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ABSTRACT

How various types of repetition influence the development of memory for real-world events was investigated in a naturalistic case study of a 2-year-old's autobiographic memories as revealed in mother-child conversation recorded when the child was between 21 and 27 months of age. Two types of repetition were studied: repeated recall of the same event, and repeated experiences with the general activity of remembering. From the total corpus of conversational data, 75 memories were selected for analysis. Results demonstrate the importance of learning to talk about the past in the development of memory and indicate that individual, autobiographic memories--independently of effects of repetition and rehearsal--are well established at an early age. In repeated conversations about the past, the child was learning how to remember, not what to remember; the structure of remembering was acquired, rather than specific content. (RH)

A longitudinal study of memory talk in mother-child conversation

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How does repetition affect autobiographic memory? Clearly it does. In general, the more times we are asked to remember an event, the better we are at doing so. This phenomenon has been observed in adults' autobiographic memory (e.g. Linton, 1978) and is consistent with what we know about memory in general. Rehearsal improves recall. But how does it improve recall? When a child is trying to remember a list of words, repeating the words over and over again is likely to increase the ability to retain those words in short term memory. But what about long-term autobiographic memory? In this case, the event is experienced not as too-be-remembered material, but as a part of one's life. The goal of remembering is not usually to perform in a memory talk defined by an experimenter, but to reminisce about an experience for the benefit of oneself or as a social activity with someone else. The question I am pursuing is how various types of repetition influences the development of memory for real-world events.

This study examines effects of two types of repetition. The first type of repetition refers to repeated recall of the same event. In this case, I am interested in how memory for the same event changes over time and as a result of repeated recall. The second type of repetition refers to repeated experiences with the general activity of remembering. That is, how do frequent opportunities for reminiscing affect the ability to retrieve autobiographic memories?

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The study is a naturalistic case study of a two-year old's autobiographic memories as revealed in mother-child conversation from 21 to 27 months of age. The data consist of mother-child conversations about past events recorded at approximately bi weekly intervals Conversations were initiated by the mother and usually took place at mealtimes. Each conversation lasted from about 3 to 20 minutes and covered 1 to 6 events. The events were 0 to 93 days old. From the total corpus, 75 memories were selected for analysis. These represented recall of 76 specific, one-time events. For example, a visit to the library was not included because this tended to occur fairly frequently and it was difficult to distinguish particular visits.

Analyses focussed on two issues. First, how did the conversations change over time? Presumably changes in the conversational structure reflected the child's increasing language skills as well as effects of repeated reminiscing, the second type of repetition. Second, events that were recalled more than once were selected for analysis of effects of repeated recall of the same event, the first type. It was hypothesized that initially, the mother would provide much of the information about what happened, but as the event was remembered over and over again, the child would eventually incorporate information into her spontaneous recall. After repeatedly recalling the same event, what the child could remember would largely be based on what had been discussed in prior conversations.

In order to examine the structure of the recall conversations over time and repeated recall, the different contributions of the mother and child were coded. This coding scheme is shown in Table 1 with the mean percentages of each participants' contributions and correlation coefficients for these

percentages correlated with the child's age. As you can see, the mother tended to ask questions, (mostly yes/no questions and requests for information which were who, what, and where questions), repeated the child's statements, and occasionally offered information, asked for clarification and provided verification. The child's contributions largely consisted of answering questions posed by the mother although she also offered information and sometimes repeated herself on her mother. (The no response category is included here to show how many questions asked by the mother were not answered, but were not included in the computations of the overall percentage of each type of response.)

Table 1 also shows that there were few changes in the mothers' contributions over time, while there were many changes in the child's responses. For example, the only significant correlations with age for the mother's contributions showed that the mother tended to repeat herself or previously mentioned information less over time and provided more verifications of the child's contributions. The proportions of each type of question were not correlated with age. However, with age, the child produced fewer yes/no responses (despite the fact that the proportion of yes/no questions did not vary), provided more information both spontaneously and in response to the mother's requests, repeated herself and her mother more, was less likely not to respond to a question, and produced fewer unintelligible responses.

These findings suggest that the child changed her interpretation of the questions over time. This interpretation is supported by examining how the child responded to different types of questions with age. A general question

(e.g., "What happened when we went to the beach?") could produce either no response or an offer of information. She could respond to a request for information with no response, producing the requested information, or by offering some different information. And yes/no questions could elicit no response, a yes or a no, or an offer of information. As shown in Table 2, with age, the child was less likely to respond with a no response to a request for information and was more likely to provide information when asked In addition, the child was more likely to interpret a yes/no question as a result for information instead of a request for a simple yes or no response. The major developments with age and repeated remembering were that the child provided more information about the events being remembered despite the fact that the structure of the mother's contributions did not change as much.

