

Childhood Amnesia: On Answering Questions About Very Early Life Events

M.J. Eacott

University of Durham, UK

R.A. Crawley

University of Sunderland

Twenty five young adults were asked about the events surrounding the birth of a younger sibling which took place when they were under the age of 2 years. Approximately 40% of the participants claimed to have significant memories of the events. The mothers of our participants verified that a majority of their answers were accurate. Comparing the pattern of data with those previously collected (Eacott & Crawley, 1998) suggests that the memories of those who were aged below 2:0 are qualitatively similar to the memories of those who were older at the time of events and dissimilar in type to those who are basing their reports on reconstructions from family knowledge. This finding may be evidence that memories of events that occurred before the age of 2 years are genuine but rare. This conclusion may be useful in assessing theories of childhood amnesia.

INTRODUCTION

Childhood amnesia (also known as infantile amnesia) is a paradoxical paucity of memories that date from our earliest childhood (Dudycha & Dudycha, 1941; Freud, 1916/1963; Sheingold & Tenney, 1982; Usher & Neisser, 1993). The interpretation one places on this relative failure of the autobiographical memory system has important implications for the understanding of memory processes in later life. For example, explanations of childhood amnesia range from a failure of development of the concept of self (Howe & Courage, 1993) to hippocampal

Requests for reprints should be sent to Dr M.J. Eacott, Department of Psychology, University of Durham, Science Laboratories, South Road, Durham DH1 3LE, UK.

Email: M.J.Eacott@durham.ac.uk

We gratefully acknowledge the assistance of Dr R. Kentridge who provided statistical advice, the students and their mothers who participated in the study, and Ms Carole Carter who provided the independent rating of the mothers' replies. The study was funded by the award of a Durham University Special Award for Younger Staff to MJE.

immaturity (Nadel & Zola-Morgan, 1984). Accepting one of these proposed explanations has implications for one's view of the fully functional adult memory system. However, the phenomenon of childhood amnesia is still poorly understood, at least in part because of the difficulty of gathering empirical evidence about the nature of the phenomenon itself. Not only do people often have difficulty dating their memories (Brown, Ripps, & Shevel, 1985) but the memories themselves are often not easily verifiable. One way to overcome at least some of these difficulties is to probe memory for a commonly experienced but datable event. The birth of a younger sibling has proved to be a useful event (Eacott & Crawley, 1998; Sheingold & Tenney, 1982; Usher & Neisser, 1993) as it is commonly experienced around the age period of interest, it is clearly datable, and the events are often experienced and remembered by other members of the family, allowing verification of the memories produced. By studying early memories for the birth of a sibling, therefore, one can examine the age of the earliest memories and their characteristics.

Using this method, Eacott and Crawley (1998) recently reported that memories from as young as 2 years and 4 months (2:4) were commonly available. (Throughout this paper we shall refer to ages in terms of years and months; 2:4 = 2 years and 4 months.) Using a questionnaire that asked for memories about the events surrounding the birth of a younger sibling, Eacott and Crawley (1998) found that those who were aged between 2:0 and 2:3 at the time of the birth reported significantly less about the events than those who were older at the time of their sibling's birth. Thus, Eacott and Crawley were able to point to this relatively precise age as a period when the number of long-lasting autobiographical memories begins to increase markedly. However, because there were no participants who experienced a sibling birth when they were under 2 years old, one important question remained unanswered from that study. It was unclear whether the recall of those aged between 2:0 and 2:3 lies intermediate between the better recall of those who were older and that of those who were younger, or whether those who were younger than 2:0 will also be able to report a similar number of memories. Our previous study (Eacott & Crawley, 1998) also reported on the amount of information known about a family birth by those who could have no autobiographical memory of the events. These participants were younger siblings who were asked about the events surrounding their own birth from the point of view of their older sibling. The reports of these participants revealed that even those who have no autobiographical memory for the events can have a great deal of knowledge about the events, which we called "family knowledge". However, in some respects the family knowledge differed qualitatively from the memories of those older siblings who claimed to recall the events. Thus, in this study we will compare the quantity and quality of the memories of those who were under the age of 2 at the time of events to previously reported similar memories from those who were older. This comparison will allow us to clarify the nature of very early memories.

