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## Adults' Earliest Memories as a Function of Age, Gender, and Education in a Large Stratified Sample

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### **Abstract**

Childhood amnesia (i.e., a marked paucity of memories from the first 3-4 years of life) has often been examined by asking people for their earliest memory. Such studies have generally been conducted with college students, and thus been unable to examine possible effects of education and current age. We here report the first study on adults' earliest memories based on a large, stratified sample covering the adult life span from age 20 to 70 (N = 1,043). Due to the nature and size of our sample we have been able to investigate a range of factors simultaneously that typically have been studied separately in other studies. Participants with higher education reported earlier first memories than respondents with lower education. Women reported earlier memories than men. There was no interaction between gender and educational level. The current age of the respondents did not affect age of earliest memory, but older respondents had more vivid and more coherent earliest memories relative to younger respondents. Finally, the data provided some support for the claim that elaborative parents have children with earlier memories.

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**Keywords:**

Autobiographical Memory, Earliest Memories, Age Differences, Sex Differences, Sociocultural Factors.

## **Adults' Earliest Memories as a Function of Age, Gender, and Education in a Large Stratified Sample**

The term childhood amnesia was originally coined by Freud (1905/1953) and refers to the phenomenon that adults usually have very few, if any, memories from their first three to four years of life. Childhood amnesia remains an enigma. Substantial evidence shows that young children are capable of accessing memories of events that occurred when they were 2 – 3 years old (e.g., see Peterson, Warren & Short, 2011, for a review). Why do these early events become inaccessible later in life? If our earliest experiences are so important for our lives hereafter as several prominent researchers have argued (e.g. Bowlby, 1951; Freud, 1949; Rutter, 2002), then why do adults remember so few specific episodes from that period (Rovee-Collier & Cuevas, 2009)? These questions become even more complicated by the fact that the age of the earliest memories as assessed later in life appears to vary substantially as a function of who is asked and how.

Researchers have been asking adults about their earliest memories for more than a century. At least four different methods have been used. One method is simply to ask adults about their earliest memories (e.g., Bruce, Wilcox-O'Hearn, Robinson, Phillips-Grant, Francis, & Smith, 2005; Fitzgerald, 2010; Henri & Henri, 1898; Howes, Siegel, & Brown, 1993; MacDonald, Uesiliana, & Hayne, 2000; Mullen, 1994; Peterson, Noel, Kippenhuck, Harmundal, & Vincent, 2009; Rabbitt & McInnis, 1988; Wang, 2001). A second method is to ask adults about multiple memories from either their entire lives (Jack & Hayne, 2007; Rubin & Schulkind, 1997) or from childhood specifically (Peterson et al., 2009; Wang, Conway & Hou, 2004) and then subsequently pinpoint their earliest memories. A third

method is to conduct a more structured inquiry, in which the participants are asked questions about specific events that the researcher knows took place around the time of the assumed off-set of childhood amnesia. Such specific events could be the birth of a younger sibling (Usher & Neisser, 1993; Eacott & Crawley, 1998; Sheingold & Tenney, 1982) or an important public event like the assassination of Kennedy (Winograd & Killinger, 1983) or World War II events (Berntsen & Rubin, 2006). A fourth distinct approach is to make intensive personal interviews in order to elicit early memories (e.g. Jack & Hayne, 2010; Thorne, 1995; Tustin & Hayne, 2010; Jack, MacDonald, Reese & Hayne, 2009).

Across different methodologies the results converge by showing that childhood amnesia is indeed a robust finding (Rubin, 2000). A closer look at the existing evidence does, however, reveal substantial variability with regards to the age at the first reported memories. Variability is present both at a cultural and at an individual level. Participants from Western-individualistic oriented cultures often have earlier memories relative to participants from Eastern-collectivistic oriented cultures (e.g., MacDonald et al., 2009; Wang et al., 2004). Women usually have earlier first memories than men (Howes et al., 1993; Mullen, 1994, Study II). However, some studies find no gender differences (e.g., Wang, 2001; West & Bauer, 1999). One recent study shows that black American women have later earliest memories compared to black American men as well as compared to white American women and men (Fitzgerald, 2010). Individuals with higher scores on intelligence tests have been found to have earlier first memories (Rybash & Hrubí, 1997). Rybash and Hrubí also found that the older participants reported later first memories than the younger participants. This effect may reflect that the functionalities of early memories vary with age. On the other hand, in a prospective study involving children in five different age groups,

Peterson et al., (2011) found that the nomination and dating of earliest memories appear to stabilize in late childhood and early adolescence.

