Autobiographical fluency: A method for the study of personal memory

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Fifty-five subjects recalled autobiographical episodes or personal facts such as names of friends and teachers, from different lifetime periods. In each case, subjects were given 90 sec in which to retrieve as many items as possible. Also tested was subjects' fluency in generating items from semantic categories (animals, vegetables, British prime ministers, and U.S. presidents). Results of cluster analysis on the fluency tasks showed a dissociation between subjects' ability to retrieve personal episodes, personal semantic information, and nonpersonal semantic information. The dissociations observed in the fluency tasks are interpreted in terms of the different retrieval strategies required for the different types of information sought.

In recent years, there has been a resurgence of interest in autobiographical memory, or the capacity to recollect the personal events of one's life (Rubin, 1986). Much of this work on autobiographical memory has been done with a modification of Galton's technique (Galton, 1883) in which subjects are provided with a cue word and asked to retrieve an associated event (Crovitz & Schiffman, 1974). Although this method has been successfully employed in many investigations of autobiographical memory in normal, elderly, brain-damaged, and emotionally disturbed individuals (Baddeley & Wilson, 1986; Crovitz, 1986; Robinson, 1986; Rubin, Wetzler, & Nebes, 1986; Williams & Dritschel, 1988; Williams & Scott, 1988), there are reasons for wanting to use an alternative methodology for investigating autobiographical memory. That is, there is a need to have additional methods of assessing autobiographical memory besides the Galton technique, in order to avoid the biases in retrieval that are associated with one given method. Further key theoretical issues in autobiographical memory remain to be addressed, such as the relationship between subject's ability to retrieve (nonpersonal) semantic information and their ability to retrieve different types of personal information, namely personal episodic and personal semantic. Personal *episodic* information refers to single incidents, while personal *semantic* information is information repeatedly experienced by the subject (e.g., one's name). The aim of present study, therefore, was to use an alternative methodology that would enable us to address the theoretical issues described above.

Consider in further detail our motivation for developing an alternative methodology. First, there is some evidence to suggest that the Galton technique may bias the type of memories that are retrieved in a number of ways. When Rabbitt and Winthorpe (1988) compared the results of recollection in response to a cue and in response to a

general invitation to recall past events, they found that there were several differences between the qualities of memories produced in cued situations and those produced in uncued situations. Cuing reduced the number of memories retrieved and made the memories less vivid, less emotional, and less likely to have been spontaneously rehearsed. Some researchers (Rubin, personal communication) argue that this bias may be advantageous, because the resulting sample may be more representative of stored information than the overly vivid memories. Nonetheless, the bias does exist. Rabbitt and Winthorpe (1988) further suggest that subjects may be predisposed to retrieve memories from the recent past even though recent and remote memories may be equally accessible. Retrieving a single event tends to cue other related memories, and often the memories are close together chronologically. Therefore, the memory search concentrates unevenly on the different lifetime periods (Baddeley & Wilson, 1986; Rabbitt & Winthorpe, 1988). Any temporal gradient obtained from a task that does not constrain the subject to recollect from specific life periods may thus reflect biases in recollection rather than a capacity to recollect from that period.

Some biases associated with retrieval in the cuing technique can be handled by modifying the cuing method. Kopelman, Wilson, and Baddeley (1989, 1990), for example, changed the problem of temporal bias by constraining the lifetime period from which memories were requested, systematically sampling across the whole life span. However, there still seemed to be a need to develop another methodology that would enable one to address theoretical issues in autobiographical memory that were beyond the scope of the Galton cuing task in addition to overcoming the biases associated with this particular task. First, we wanted to compare subjects' ability to retrieve autobiographical information with their ability to retrieve general (nonpersonal) semantic information. In order to achieve this, it was necessary to find a method in which the demands of the task would remain constant while the information sought varied.

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Second, as well as wanting to examine autobiographical versus nonautobiographical information, we wanted (because of the implications for neurological impairment) to see whether there was evidence of dissociation within autobiographical memory between subjects' abilities to retrieve different types of personal information. This requirement made even a modified Galton cuing method inappropriate for our needs. The Galton task is limited by the fact that it focuses exclusively on the aspect of autobiographical memory that corresponds to Tulving's "episodic" memory. Yet "autobiographical memory" is a wider concept than a personal episodic memory (Brewer, 1986). For example, even if we were reluctant to call knowledge of our own name and address "autobiographical memory," how would we categorize our memory for a maiden name or for previous addresses? And how would one categorize names of friends or teachers one had as a child? As has been suggested for "semantic" memory in general (Tulving, 1984), this information may once have been linked to particular contexts and coded episodically, but now it appears as part of the personal semantic information about one's past. Thus we decided to examine both personal episodic information, or memory for single incidents, and personal semantic information, or that which is repeatedly experienced by the subject.