In summary, we tested participants who were aged under 2 years at the time of their sibling's birth for their memory of the events surrounding the birth. We also asked the mothers of our participants to judge whether the memories produced were accurate. The details of this study are identical to those of our previously reported study (Eacott & Crawley, 1998) to allow a direct comparison to be made between the results reported here and those previously reported.

METHOD

Participants

The participants were identified and contacted exactly as in our previous study (Eacott & Crawley, 1998) and so these processes are outlined only briefly here. A contact questionnaire was distributed to students at the University of Durham, UK and the University of Sunderland, UK. The questionnaire invited students to indicate their general willingness to participate in psychological research in the university. From information provided on the contact questionnaire, participants were identified who had only one sibling, were the elder sibling in their family, and had no children of their own. In addition, for this study, the age difference between the siblings had to be less than two years. Participants who were suitable by these criteria were contacted by Email, letter, or personally and invited to take part in what was described as a study of early memory, for which they would be paid £3.00.

The Participants' Questionnaire

Those who responded to our invitation were given a questionnaire, which they completed individually in the laboratory. At this point, we verbally checked the information on birth dates that we had been given and established whether their sibling had been born in hospital or at home (see later).

The questionnaire asked about the events surrounding the birth of a younger sibling and was identical to that used in our previous study. The instructions given to the participants were in written form and included the following sentences: "*It is very important that you only report information that you actually remember. If you think you remember something, report it; however, if you only know about certain information because you have seen photos or heard family stories about it, do not include it.*" and later "*... So again, please report only those things that you actually remember.*" Moreover the instructions included the following: "*No one is expected to recall details about every question. In fact, you may be able to recall very little or nothing about parts of the event. What you don't recall is as important to this investigation as what you do recall.*" Thus participants were instructed to include only those things for which they had an autobiographical memory.

The questionnaire used for those whose sibling was born in hospital is shown in Table 1 and consisted of the 17 universal and 14 contingent questions used in our previous study (Eacott & Crawley, 1998), based on previous studies (Sheingold & Tenney, 1982; Usher & Neisser, 1993). Universal questions concerned aspects of the event that it was assumed would have been experienced by all participants and therefore could potentially be answered by them all.

TABLE 1
Questionnaire

-
1. Do you remember being told that your mother was going to have a baby?
 - *2. Who told you?
 - *3. Where were you?
 - *4. What were you doing when this happened?
 - *5. What time of day was it?
 6. Were there any special purchases made in preparing for the baby's birth? If so, what were they?
 7. Do you recall your parents doing any kind of room preparation for the baby? If so, what?
 - *8. Who told you that your mother was leaving to go to the hospital?
 - *9. What were you doing when she left?
 - *10. Who went with her?
 - *11. What did you do right after your mother left?
 - *12. Who took care of you while your mother was in hospital?
 13. Did you do anything special with this person while your mother was away?
 - *14. How did you find out that the baby was a boy or a girl?
- If you visited your mother while she was in hospital, please answer questions 15–21, otherwise go to question 22*
15. What time of day was it when you visited her?
 16. Were there other patients besides your mother in the room?
 17. Were there other visitors in the room while you were there?
 18. What did you do there?
 19. Do you remember how the room was arranged or what specific items of furniture were in the room?
 20. Was there anything unusual about the room?
 21. Did you eat anything while you were in the hospital? If so, what?
 22. Did you talk with your mother on the telephone while she was in the hospital? Do you remember anything specific from the conversation?
 - *23. Where were you the first time you saw the baby?
 - *24. What was the baby wearing the first time you saw him/her?
 - *25. What was the baby doing?
 - *26. Who picked your mother up from hospital?
 - *27. What time of day was it when they came home?
 - *28. What did you do when they arrived home?
 - *29. Was anyone else at home when they arrived? If so, who?
 30. What presents did the baby get?
 31. Did you get any presents at that time? What were they?
 32. Who gave them to you?
 33. If you recall anything else about the events surrounding the birth of your sister/brother, please add it here.
-

Universal questions are marked with an asterisk. The remainder are contingent questions.