Whereas the aforementioned differences display relative differences between cultures or groups, divergent results are also found with regards to the absolute measures of age at earliest memory. For studies conducted within the same (Western) culture, the mean age in earliest memory tends to vary between 3-4 years (e.g., Kihlstrom & Harackiewicz, 1982; Mullen, 1994; Tustin & Hayne, 2010; Wang, 2001; West & Bauer, 1999). However, other studies have either shown substantially earlier memories with mean ages below three years of age (e.g., Jack & Hayne, 2010; Wang et al., 2004; Peterson et al., 2009) or later memories above four years of age (Bruce et al., 2005; Bruce, Phillips-Grant, Wilcox-O'Hearn, Robinson, & Francis, 2007).

The great majority of the existing studies share the limitation of having used college students as participants. This raises the possibility that these studies may suffer from sample bias effects with respect to educational level and/or age. For example, it is possible that well-educated middle-class people would report earlier memories than people with a less well-educated background because the former belong to a subculture with more individualistic values (e.g., Wang, 2001) or because the former have higher performance on measures of intelligence (Rybash & Hrubí, 1997).

In order to examine these potential factors, we conducted a study on earliest memories based on a large, stratified Western (Danish) sample. To the best of our knowledge no existing studies on earliest memory have been based on stratified samples representing the entire adult life span from age 20 to 70. One important advantage of the present study as compared to previous research in this area is that it allows us to study the age of earliest

memories as a function of participants' age, gender and educational level in a large, stratified sample covering the entire age range of 20 to 70 years. In contrast to previous research, this allows us to examine the relative importance of these basic demographic factors and their possible interactions. Given the existing evidence in the field, we hypothesized that the respondents would on average report to be 3-4 years of age in their earliest memory, and that women would have earlier first memories than men. We also hypothesized that people with more education would report having earlier first memories than people with less education. This has been suggested earlier (e.g. Nelson, 1993) but has never been investigated in a stratified sample. Due to lack of systematic evidence we had no firm expectations with regards to the possible impact of age and whether age might interact with gender. However, from common sense and indirect evidence from other studies (e.g. Rybash & Hrubci, 1997) a tentative expectancy would be that "memories fade" and consequently that younger people would be able to retrieve earlier first memories than older people.

A comprehensive theory of childhood amnesia should not only explain the average off-set of childhood amnesia, but also provide an adequate account of the individual differences acknowledged in the literature. Among the single factors proposed in order to explain the variation in the individual off-set of childhood amnesia, maternal reminiscence style has received substantial empirical support. Several studies have shown that mothers employing an elaborative reminiscing style tend to have children who have earlier and more elaborated episodic memories (e.g., Jack et al., 2009; Fivush, Haden, & Reese, 2006; Reese & Newcombe, 2007). In the present study we examined this hypothesis by collecting data on the respondents' retrospective assessments of the way in which their parents had communicated with them during their childhood. We hypothesized that respondents who

reported having been allowed to lead the conversation with their parents during childhood and who had parents who had talked more with them when they were children, would report having earlier first memories.

### The Study

The data were collected by TNS Gallup by means of an internet based questionnaire. From a large panel of invited participants (n= 2,180) the overall response rate was 48%. The sample was stratified with respect to *age, gender, geography, and education*. As the basis for the stratification TNS Gallup used data from Statistics Denmark.<sup>1, 2</sup>

### Participants

The final sample consisted of 1,043 adult participants (530 females), between 20 and 70 years of age (see Table 1) (94.2 % Scandinavian-Caucasian; 1.8 % of other race, and 3.9 % mixed). An additional 12 participants were eliminated from the sample, because they had replied “other age” (see below) to the key question concerning their age at earliest memory. As compensation participants took part in a lottery of a number of gift certificates, each worth 40 Euro.

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Insert Table 1

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<sup>1</sup> For further information on Statistics Denmark see: <http://dst.dk/en>.

<sup>2</sup> Divergences in a specific sample from the absolute norms from Statistics Denmark were quantified by a ‘weight effectiveness’ and weighted (corrected) numbers were provided as well. In the present sample the weight effectiveness was 90 % which is very high. In order to assess the magnitude of the differences between using non-weighted and weighted numbers we initially ran control assessments on means between non-weighted and weighted numbers and the differences were clearly insignificant (e.g.,  $M_{\text{non-weighted age at earliest memory}} = 4.20$  years;  $M_{\text{weighted age at earliest memory}} = 4.21$  years;  $M_{\text{MEN non-weighted age at earliest memory}} = 4.43$  years;  $M_{\text{MEN weighted age at earliest memory}} = 4.43$  years;  $M_{\text{WOMEN non-weighted age at earliest memory}} = 3.97$  years;  $M_{\text{WOMAN weighted age at earliest memory}} = 3.97$  years). Because of the very high weight effectiveness and in order to maintain direct face-value of the reported numbers, we chose to base the analysis on the non-weighted numbers.