In looking at the overall interaction within a conversation, it appeared that the mother did in fact provide most of the information. But instead of simply stating information, she asked yes/no questions, for example, "Did you see Aunt Gail yesterday? Did you ride in a car? Did you eat ice cream?" In this way, she is setting up a question-answer format and providing the child with a model of what kinds of information to report. When the child did not respond to a question, another one was offered (usually a more specific one), for example, "Who else was there? Was Uncle Tim there?" From this type of scaffolding, the child learned how to participate and over time, and provided more information in response to the questions. So initially, the questions asked by the mother modelled the kind of information that should be provided and set up a dialogue framework. Later, the child responded to the same types

of questions as requests for information and offered more information spontaneously. At this point, the mother provided more verifications (e.g. "Yes, that's right") and did not have to repeat herself and previously mentioned information as much as before. The change in structure of this type of interaction over shows that the child was, in fact, learning to talk about the past in a particular type of format.

What about repeated recall of the same events? These analyses are based on 15 events repeated 2-6 times for a total of 42 observations. Contrary to expectations, there was relatively little overlap in information from one conversation to the next. Consistency scores based on the number of overlapping pieces of information divided by the total number of information units divided by 2 showed that the mean consistency score was only .39 (a score of 0 would indicate no overlap and a score of 1.00 would indicate total overlap). Thus less than half of what was talked about had been discussed in the prior conversation.

When consistency scores were computed separately for the mother's and child's contributions, the mother's consistency score was .35 and the child's was .17. The low consistency score for the child could reflect two things. Either she mentioned a lot of new information in each conversation (that is, information that had not been brought up before) or she was repeated much of what the mother had said before. In fact, only 22% of the child's contributions repeated the mother's contributions, 34% repeated what the child had mentioned before, and 44% was new information that had not previously been mentioned by the mother or the child. Thus, it seemed that the child was not simply remembering what had been discussed before, but was actually providing

new information in repeated conversations about the same event.

This requires us to pay more attention to the child's role in remembering it was not entirely mother-directed. However, the mother did play an important role. The conversations consisted largely of the mother asking questions and the child responding. Did what the child was able to remember influence what the mother asked about. The answer seems to be yes. Table 3 shows the data on whether or not the mother repeated a given question after eliciting or failing to elicit a response from the child. Questions (both yes/no questions and requests for information) that the child did not respond, to were only repeated 23 and 36 percent of the time. If the child did respond, the question was repeated 44 and 46 percent of the time. So even though there was relatively little overlap in exactly what was dicussed each time, the likelihood of the mother repeating a question was influenced by the child's past performance in answering the question.

In sum, these findings indicate that in this particular interaction (which is similar to the reminiscers in Engel's, 1986, study), remember in an interactive process. Although the mother is orchestrating the performance of the child to a large degree, the child is still learning to remember, not merely to repeat what has been said before. This study demonstrates the importance of learning to talk about the past in the development of memory, and at the same time, indicates that individual, autobiographic memories independent from effects of repetition and rehearsal are well established at an early age. In repeated conversations about the past, the child was learning how to remember, not what to remember -- that is, the structure of remembering, not the specific content.

References

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TABLE 1: PROPORTIONS OF EACH PARTICIPANTS' CONTRIBUTIONS CORRELATED WITH CHILD'S AGE

MOTHER:	MEAN	S.D.	R
GENERAL QUESTION	4.5	5.6	-.09
REQUEST FOR INFORMATION	19.5	13.8	-.11
YES/NO QUESTION	39.1	14.8	-.03
OFFERS INFORMATION	4.4	4.9	.09
REPETITION (MOTHER)	.1	.8	-.25*
REPETITION (CHILD)	19.0	12.9	.05
REPETITION (INFORMATION)	.5	1.3	-.23*
CLARIFICATION	4.3	5.1	.04
VERIFICATION	9.3	7.8	.21*

CHILD:	MEAN:	S.D.	R
YES/NO RESPONSE	44.3	17.4	-.42**
PROVIDES INFORMATION	10.6	10.1	.23 *
OFFERS INFORMATION	27.1	16.3	.25*
REPETITION (MOTHER)	4.0	6.8	-.17
REPETITION (CHILD)	6.0	7.6	.26*
REPETITION (INFORMATION)	1.7	3.4	.34**
NO RESPONSE	26.3	25.0	-.33**
UNINTELLIGIBLE	5.4	8.0	-.33**

*$P < .05$

**$P < .01$

TABLE 2: CHILD'S RESPONSES TO MOTHER'S QUESTIONS CORRELATED WITH CHILD'S AGE.

TYPE OF QUESTION	RESPONSE	R
GENERAL	NO RESPONSE	-.19
	OFFERS INFORMATION	.20
REQUEST FOR INFORMATION	NO RESPONSE	-.25*
	PROVIDES INFORMATION	.22*
	OFFERS INFORMATION	.13
YES/NO QUESTION	NO RESPONSE	-.17
	OFFERS INFORMATION	.26*
	YES/NO	-.15

* $P < .05$

TABLE 3: EFFECTS OF CHILD'S RESPONSE TO MOTHER'S REPETITION OF QUESTIONS.

QUESTION	RESPONSE	PERCENT REPEATED
YES/NO QUESTION	RESPONSE	48%
	NO RESPONSE	23%[A]
REQUEST FOR INFORMATION	RESPONSE	44%
	NO RESPONSE	36%[B]

[A] χ^2 (1) = 29.16, $p < .001$

[B] χ^2 (1) = 7.84, $p < .01$