Contingent questions concerned aspects that may or may not have been experienced by a participants (e.g. a set of seven questions concerning events taking place on a visit to the mother and baby in hospital which could only be answered if such a visit had occurred). In addition, participants were asked to add any additional information that they could recall. The universal questions are marked with an asterisk in Table 1.

Participants were also asked to rate the recency and frequency with which they had talked about or heard others discuss the events surrounding the birth of their sibling on a 4-point scale. They were also asked whether photos, videos/films, family stories, or other external sources had helped to keep the event preserved for them and, if so, to rate the frequency with which they had experienced this source on a 5-point scale (from *less than once a year* to *more than once a month*). The questionnaire ended with a request to provide their mother's name and address in order that she might be contacted to fill in a similar questionnaire. Participants were asked not to discuss their answers to the questions with her before she had completed the questionnaire.

An equivalent questionnaire was constructed for participants whose sibling was born at home rather than in hospital. This questionnaire was slightly shorter than the hospital questionnaires (24 questions rather than 36) as it was not possible to include the contingent questions about the possible hospital visit, or the universal questions about the arrival home of mother and baby from hospital.

Thus, in summary, the questionnaire we used was identical to that used in our previously reported study (Eacott & Crawley, 1998), which in that study we called the recall questionnaire.

Scoring. The questionnaires were scored by the authors in an identical manner to that used in our previous study. Briefly, credit was given for all informative answers. For example, to the question "Did you receive any presents?", credit was given for the informative answer "toys" or "a teddy bear", but not for the answer "I think I did, but I don't know what." Where exactly the same information was used in answer to more than one question, it was only credited once under the more appropriate question.

The Mothers' Questionnaires

For those who had given permission for us to contact their mother, we sent the mother a questionnaire about the events surrounding the birth of their younger child. The questionnaire contained all the questions that the participants had been asked (e.g. "Who told your child that you were leaving to go to hospital?"), but the questions that their child had answered were marked and mothers were asked only to answer those questions. When they had given their own independent answers, they were asked to open a sealed envelope, which

contained a copy of their child's answers to the same questions, and to assign to each question one of the following:

1. My child's memory matches my own memory.
2. I believe my child was inaccurate.
3. Our memories involve different aspects of the event, we may both be right.
4. Although I recalled this differently, s/he may be right.
5. Other (please comment).

As an incentive for returning the completed questionnaire, £1.00 for every returned questionnaire was promised to a local neonatal care hospital.

Scoring. The mothers' questionnaires were used to verify the information given by their children, our participants. The participants' answers were assessed by an independent person as to whether they were *verified* by the mother, *denied* by the mother, or *neither verified nor denied* by the mother. We took a strict definition of *verified* and included only those answers that the mother unambiguously claimed were correct. Included in the category of *neither verified nor denied* were many answers that the mother had judged to be in category 3 or 4 from the alternatives listed, and which therefore she admitted could be correct. Those answers that the mother had rated as category 5 (Other, please comment) were rescored by the independent rater according to the comments of the mother. The most common reason for scoring an answer as category 5 was where the mother admitted that she could not recall the answer to our question—in these cases the participant's response was rated as *neither verified nor denied*. Another illustrative case was a participant's report of events that the mother confirmed had occurred, not on the occasion of the birth but on some other occasion (in which case it was rated as *denied*). It was relatively common for participants to report partially correct information. For example, a participant reported being cared for during her mother's absence by her grandmother: the mother reported that both grandparents had played a role. In these cases the participant's response was rated as *verified*, as the response itself was correct, although incomplete. However, where the response was over-inclusive—for example claiming that both grandparents were present when the mother reported that the grandfather was absent—the response was rated as *neither verified nor denied*, as it had elements that were both verified and denied. Under our strict definitions, therefore, such a response cannot be said to be either unambiguously verified or denied.

RESULTS

Approximately 800 contact questionnaires were distributed and from these we were able to identify participants who met our selection criterion. A total of 25

such participants responded to our invitation and completed the questionnaire. The age of the participants at the time of their sibling's birth was between 1:2 and 1:11. However, it was more common for the age to be in the latter third of this range, as only five participants were aged 1:0–1:3, five were aged between 1:4–1:7, and the remaining 15 were aged 1:8–1:11. All of the sibling births took place in hospital, and therefore all completed the hospital birth version of our questionnaire. Following the procedure used in our previous study, we counted the number of universal questions that had been answered by each participant. Universal questions ask about events that are assumed to have happened to all participants. In contrast, contingent questions ask about events that may or may not have occurred, such as a visit to the hospital, and can only be answered if such an event did in fact occur. Our analysis concentrates on universal questions, because we wish to compare the results to those obtained in our previous study with participants who were older at the time of the sibling birth. It is plausible that experience, rather than recall, varies by age and will influence answers to contingent questions.