## Materials

The questionnaire consisted of seven questions:<sup>3</sup> Participants were asked about the following aspects of their earliest memory (1) *age at earliest memory*, (2) *vividness*, (3) *typicality*, (4) *fragmentation*, and (5) *valence*. In addition the participants were asked two questions concerning the communication with their parent during childhood: (6) *amount of parent communication*, and (7) the degree to which they had been *allowed to lead conversations*. In question (1) *age* was indicated in half-year slots up to 15 years of age plus an “other age” option. All other questions could be answered on 5 point Likert scales. Here follows the exact wording of the seven questions asked (translated from Danish) and the response options:

### Question (1) *age at earliest memory*.

Think about the earliest episode or experience you can remember from your childhood. How old were you when the episode took place? (Response options: 31 discrete options from age “0 years of age”; ½ year of age”; “1 year of age”... to “15 years of age”. The 31<sup>st</sup> option was “other age”.

### Question (2) *vividness*.

To what extent does the statement below match your earliest memory? The memory appears vivid and clear. (Response options: A five point Likert scale [1 = Not at all; 5 = To a very high degree]).

### Question (3) *typicality*

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<sup>3</sup> An additional 5 questions were asked about another type of memory, but since the data from these questions were not analyzed in the present context, they are not described here.

To what extent does the statement below match your earliest memory? The episode was typical for my everyday life at that time. (Response options: A five point Likert scale [1 = Not at all; 5 = To a very high degree]).

Question (4) fragmentation

When you recall your experience, does it then appear as a coherent episode with a beginning and an end, or is it more like one or more fragments? (Response options: A five point Likert scale [1 = Very incoherent; 5 = Very coherent])

Question (5) valence

When you recall the episode, are the emotions you experience positive or negative? (Response options: A five point Likert scale [-2 = Very negative; 2 = Very positive])

Question (6) how much the parents talked with them

To what extent is the following statement true for you? When I was a child, my parents talked a lot with me about my experiences. (Response options: A five point Likert scale [1 = Not at all; 5 = To a very high degree])

Question (7) the extent to which the participants when they were children were allowed to lead the conversation with their parents

To what extent is the following statement true for you? When I in my childhood talked with my parents about my experiences, I was allowed to lead the conversation and decide what I talked about (Response options: A five point Likert scale [1 = Not at all; 5 = To a very high degree])

**Procedure**

The data were collected on a TNS Gallup website, where the participants were given the following written instructions: “*Dear participant. This investigation is about your*

*memories. The questions are exclusively about your assessments of your memories and their importance and quality. The investigation is part of a larger research project conducted at the Department of Psychology and Behavioral Sciences at Aarhus University. Both foreign and Danish researchers take part in the project. No economical, ideological, or political interests are involved in the study.”*

## Results

Parametric tests were used throughout the analysis with an alpha level of .05. In each specific analysis, a few participants who had responded with the “Do not wish to reply”-option, were removed from the given analysis.

Table 2 provides an overview of the main findings for the whole sample, their phenomenological qualities, and whether their assessments on average differed from neutral (test value = “3” on the 5 point Likert scale).

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Insert Table 2

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The mean *age at earliest memory* was slightly higher than expected given previous work ( $M = 4.20$  years,  $SD = 1.92$ ). Initially, we ran a series of one-sample t-tests on the phenomenological qualities of the earliest memories (see Table 2 for details). These tests revealed that the participants assessed the earliest memories as significantly *vivid and clear* as well as significantly *non-typical*. In accordance with the findings from Bruce and colleagues (Bruce et al., 2005; Bruce et al., 2007), the earliest event remembered was evaluated as being significantly *fragmented*. Finally, the *valence* of the earliest memory was

considered to be significantly positive, which is consistent with the general positivity bias in autobiographical remembering (Walker, Skowronski & Thompson, 2003).

The main purpose of the study was to investigate the possible effects of *gender*, *educational level*, and *age* and potential interactions between these factors. In order to base the study on a stratified sample, information regarding the last completed qualification had been collected for each participant. The variety of responses with regards to education was then re-coded into the following four broad, yet, distinct categories: 1. Basic school (i.e., no completed education beyond 9-10 years of obligatory public school); 2. Vocational education (i.e., a non-academic education such as a workman training); 3. High school; 4. Higher education (high school exam required for enrolment).

We then conducted a three-way MANOVA with *gender*, *educational level*, and *age group* as between subjects factors and with *age at earliest memory*, *vividness*, *typicality*, *fragmentation*, and *valence* as dependent variables. Using Pillai's trace the multivariate tests revealed a significant effect of *gender* ( $V = .012$ ,  $F[5, 1000] = 2.427$ ,  $p = .034$ ,  $\eta_p^2 = .012$ ), *educational level* ( $V = .028$ ,  $F[15, 3006] = 1.868$ ,  $p = .022$ ,  $\eta_p^2 = .009$ ), and a significant effect of *age group* on the combined dependent variables ( $V = .044$ ,  $F[20, 4012] = 2.242$ ,  $p = .001$ ,  $\eta_p^2 = .011$ ). No significant multivariate interactions were obtained.