There have been few attempts to distinguish between episodic and semantic aspects of personal memory or to investigate how either of these aspects of personal memory relate to general semantic knowledge. The exception consists of research on memory deficits in brain-damaged patients, where a range of memory abilities has been assessed. Some work in this field has claimed to show that amnesics have normal semantic memory but impaired episodic memory (e.g., Schacter & Tulving, 1982). Recognition of methodological differences between the episodic and semantic task, such as differences between the times when the material has been encoded (Baddeley, 1984) has prompted further, more systematic investigations involving a broader range of patients (Baddeley & Wilson, 1986; Zola-Morgan, Cohen, & Squire, 1983). This later research has questioned the conclusion that dissociations between different aspects of amnesics' memory deficits support the separation into episodic and semantic memory systems. Research on this aspect of autobiographical memory is at the point, therefore, at which it has three problems: the reliable assessment of autobiographical memory from different lifetime periods; the assessment of a range of different types of autobiographical information; and the assessment of possible associations between personal and nonpersonal information.

In a recent study, Borriani, Dall'Orra, Della Sala, Marinelli, and Spinnler (1989) attempted to assess autobiographical memory across the life span, using a structured standardized questionnaire that was divided into three sections, each of which elicited personal knowledge within a strict time period (up to age 15; up to age 40; and over age 40). Using the structured interview with 157 healthy subjects over 55 years of age, they discovered that questions from different lifetime periods could be found that

were of equal difficulty. However, the Borriani et al. (1989) instrument, though providing useful normative data, mixed personal semantic memory (e.g., Can you remember your first bike?) with personal episodic memories (e.g., Can you remember any particular ceremony you took part in during the period between 16 and 40 years of age?). Thus it did not distinguish between the semantic and episodic components of personal memory.

An alternative semistructured interview to examine memory across the life span has been developed by Kopelman et al. (1989, 1990). Their instrument addressed both episodic and semantic aspects of personal memory over various periods of the subject's life. It controlled for age of acquisition but also separated episodic from personal semantic memory by eliciting memories for specific events and personal semantic information (names of friends or teachers) from the same lifetime periods (i.e., preschool, primary school, secondary school, early adult life, recent). Kopelman et al. (1989) used the interview with 23 amnesic patients (19–78 years of age) and 16 healthy controls matched for age and for estimated premorbid intelligence. Their results suggested that no clear-cut distinction could be made between autobiographical events and personal semantic facts. Patients who were most impaired in recollecting episodes were also most impaired in recollecting personal semantic information (e.g., names of friends).

While Kopelman et al. (1989) found that both episodic and personal semantic memory differed between normal controls and patients, there are problems in concluding from these data that no distinctions within autobiographical memory exist. The pattern of deficits in this group of patients of heterogeneous diagnosis and age may obscure genuine dissociations. Furthermore, because the main aim of Kopelman et al.'s experiment was to devise a test that would detect patients with retrograde amnesia, the normal controls scored at ceiling. This could have obscured any dissociations that might otherwise have been found. Third, there were not sufficient subjects in this study to perform a cluster analysis on the data. Finally, although the test questions were designed to sample different aspects of personal memory, the subjects were not assessed with more conventional measures of semantic memory, so the correlation of the personal and nonpersonal aspects of memory is unknown.

The present paper describes a development of the Kopelman et al. (1989) schedule in which the problems of a ceiling effect are avoided by requiring subjects to produce as many items as possible from the various components of the test. This results in a task analogous to generation of category members or verbal fluency and resembles a method used by Battig and Montague (1969) for determining "instance dominance." However, in the present task, the information required is autobiographical; subjects are probed, using lifetime periods, separately for personal episodic memories of specific events and for "personal semantic" information such as names of friends, colleagues, or teachers. Conway and Bekerian (1987) found lifetime periods to be an effective probe for eliciting autobiographi-

Table 1
Tasks Included in Personal Memory Information Section

Time Period	Information Requested
Preschool	Events
Primary school (age 5-11)	Friends' names Teachers' names Events
Secondary school (age 11-16/18)	Friends' names Teachers' names Events
Five years postschool	Other peoples' names (friends', colleagues', etc.) Events
Current	Other peoples' names (friends', colleagues', etc.)

cal information. The number of items generated from the different types of information and different lifetime periods are then analyzed using cluster analysis in order to obtain an indication of possible dissociations within autobiographical memory. We compared the autobiographical fluency data with the results of tests involving more conventional category generation, hence allowing us to examine the relationship between measures of autobiographical and semantic memory.