Figure 1 shows the proportion of participants who answered at least one, or three or more, universal questions, alongside the equivalent data from our previous study (Eacott & Crawley, 1998). This figure shows that a substantial minority of participants were able to answer three or more universal questions about the birth of a sibling which took place when they were aged under 2. More than half were prepared to offer at least one “memory”. The important question is how these data compare to those previously reported from those who were older at the time of their sibling's birth. Using the strict, although arbitrary, recall criterion of being able to answer three or more universal questions, we found that the age groups differed in the number of participants who recalled the birth event ($\chi^2 = 12.78, n = 94, df = 4, P < .025$). From Fig. 1 it would appear that the two youngest groups (those who were younger than 2:4 at the time of their sibling's birth) were less often able to recall the events. To test this suggestion further, the number of universal questions answered by each participant from each of the five groups was examined using a one-way ANOVA. This analysis revealed a significant effect of age group, $F(4,93) = 4.49, P < .025$. A Newman-Keuls test revealed that the currently reported group (those aged under 2 at the time of their sibling's birth) answered significantly fewer questions than those aged 2:4 and older ($P < .05$), but were not significantly different from those who were aged 2:0–2:3. The three older groups (those who were aged 2:4 and older at the time of their sibling's birth) did not differ significantly from each other ($P > .05$).

Mothers' Verifications

The analyses just reported refer only to the number of universal questions answered. However, we also had a measure of the accuracy of the answers as

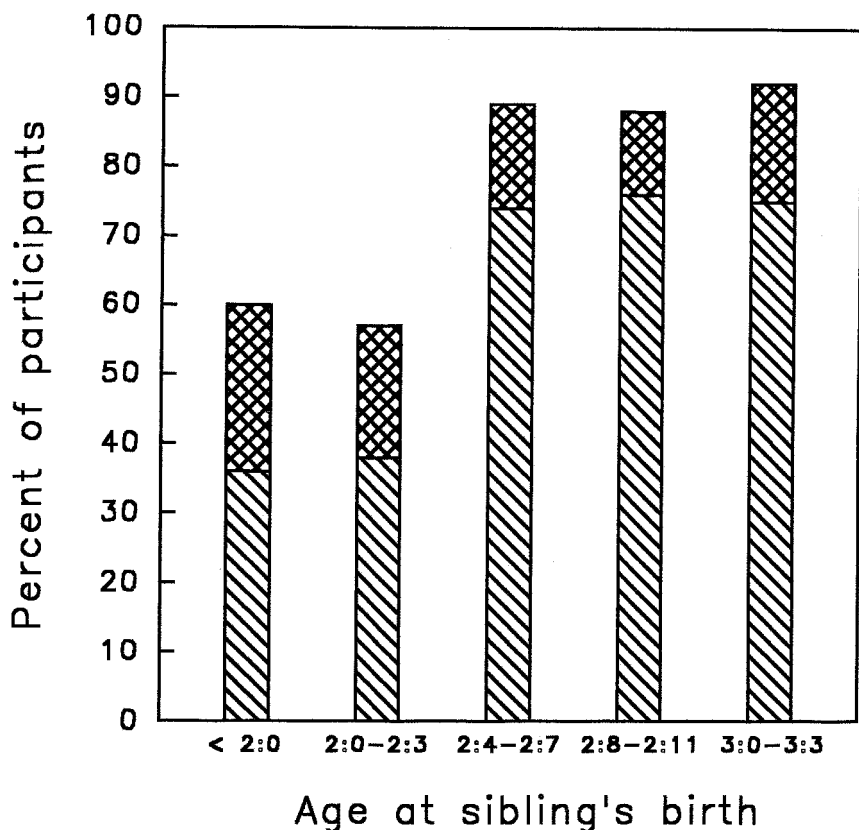


FIG. 1. The percentage of participants in each age group who were able to give at least one answer (cross-hatched) or three or more answers (diagonal shading) to universal questions. The data in the four older groups are from Eacott and Crawley (1998).