In the following we present the results from univariate analysis for each of the separate dependent variables (*age at earliest memory*, *vividness*, *fragmentation*, *typicality*, and *valence*) and with *gender*, *educational level*, and *age group* as between subjects factors.

### **Age at earliest memory**

There was a significant effect of *gender* on *age at earliest memory*,  $F(1, 1004) = 5.660$ ,  $p = .018$ ,  $\eta_p^2 = .006$ . As predicted, women ( $M_{\text{age}} = 3.98$ ,  $SE = .12$ ) had significantly

earlier memories than men ( $M_{age} = 4.48, SE = .13$ ). The analysis also revealed a significant effect of *educational level* on *age at earliest memory*,  $F(3, 1004) = 4.395, p = .004, \eta_p^2 = .013$ . The higher the educational level, the earlier first memories were reported. In particular, people with only 9-10 years of obligatory basic school reported later memories than people with higher levels of education (cf. Figure 1). There was no effect of *age group* on *age at earliest memory* ( $F < 1$ ), and no interactions between any of these factors. These results are displayed in Figure 1.

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Insert Figure 1  
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### **Vividness**

The univariate analysis showed a significant effect of *gender* on *vividness* ( $F[1, 1004] = 6.978, p = .008, \eta_p^2 = .007$ ) as well as a significant effect of *age group* on *vividness* ( $F[4, 1004] = 7.700, p = .000004, \eta_p^2 = .03$ ). As evidenced in Figure 2, women's earliest memories were systematically reported to be more vivid relative to men's; further, as the respondents got older they systematically reported their earliest memories to be more vivid. No other effects or interactions were obtained on *vividness* as dependent variable.

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Insert Figures 2 and 3  
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### **Fragmentation**

The analysis revealed a single significant effect of *age group* on *fragmentation*,  $F(4, 1004) = 4.621, p = .001, \eta_p^2 = .018$ . As the respondents got older, they systematically rated

their first memory as less fragmented (see Figure 3). No other effects or interactions were obtained.

### **Typicality**

There was a significant effect of *educational level* on *typicality*,  $F(3, 1004) = 2.974$ ,  $p = .039$ ,  $\eta_p^2 = .008$ ). Respondents with a vocational education tended to assess their earliest memory as more typical than respondents with other educational background ( $M_{\text{voc-edu}} = 2.40$ ,  $SD = 1.32$ ;  $M_{\text{bas-school}} = 2.33$ ,  $SD = 1.40$ ;  $M_{\text{hi-school}} = 2.33$ ,  $SD = 1.29$ ;  $M_{\text{hi-edu}} = 2.34$ ,  $SD = 1.34$ ). Further, there was a significant interaction between the factors *educational level* and *age group* on *typicality*,  $F(12, 1004) = 2.538$ ,  $p = .003$ ,  $\eta_p^2 = .029$  (see Figure 4). The analysis revealed no other effects or interactions.

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Insert Figure 4  
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### **Valence**

The analysis with *valence* as dependent variable revealed no significant effects or interactions.

### **Parent-child communication as predictor for age at earliest memory?**

The potential impact of how the parents of the respondents had communicated with the respondents when they were children were analyzed by examining the responses from questions concerning (6) *amount of parent communication*, and (7) *allowed to lead conversation* to the dependent variables. These two items on parent communication qualities were highly positively correlated ( $r = .633$ ,  $p < .0001$ ), for which reason we computed an

aggregate variable, *parent communication qualities*, operationalized as the mean of the responses to the questions (6) and (7).

In order to analyze the potential impact of *gender* and *educational level* on *parent communication qualities*, a two-way ANOVA with *gender* and *educational level* as between subjects factors and the aggregate variable *parent communication qualities* as the dependent variable was conducted. This analysis revealed a single main effect of *educational level*,  $F(3, 1035) = 3.167$ ,  $p = .024$ ,  $\eta_p^2 = .009$ , which reflected that respondents with higher education reported having had more communicative and engaging parents relative to less well educated participants ( $M_{\text{bas-school}} = 2.649$ ,  $SD = .059$ ;  $M_{\text{voc-edu}} = 2.791$ ,  $SD = .049$ ;  $M_{\text{hi-school}} = 2.888$ ,  $SD = .101$ ;  $M_{\text{hi-edu}} = 2.877$ ,  $SD = .051$ ). No other effects or interactions were obtained.

In order to examine the influence of parent communication style on the dependent variables while controlling for other factors, a series of multiple linear regression analyses was conducted, one for each of the following dependent variables: *age at earliest memory*, *vividness*, *fragmentation*, *typicality* and *valence*. Each analysis had *parent communication qualities*, *current age*, *education*, and *gender* as independent variables.