METHOD

Subjects

The subjects consisted of 55 volunteers from the Medical Research Council Applied Psychology Unit's subject panel. There were 6 males and 49 females. The mean age of the subjects was 45.9 years, with a range from 38 to 55. This narrow range was selected to minimize the variability in ages of the memories and distribution of memories across the life span that would have occurred had we required subjects of widely differing ages to recall their early life.

Materials and Procedure

Subjects were tested individually in the autobiographical fluency task. The experimenter explained that the task involved recalling events and names of people from certain periods of the subjects' lives and also generating members of several semantic categories. The subjects were then given a lifetime period and asked to recall events from the period first, followed by names of people from it. For the recall of events, the instructions emphasized that no detail was required; subjects who remembered visiting someone when they were children were told just to say "visiting 'so and so'" and then to pass on to another memory. In other words, subjects were encouraged to report on something even if they only had a vague recollection or fleeting image of it. For the recall of names of other friends or teachers, subjects were simply instructed to "tell me all the names of (teachers) you can remember." The different categories of autobiographical information requested are shown in Table 1. The personal memory questions were always presented in the order given in Table 1; subjects were then instructed to generate items from four semantic categories, namely vegetables, animals, U.S. presidents' names, and British prime ministers' names, always in that order. Subjects were given a category and were allowed 90 sec for each task, recorded by stop watch. The score on each task was the total number of responses given, excluding any repetitions. It must be noted that the score for the personal information in no way reflected whether or not the response was accurate due to difficulties with verification. However, for the semantic tasks, only accurate recollections were used.

RESULTS

Personal Memory Listing Task

The mean numbers of items listed for the personal memory and the semantic tasks are shown in Tables 2 and 3.

Within-subject one-way analyses of variance performed on the individual items comprising the events, friends' names, teachers' names, and semantic tasks, respectively, yielded highly significant results [events, $F(3,159) = 13.30, p < .001$; friends, $F(3,162) = 53.66, p < .001$; teachers, $t(53) = -5.15, p < .001$; semantic, $F(3,162) = 366.98, p < .001$], and follow-up analyses were therefore conducted with paired t tests. Within the events task, significantly fewer preschool events were retrieved relative to primary events [$t(53) = -3.76, p < .001$], secondary events [$t(53) = -4.35, p < .001$], and postschool events [$t(53) = -5.29, p < .001$]. Furthermore, significantly fewer events from primary as opposed to secondary school were also listed [$t(53) = 2.38, p < .02$]. The main differences emerging from the friends' name task was that significantly more names of current friends as opposed to names of primary school friends [$t(54) = 9.32, p < .001$], secondary school friends [$t(54) = 8.64, p < .001$], and postschool friends [$t(54) = 8.55, p < .001$] were retrieved. The differences in the teachers' names category resulted from subjects producing significantly more teachers' names from secondary as opposed to primary school [$t(53) = 5.15, p < .001$]. Finally, for the semantic tasks, subjects listed significantly more vegetables than animals [$t(54) = 7.42, p < .001$] and

Table 2
Number of Items Reported (in 90 sec)
on Personal Memory Task

Time Period	Personal Semantic					
	Events		Friends' Names		Teachers' Names	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Preschool	6.0	3.2				
Primary school	7.5	2.8	10.5	4.9	5.4	3.6
Secondary school	8.0	2.9	11.4	4.8	9.4	5.1
Five years postschool	8.2	3.1	10.9	4.3		
Current			20.1	7.4		

Table 3
Number of Items Reported (in 90 sec) on Semantic Task

	Vegetables		Animals		Presidents' Names		Prime Ministers' Names	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
General semantic	19.7	4.8	25.5	6.5	6.6	1.8	7.2	2.0

more names of prime ministers than of presidents [$t(54) = 2.60, p < .05$].

These data reveal that subjects could list a large number of events and names of personal acquaintances from early lifetime periods and that the total number of items recalled in each task appeared to increase as the recall period became more recent. In addition, the data also indicated that the number of items produced is generally higher for personal semantic (except for the names of primary school teachers) than for personal episodic memory. The latter finding could reflect the fact that personal semantic information is more memorable than episodic information, since it is based on more experiences.