judged by the mothers of our participants. A total of 23 (92%) of our participants gave permission for their mother to be contacted. Questionnaires were sent to 15 mothers. (The discrepancy between this and the previous figure is due to the fact that mothers of those who had produced no answers at all were not contacted.) The questionnaires were returned by 14 (93%) of the mothers, but two were discarded as the mothers had failed to follow the instructions properly. Thus we had the mother's questionnaire for 12 (48%) of our participants, 80% of those who had answered at least one question that needed verification.

Each of the answers given by the participants (both to universal and to contingent questions) was rated as *verified*, *denied*, or *neither verified nor denied* based on the answers given by the mother. The percentages of answers falling into each of these categories are shown in Table 2, alongside data from

TABLE 2
Verification of Answers

Age	<i>Mother's Verification of Answers</i>		
	<i>Verified</i>	<i>Neither</i>	<i>Denied</i>
Under 2:0	64	23	13
2:0-2:3	65	24	11
2:4-2:7	74	14	12
2:8-2:11	54	28	18
3:0-3:3	62	26	12

The percentages of answers from each age group that were *verified*, *denied*, or *neither verified or denied* by the participant's mother. The data for those aged 2:0 or more are from Eacott and Crawley (1998).

our previous study (Eacott & Crawley, 1998) for comparison. It is clear that the majority of the answers given by participants who were under the age of 2 at the time of the event were verified as accurate by their mother. Only a small minority was specifically denied. A chi-square analysis suggested that the proportion of memories falling into each category did not differ between the age groups ($\chi^2 = 13.73$, $df = 8$, $P > .05$). In addition, excluding those answers that were *neither verified nor denied*, no differences between the age groups in the number of answers specifically verified and specifically denied were found ($\chi^2 = 4.82$, $df = 4$, $P > .05$). Thus, the memories of those who were below the age of 2 at the time of their sibling's birth were as accurate as the memories of those who were older at the time.

The Effects of Rehearsal-Review

Our subjects were asked how often and how recently they had discussed the events or heard the events discussed by others. We found that the most common answer was "a few times in my life" ($n = 12$), although two participants claimed never to have discussed the events. Most commonly, participants reported having last discussed the event when they were aged between 14 and 18 ($n = 11$), although five participants had discussed the events in the previous six months. However, the number of questions answered by each participant was not significantly correlated with either the recency ($r = 0.24$, $t = 1.18$, $df = 23$, $P > .05$) or the frequency of this review ($r = 0.23$, $t = 1.13$, $df = 23$, $P > .05$). Not unnaturally, the frequency and recency were significantly correlated ($r = 0.69$, $t = 3.40$, $df = 23$, $P < .01$), as those who had discussed the events relatively frequently had also done so relatively recently. These correlations are very

similar to those we have reported previously from participants who were older at the time of their sibling's birth (Eacott & Crawley, 1998).

We also asked our participants about any external sources (for example, photographs or family stories) that had helped to preserve the event for them. As in our previous study (Eacott & Crawley, 1998), these were commonly available and only 3 of our 25 participants reported experiencing no external sources at all. This is a similar proportion to that reported in our previous study (Eacott & Crawley, 1998). However, the rarity of participants reporting no external sources makes it difficult to compare the number of memories available to those who reported external sources with those who had none.