The regression equation in standardized beta weights for *age at earliest memory*, including all variables that were significant at the .05 level was  $\text{age at earliest memory} = -.14 \text{ education} + (-.12) \text{ parent communication} + (-.11) \text{ gender}$ ,  $R^2 = .05$ ,  $N = 1043$ .

The regression equation in standardized beta weights for *vividness*, including all variables that were significant at the .05 level was  $\text{vividness} = .21 \text{ current age} + .12 \text{ gender} + .11 \text{ parent communication}$ ,  $R^2 = .07$ ,  $N = 1043$ .

The regression equation in standardized beta weights for *fragmentation*, including all variables that were significant at the .05 level was  $fragmentation = .24 \text{ current age} + .11 \text{ parent communication} + (-.10) \text{ education}$ ,  $R^2=.07$ ,  $N=1043$ .

For the variable *typicality* only parental communication was significant at the .05 level in the regression analysis  $\beta = .10$ ,  $R^2=.01$ ,  $N=1043$ . Likewise for *valence* only parental communication was significant at the .05 level in the regression analysis  $\beta = .22$ ,  $R^2=.05$ ,  $N=1043$ .

In short, parental communication was a significant predictor for all dependent variables, even when controlling for current *age*, *education*, and *gender*. However, the effect sizes were small.

### Discussion

The results show that the *educational level* and *gender*, but not current *age* had significant and independent effects on the reported *age at earliest memories*. Women and people with higher education report earlier memories. The finding in our study that current age had no effect on reported age at earliest memories differs from what Rybash and Hrubí (1997) found when comparing a group of young adults (college students) to a group of older adults (community dwelling volunteers). However, as Rybash and Hrubí (1997) report, the group of college students had significantly more years of formal education than the group of older adults. Therefore, the reported effect of current age on age at earliest memory in the Rybash and Hrubí study may very well have been a product of the differential effects of educational level as shown in the current study.

When considering the phenomenological qualities of the earliest memories, the respondents' current *age* had clear effects: With increasing age, the respondents' earliest

memories were reported as being both significantly more *vivid* and less *fragmented* (more coherent). Finally, we have provided evidence that *parent communication style* towards the respondents when they were children was related to *age at earliest memories* as well as to the other dependent measures, even when controlling for *educational level*, *gender* and current *age*. In the following these results are discussed in more detail.

The finding that higher educational level leads to earlier memories raises at least two questions: First, the majority of existing studies in the field based on reports from college students may suffer from sample bias effects with regards to educational level. This may on average have resulted in the reports of earlier memories compared to what would be obtained using stratified samples. One obvious advantage of the present stratified sample is that it allowed us to compute a sub-sample that with regards to *educational level* roughly corresponding to the college students used extensively in previous work.<sup>4</sup> This sub-sample ( $n = 424$ ) consisted of participants who had completed high school and/or a medium to long college education. The mean age of earliest memory in this sample was compared to that of the remaining sample ( $n = 619$ ). A *t*-test revealed that the mean age of the earliest memory in the sub-sample (high school or longer) was significantly lower ( $M = 3.92$  years,  $SD = 1.64$ ) than that of the remaining sample ( $M = 4.39$  years,  $SD = 2.07$ ),  $t(1041) = 3.93$ ,  $p < .001$ ,  $d = .74$ . Because the majority of previous studies have based their results on reports from college students, most existing studies may have overestimated how far back in time the average adult is actually able to remember.

Second, to what extent does the demonstrated effect of *educational level* on *age at earliest memories* help us understand the variability in the existing literature? Since previous

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<sup>4</sup> Age of the respondents was disregarded when constructing the sub-sample since current age had no effect on age at earliest memories as reported above.

research in the field has been largely based on educationally uniform samples of college students, the present effects of educational level appears to be an unlikely explanation for this variability. On the other hand, a possible interpretation is that age of earliest memory is affected by intelligence (Rybash & Hrubí, 1997) which is known to be correlated with academic achievement (Deary, Strand, Smith & Fernandes, 2007; Rhode & Thomson, 2007; Zhu & Weiss, 2005) as well as occupational attainment (McCall, 1977). More research is needed to disentangle the interaction between such possible factors.

In accordance with several previous findings (e.g., Howes et al., 1993; Mullen, 1994, Study II), the results from the present study demonstrated that women had significantly earlier first memories than men. The perhaps most convincing attempt at explaining gender differences in early memories comes from the socio-cultural approach (e.g., Fivush, 2009; Nelson & Fivush, 2004). Mothers who engage in a highly elaborative reminiscing style have been shown to have children who have earlier and more elaborated childhood memories (Bauer, 2007; Fivush et al., 2006; Jack et al., 2009; Reese & Newcombe, 2007), and parents have in some studies been shown to talk more (Howe, 2011) and to be more elaborative towards their daughters relative to sons (Fivush, 1998; Fivush et al., 2006). In the present study we attempted to test the socio-cultural hypothesis by collecting retrospective data on parent communication qualities from when the respondents were children. The results showed significant effects of *parent communication qualities* on *age at earliest memory* as well as on the other dependent variables included in the survey, even when controlling for respondents' *age*, *gender* and *level of education*. However, this finding should be interpreted with caution. Even though the variable *parent communication qualities* is an aggregate variable of responses to two questions, *amount of parent communication* and *allowed to*