Table 4 gives the correlation between the individual autobiographical and semantic fluency tasks. The correlations were generated by correlating amount recalled for each pair of tasks across subjects. Note that out of 91 correlations, only 2 were negative (both of which involved current friends' names). The strong trend for positive correlations suggests that, in general, people who were fluent on one aspect of memory were fluent on others. Since fluency is operationally defined in terms of items output per unit time, this fluency probably reflects both capacity and effort.

Relationship between Performance on Personal Memory and Semantic Tasks

To explore the structure of the pattern of retrieving personal memory and semantic tasks, a proximity similarity measure between pairs of tasks was calculated and analyzed. The proximity measure was the city-block measure of similarity (Payne et al., 1988). For each task, all subjects' scores were standardized to range from 0 (minimum) to 100 (maximum). Dissimilarity indices between standardized profiles were calculated by measuring for each task pair the average absolute difference between the standardized scores of the two tasks across all subjects. The resulting dissimilarity indices were transformed into similarity indices by subtracting the individual indices from 100.

The similarity index reflects the degree to which subjects have the same relative fluency for the pairs of tasks. The index is closely related to a correlation, though using absolute differences rather than their squares, and as such it is more representative of typical agreement. Furthermore, the index is less likely to be dominated by assigning too great a weight to the largest discrepancies.

A hierarchical representation was constructed from these similarity indices by applying a complete link cluster analysis (Payne et al., 1988). The resulting representa-

tion is shown in Figure 1. As can be seen, there seem to be two distinct clusters: one consists of the personal memory tasks; the other consists of the semantic tasks. Within the personal memory cluster, all the events clustered together to form an autobiographical episodic memory group. There was also a separate personal semantic cluster of teachers' names and of friends' names, the only exception being that names of postschool friends appear to form a separate subcategory. Similarly, within the semantic tasks, the common objects (vegetable and animal names) and the presidents'/prime ministers' names formed separate clusters.

In order to gain some indication of the stability of this pattern, we reanalyzed the data in two ways. First we split the group into two halves: Set A, based on the first 29 subjects tested, and Set B, based on the remaining 26 subjects. While the smaller *N*s are likely to reduce the stability of the pattern, if the clustering is reliable, we would expect to see broadly similar structures. The results suggested an encouraging degree of correspondence, and hence argued for the reliability of the pattern of clusters shown in Figure 1.

A second analysis, which was concerned with the temporal development of the pattern of results, involved performing a cluster analysis of the number of items produced for each task in the first 30 sec and first 60 sec. In this case, the pattern was much less stable, with the clustering of output after the initial 30 sec showing a rather incoherent picture, while the pattern after 60 sec began to approach the 90-sec condition, but with a number of anomalies.

In order to qualify the interpretation of the cluster analysis, an analysis of variance was performed on the similarity indices between pairs of tasks broken down into three major categories: the within-category group of personal information (personal memory tasks with personal memory tasks), the within-category group of semantic information (semantic tasks with semantic tasks), and the between-category group of personal-semantic information (personal memory tasks with semantic tasks). The overall *F* ratio was significant [$F(2,81) = 36.52, p < .05$], indicating that there were differences between the three groupings. The similarity indices for the personal information (79.50) and semantic information (79.22) within categories, respectively, were both significantly higher than for the personal-semantic information between categories [71.90; personal information within category versus personal-semantic information between category, $t(81) = 8.34, p < .05$; semantic information within category vs. personal-semantic information between category, $t(81) = 4.00, p < .05$], confirming the result

Table 4
 Correlations Between the Individual Autobiographical and Semantic Memory Tasks

	Preschool events	Primary school events	Secondary school events	Postschool events	Primary friends' names	Secondary friends' names	Postschool friends' names	Current friends' names	Primary teachers' names	Secondary teachers' names	Vegetables	Animals	Presidents' names	Prime ministers' names
Preschool events	1.00													
Primary school events	.56†	1.00												
Secondary school events	.43†	.65†	1.00											
Postschool events	.54†	.70†	.61†	1.00										
Primary friends' names	.44†	.49†	.38*	.36*	1.00									
Secondary friends' names	.53†	.20	.24	.31*	.47†	1.00								
Postschool friends' names	.14	.12	.18	.16	.33*	.36*	1.00							
Current friends' names	.06	.13	.19	.02	.29*	.33*	.17	1.00						
Primary teachers' names	.41†	.53†	.31*	.22	.52†	.19	.21	.12	1.00					
Secondary teachers' names	.31*	.17	.28*	.22	.53†	.19	.21	.12	.31*	1.00				
Vegetables	.35*	.28*	.37*	.39*	.24	.33*	.09	.17	.23	.23	1.00			
Animals	.31*	.19	.32*	.30*	.21	.33*	.17	.28*	.09	.24	.18	1.00		
Presidents' names	.13	.17	.27*	.17	.22	.16	.005	.09	.30*	.16	.23	.44*	1.00	
Prime ministers' names	.19	.19	.17	.14	.22	.15	.07	.08	.33*	.16	.33*	.52†	.33*	1.00