Pattern of Information Produced

We also looked at the pattern of information produced. We found a significant correlation between the number of answers given to each question by the currently reported group (those under 2 at the time of their sibling's birth) and both groups previously reported (Eacott & Crawley, 1998): those who were older than 2:0 at the time of their sibling's birth (called the recall group) and those who were the younger sibling and were reporting only family knowledge (called the report group). However, there was a higher correlation between the number of answers given by the currently studied group to each question and those of the recall group ($r=0.87$, $t=9.66$, $df=30$, $P<.001$) compared to those of the report group ($r=0.60$, $t=4.83$, $df=30$, $P<.001$). This suggests that the pattern of questions answered tends to be similar across all groups of participants, although the similarity is strongest for those under 2 years and the previously studied recall group (i.e. those recalling a birth that occurred when they were older than 2:0). An overall correlation is not surprising, because some questions clearly asked about aspects that were much more salient than others. For example, question 21 asked if anything was eaten while visiting the hospital. This concerns relatively unsalient information and was rarely answered by any group: only 8% of the currently reported group answered this question. In contrast, question 12 asked who cared for the elder child while the mother was in hospital, and was relatively commonly answered by all groups. Of the currently studied group, 52% answered question 12. However, Eacott and Crawley (1998) noted that there were some significant differences in the way the recall and report group answered some questions. To take account of overall differences in the number of questions answered, we calculated the proportion of all answers that were to these critical questions. The results are shown in Fig. 2, alongside the equivalent data from Eacott and Crawley (1998) for comparison. It is clear from this figure that the pattern of answers produced by the currently studied group conforms much more closely to that of the recall group from Eacott and Crawley (1998) than to the pattern produced by those in the report group. For each of the questions, a chi-square analysis was performed on the number of answers given to each question shown in Fig. 2. This revealed that only the

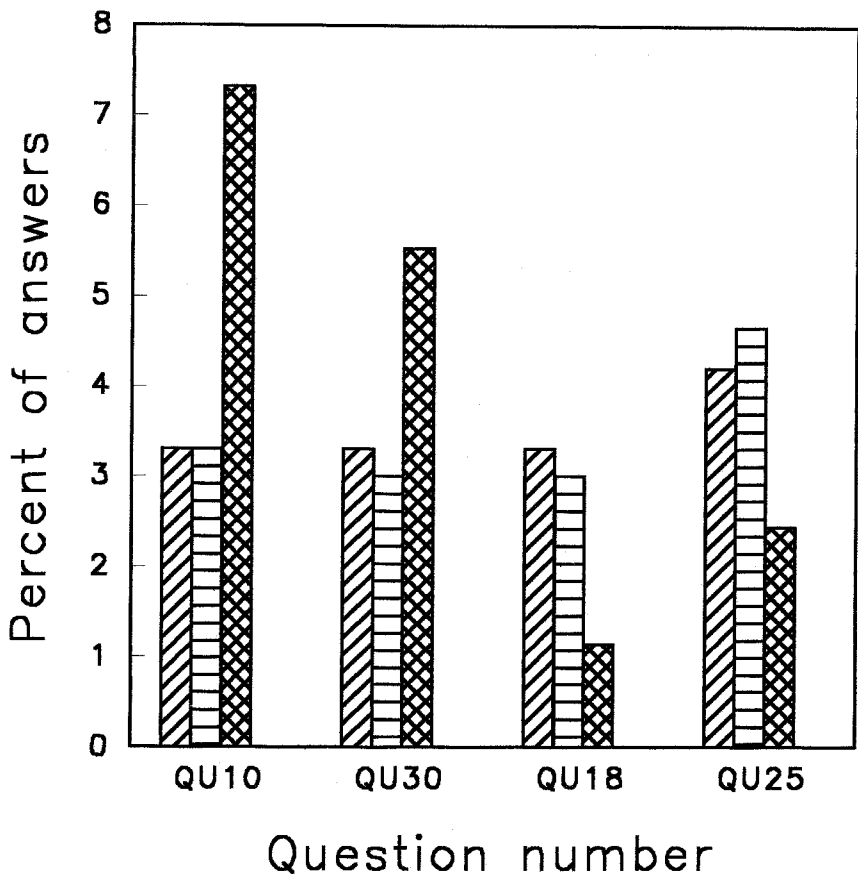


FIG. 2. The proportion of answers to each question by the currently reported group (diagonal shading), the recall group of Eacott and Crawley (1998) (horizontal shading), and the report group of Eacott and Crawley (1998) (cross-hatched).

proportion of participants answering question 10 differed significantly between the groups ($\chi^2=10.59$, $df=2$, $P<.01$), although the proportion answering both questions 30 and 18 approached significance (question 30: $\chi^2=5.32$, $df=2$, $0.05<P>.1$, question 18: $\chi^2=5.95$, $df=2$, $0.05<P>.1$). There was no significant difference between the groups in the proportion who answered question 25 ($\chi^2=4.6$, $df=2$, $P>.1$).