*lead the conversation*, these are still quite simple measures of the maternal reminiscing style and do not capture the full complexity of that construct. For instance, the amount of details that the parents (mothers) provide in the conversation have often been described as an important part of the maternal reminiscing style as a theoretical construct (Fivush et al., 2006; Jack et al., 2009). This aspect, and most likely also other aspects, of maternal reminiscing style are not captured by the present questions and thus the *parent communication quality* can only be expected to partly relate to the full multi-leveled construct. Nonetheless, the retrospective assessments obtained in the present study are consistent with the claim that highly elaborative parents facilitate early autobiographical memories in their children. Interestingly, however, whereas level of education was significantly associated with parental communication quality, no differences were found between males and females on these assessments. Given that some studies have found a tendency for parents to talk more with their daughters than with their sons (e.g. Howe, 2011) the present finding may seem surprising. However, the divergent results may be due to different methodologies. Whereas measures of maternal communication from the reminiscing studies are based on controlled observer generated (objective) data, the data from the present study were derived from retrospective (subjective) assessments many years later. One might speculate that the respondents may have used their own gender as reference for such assessments (as opposed to absolute measures across gender) which may have led to a reduction in the potential 'subjective' gender differences. Alternatively, Danish parents may more equally engage in elaborative reminiscing with both their sons and daughters. Such cultural differences have been found before such as in a study by Minami and McCabe

(1995) where Japanese mothers were reported to spend longer talking to their sons than to their daughters.

While current age had no effects on the age at earliest memory, current age had substantial impact on some of the phenomenological qualities of the earliest memories. Older respondents reported their earliest memories to be significantly more vivid and coherent than did younger respondents. This finding may be taken as evidence of the constructive element in autobiographical memories, possibly spurred by nostalgia (Holbrook, 1993) or other functional differences in the role played by early childhood memories across age (Rybash & Rhubi, 1997). For example, it may reflect greater levels of rehearsals and retellings of earliest memories among older relative to younger respondents leading the subjective feeling of coherence and vividness to increase in older adults - such as it is found in the current study. This needs to be investigated in future studies.

In conclusion, we report the first data on adults earliest memories based on a stratified sample. The data provided evidence that *educational level* has clear and systematic effects on the age at earliest memory. The study also showed that gender differences are prominent with regards to age at earliest memories as well as their vividness, and that these gender differences are independent of the respondents' educational level and age. Further, while respondents' current age had no effect on the age of the earliest memories, their subjective vividness and coherence increased systematically with the age of the participants. Finally, our findings support the view that maternal reminiscing style is related to age at earliest memories as well as their phenomenological qualities, when assessed retrospectively. In a broader perspective, the present results emphasize the need for caution when generalizing results based on college students to the adult population in general. Finally, many of the

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effect sizes reported in this study are quite small and some of the differences found may not have been statistically significant in smaller samples. This, we believe, does not undermine the contribution of our study. It does, however, emphasize the multitude of factors that influence earliest memories and thus the multifaceted explanations needed to account for individual differences in this field.

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### Figure Captions

Figure 1. Graphic representation of the mean reported age in years at earliest memory for each gender across different levels of education. Error bars: +/- 1 SE.

Figure 2. Graphic representation of vividness for each gender across age groups. Error bars: +/- 1 SE.

Figure 3. Graphic representation of fragmentation for each gender across age groups. Error bars: +/- 1 SE.

Figure 4. Graphic representation of typicality for each age group. Split into educational level. Error bars: +/- 1 SE.

Table 1  
*Participants*

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Age range (years)	<i>n</i>	Women
20-29	116	61
30-39	140	71
40-49	234	115
50-59	267	138
60-70	286	145

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Table 2  
*Overview of Main Findings and Deviations of the Phenomenological Quality Means from a Neutral Test Value*

	Total	Neutral? (test value = "3")		
		<i>t</i> -value	df	<i>r</i> -value
Age at earliest memory (in years)	4.20 (1.92)	-	-	-
Vividness <sup>§</sup>	3.48 (1.17)	14.005**	1039	0.40
Typicality <sup>§</sup>	2.35 (1.33)	-15.839**	1039	0.44
Fragmentation <sup>§§</sup>	2.88 (1.17)	-3.566*	1042	0.11
Valence <sup>§§§</sup>	3.40 (1.18)	10.847**	1042	0.32
My parents talked a lot with me <sup>§</sup>	2.74 (1.06)	-	-	-
Allowed to lead the conversation <sup>§</sup>	2.85 (1.02)	-	-	-

<sup>§</sup> Five point Likert scale (1 = Not at all; 5 = To a very high degree)

<sup>§§</sup> Five point Likert scale (1 = Very incoherent; 5 = Very coherent)

<sup>§§§</sup> Five point Likert scale (-2 to 2, recoded as follows: 1 = Very negative; 5 = Very positive)

\*  $p < .001$

\*\*  $p < .00001$

Figure 1.

