconsistent in their estimated age, there was not a systematic trend for the direction of change in age over time: in two cases, the estimated age was younger at a later report, and in four cases, the trend was reversed.

**Table 5**

Pearson Product-Moment Correlations Reflecting Consistency over Time in Narrative Breadth, Total Content, and Narrative Coherence (Context, Chronology, Theme)

Variable	Report	Report		
		2 (N = 28)	3 (N = 21)	4 (N = 14)
Breadth	Report 1	.77**	.73**	.46 <sup>^</sup>
	Report 2		.60**	.48 <sup>^</sup>
	Report 3			.43
Coherence				
Context	Report 1	.41*	.29	.31
	Report 2		.42*	.48 <sup>^</sup>
	Report 3			.16
Chronology	Report 1	.76**	.81**	.88**
	Report 2		.87**	.92**
	Report 3			.98**
Theme	Report 1	.69**	.67**	.69**
	Report 2		.77**	.54*
	Report 3			.59*
Content	Report 1	.77**	.78**	.45
	Report 2		.83**	.70**
	Report 3			.70**

Note:

\*\*  
 $p < .01$ ;

\*  
 $p < .05$ ;

<sup>^</sup>  
 $p < .10$

**Table 6**

Means (and Standard Deviations) of the Percentage of Content Provided in Report 1 Omitted from Reports 2, 3, and 4 (Omissions) and the Percentage of Content Provided in Reports 2, 3, and 4 Not Provided in Report 1 (Additions)

Reports	Different Content in Reports 2, 3, and 4 Relative to Report 1			
	Omissions (content provided in Report 1 but not included in subsequent reports)		Additions (content featured in later reports not provided in Report 1)	
	Mean (%)	(SD)	Mean (%)	(SD)
Report 1 to Report 2 ( <i>N</i> = 28)	45.68	(14.38)	46.03	(23.86)
Report 1 to Report 3 ( <i>N</i> = 21)	45.49	(21.00)	43.03	(18.18)
Report 1 to Report 4 ( <i>N</i> = 14)	46.85	(25.20)	49.71	(20.59)

*Note:* Percentages of omissions and additions do not total 100% because they are not the inverse of one another. For percentage of omissions, the numerator is the total content included in Report 1 but not included in the later report (Report 2, 3, or 4) and the denominator is the total content included in Report 1. For percentage of additions, the numerator is the total content included in the later report (Report 2, 3, or 4) but not included in Report 1 and the denominator is the total content included in the later report (Report 2, 3, or 4).