DISCUSSION

We have previously reported (Eacott & Crawley, 1998) that participants who were aged between 2:0 and 2:3 claimed to have significantly fewer memories about the birth of a sibling than those who were older at the time but

nevertheless did report many memories. Our present data reveal that participants who were between 1 and 2 years old at the time of their sibling's birth also claim to recall a similar number of events. One is left with two possible conclusions: that these reports are genuine memories or that they are false memories, perhaps reconstructions from other sources of knowledge about the events. It is possible that, faced with autobiographical questions about which the participant will have a great deal of family knowledge (Eacott & Crawley, 1998), there is a baseline level of spontaneous false memories; that is, a baseline level of participants mistaking information they have from other sources for autobiographical memories. This argument would suggest that all the memories produced by those aged under 2;4 at the time of their sibling's birth (from Eacott & Crawley, 1998, and the currently reported data) were false memories. In support of such a view, false memories are known to be more common for events that are familiar to the participant rather than those about which they know little (Pezdek, Finger, & Hidge, 1997). The events that were asked about in this study certainly involved a familiar scenario (a family birth) and highly familiar participants (family members), and concerned events that we know are familiar to participants who can have no personal memory of the events (Eacott & Crawley, 1998). In addition, mistaking the source of information, such as mistaking imagined or heard-about events for directly experienced events, is more common when the events occurred long ago, particularly during childhood (Johnson, Foley, Suengas, & Raye, 1988; Schacter, Kaszniak, Kihlstrom, & Valdiserri, 1991). Thus, the situation is one in which reconstructions, or false memories, might reasonably be expected to occur. If one were to accept this argument, it suggests that the lower but consistent level of memories reported by adults for events that took place before the age of 2;4 involved false memories based on reconstructions.

However, several pieces of evidence argue against this interpretation of our data. The first is that each of our participants was carefully instructed to report only things that they remembered and not things they knew from other sources. We have already reported data (Eacott & Crawley, 1998) that suggest that our participants had a great deal more information about the events available to them than they reported in this study. Thus they did not simply mistake all the information they knew for autobiographical memories. Second is the fact that the information produced by this age group was verified (and denied) at a similar rate to that produced by those who were older at the time of the birth, many of whom can be expected to have some genuine memories. However, one should bear in mind that those with no memories of the event, who are reporting knowledge gleaned from other sources, are also able to produce a high level of verified information (Eacott & Crawley, 1998). This may suggest that maternal verification itself is not a good way of distinguishing between true and false memories, possibly because the source of the information produced by those in the report group was based heavily on information from the mother in the first

instance. In addition, the current data on maternal verifications are based on a relatively small number of cases. However, the final piece of evidence is based on the pattern of information produced. Eacott and Crawley (1998) noted that, although those who were recalling the events and those who were reporting known facts produced a similar pattern of information overall, there were some questions that were answered in a significantly different way by the two groups. Those who were under the age of 2 at the time of their sibling's birth produced a pattern of information that was remarkably similar to that produced by the recall group and significantly different from that produced by the report group. This evidence suggests that information that is available from other sources (such as schemas and family lore) provides a different pattern of information from that produced by actual memories. Those who were under the age of 2 at the time of the events investigated here recalled quantitatively different information, but it was qualitatively similar to those who were older at the time of the sibling birth.

The evidence produced here has implications for one's understanding of memory for personally experienced events that take place in the first few years of life. Although it is known that memories for the first three years of life are relatively rare (Waldvogel, 1948), we have previously reported a sharp decrease in the number of memories that could be reported from the ages of 2:0 to 2:4 (Eacott & Crawley, 1998). The current data only highlight the sharpness of this change by confirming a very similar low level of reported memories in those who were aged below 2:0 at the time of the remembered events. This suggests that there is some rapid change in the ability to lay down long-lasting memories of salient personally experienced events around this time. In addition, the current data suggest that below this age, while there is a genuine paucity of memories, those memories that exist are qualitatively similar to memories of later events. Mothers' verifications suggest that they are also as accurate as later memories. These findings may have implications for understanding the memory system in operation before this rapid change in abilities at around 2:4. Some theories of childhood amnesia suggest that the memory system operating before the offset of childhood amnesia is qualitatively different from that operating later (e.g. Nadel & Zola-Morgan, 1984). Our results would suggest that this may not be the case. The type of memory is very similar, it is just less commonly available. In support of such a view, these earliest memories are also less consistent (Crawley & Eacott, *in press*). Theories that propose a difficulty in storing or organising memories (e.g. Fivush, Haden, & Adams, 1995; Nelson, 1993) which allows them to be more easily lost or less easily retrieved, may prove more consistent with these data than those that suggest that the operation of memory is qualitatively different during the period of childhood amnesia.