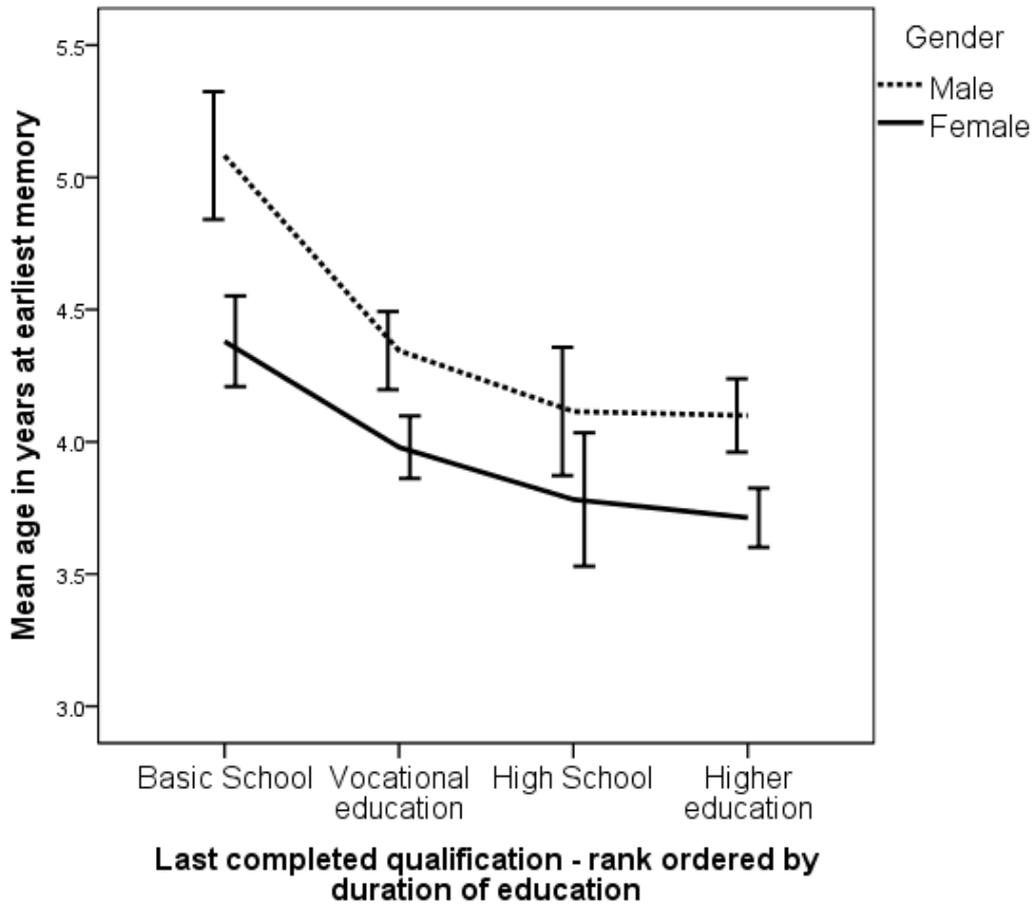


Figure 2

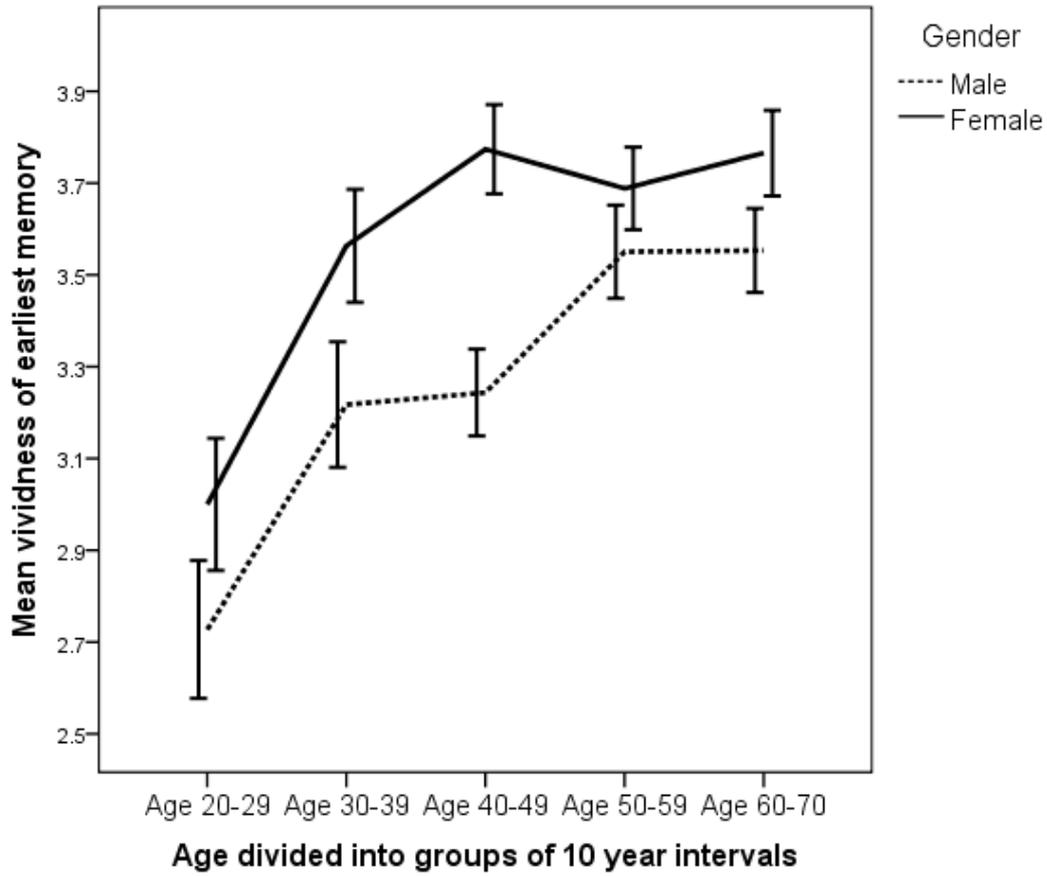