In conclusion, therefore, we have shown that it is not unusual for an adult to claim to have memories about events that took place in their second year of life. A significant proportion of these claims will be verified as accurate by their mother and relatively few will be specifically denied. The pattern of data

suggests that the memories of those who were below 2;0 are qualitatively similar to the memories of those who were older at the time of the events, and dissimilar in type from those who are basing their reports on reconstructions from family knowledge. Although we lack any absolute index of the veracity of a memory, this finding may be evidence that memories of events that occurred before the age of 2 years are genuine but rare.

Manuscript received 3 April 1998

Manuscript accepted 12 October 1998

REFERENCES

- Brown, N.R., Ripps, L.J., & Shevel, S.K. (1985). The subjective dates of natural events in very-long-term memory. *Cognitive Psychology*, 17, 139–177.
- Crawley, R.A., & Eacott, M.J. (in press). Memory for early life events: Consistency of retrieval of memories over a one year interval. *Memory*.
- Dudycha, G.J., & Dudycha, M.M. (1941). Childhood memories: A review of the literature. *Psychological Bulletin*, 38, 668–82.
- Eacott, M.J., & Crawley, R.A. (1998). The offset of childhood amnesia: Memory for events that occurred before age 3. *Journal of Experimental Psychology: General*, 127, 22–33.
- Fivush, R., Haden, C., & Adams, S. (1995). Structure and coherence of preschoolers' personal narratives over time: Implications for childhood amnesia. *Journal of Experimental Child Psychology*, 60, 32–56.
- Freud, S. (1916/1963). Introductory lectures on psycho-analysis. In J. Strachey (Ed. & Trans.), *The standard edition of the complete psychological works of Sigmund Freud* (Vol. 15, pp. 199–201). London: Hogarth Press.
- Howe, M.L., & Courage, M.L. (1993). On resolving the enigma of infantile amnesia. *Psychological Bulletin*, 113, 305–326.
- Johnson, M.K., Foley, M.A., Suengas, A.G., & Raye, C.L. (1988). Phenomenal characteristics of memory for perceived and imagined autobiographical events. *Journal of Experimental Psychology: General*, 117, 371–376.
- Nadel, L., & Zola-Morgan, S. (1984). Infantile amnesia: A neuro-biological perspective. In M. Moscovitch (Ed.), *Infant memory* (pp. 145–172). New York: Plenum Press.
- Nelson, K. (1993). Explaining the emergence of autobiographical memory in early childhood. In A.F. Collins, S.E. Gathercole, M. Conway, & P.E. Morris (Eds.), *Theories of memory* (pp. 355–385). Hove, UK: Lawrence Erlbaum Associates Ltd.
- Pezdek, K., Finger, K., & Hodge, D. (1997). Planting false childhood memories: The role of event plausibility. *Psychological Science*, 8, 437–441.
- Schacter, D.L., Kaszniak, A.K., Kihlstrom, J.F., & Valdiserri, M. (1991). The relation between source memory and aging. *Psychology and Aging*, 6, 559–568.
- Sheingold, K., & Tenney, Y.J. (1982). Memory for a salient childhood event. In U. Neisser (Ed.), *Memory observed* (pp. 201–212). New York: Freeman.
- Usher, J.A., & Neisser, U. (1993). Childhood amnesia and the beginnings of memory for four early life events. *Journal of Experimental Psychology: General*, 122, 155–165.
- Waldvogel, S. (1948). The frequency and affective character of childhood memories. *Psychological Monographs*, 62 (4, Whole No. 291).