Figure 3

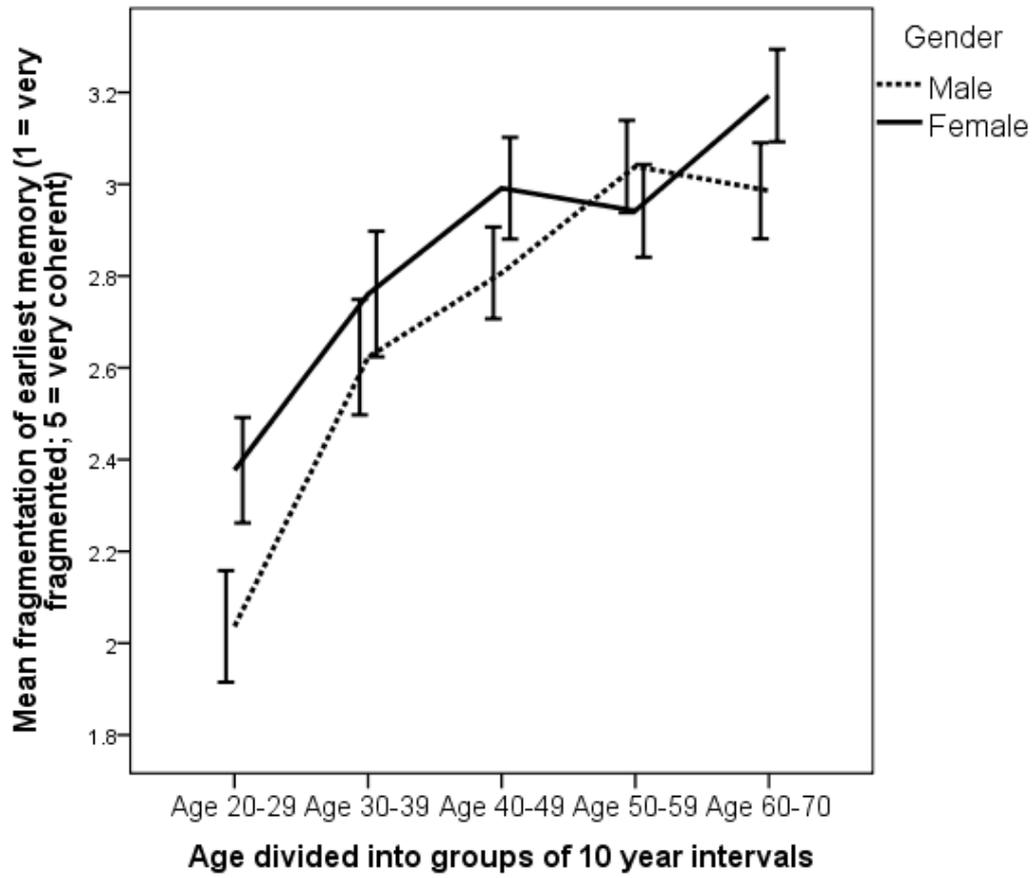


Figure 4