 * $p < .05$, two-tailed. † $p < .01$, two-tailed.

from the cluster analysis that there is a dissociation between the retrieval pattern for personal information as opposed to semantic information.

The results from the cluster analysis also prompted us to examine differences in similarity indices among the major subcategories constituting the personal information category, namely the similarity indices for the episodic information within category (events with events), the personal semantic information within categories (names of friends and teachers with names of friends and teachers), and the episodic-personal semantic information between categories (events vs. names of friends and teachers).¹ The analysis of variance on the similarity indices for the personal information subcategories resulted in a significant F ratio [$F(2,33) = 14.66, p < .05$]. The similarity index for the within category of episodic information (84.82) was significantly different from the similarity index for the between category of episodic-personal semantic information [$79.93; t(33) = 4.60, p < .05$], providing evidence for the interpretation from the cluster analysis that there is a dissociation between episodic and personal semantic information. It must be noted that the similarity index for the episodic within-category information (84.82) was also significantly different from the similarity index for the personal semantic within-category information [$79.92; t(33) = 5.11, p < .05$], indicating that the episodic cluster was more homogeneous and better defined than the personal semantic cluster. No differences emerged between the similarity index for the personal semantic information within categories (79.92) and the similarity index for the episodic-personal semantic information between category (79.93). Finally, further analyses of variance on subcategories of clusters (e.g., teachers' names vs. friends' names) revealed no evidence for more detailed dissociations between the various subcategories.

DISCUSSION

An autobiographical fluency task was developed that aimed to assess two aspects of personal memory: (1) an episodic component—how easily past personal events come to mind; and (2) a semantic component—how easily knowledge about one's past comes to mind. As in the structured interview of Kopelman et al. (1989), the mean number of events and personal semantic information reported across the different periods from the current interview indicates that there is a temporal gradient in recall across the different lifetime periods. However, the present task goes beyond the Kopelman et al. interview in avoiding ceiling effects with normal subjects, thus allowing us to observe associations and dissociations between different aspects of normal autobiographical memory performance.

The overall demands are similar to those of conventional fluency tasks such as semantic category generation and initial letter fluency. Thus we are in a better position to judge, with this task, what the relations are between the ability to retrieve autobiographical knowledge on the

Figure 1. Cluster analysis of personal memory and semantic tasks. In each task, subjects were given a category and allowed 90 sec to list category members; the score on each task was the total number of responses, excluding any repetitions. The cluster analysis is based on the entire sample.

one hand and ability to retrieve more general nonpersonal knowledge on the other. There was a trend for both components of the autobiographical fluency task (episodic and personal semantic) to show positive correlations with general semantic memory performance. Some people were more fluent in general than others. As we stated earlier, fluency is defined here in terms of items output per unit time. It is likely that individual differences in fluency could result from many factors. We have argued that both capacity factors such as general intelligence or verbal facility as well as effort contribute to the dissociation. Future research should attempt to look at these factors more systematically.

On the basis of their results with memory-impaired patients, Kopelman et al. (1989) cast doubt on the usefulness of an unmodified episodic/semantic distinction in characterizing the effects of organic amnesias. Like others (e.g., Zola-Morgan et al., 1983), they argue that much of the evidence which suggests that episodic memory is affected by amnesia, but that semantic memory is spared (Schacter & Tulving, 1982), fails to take account of the fact that the semantic knowledge in question is typically overlearned and furthermore has been acquired earlier than the episodic information with which it is contrasted.

By separating semantic and episodic components of autobiographical memory, and by asking for both types of information from different life periods, Kopelman et al.

(1989) were able to show for their group of patients that whenever memory for episodes was impaired, so was memory for personal facts acquired during the same time period. Their data, therefore, give no support for the distinction between episodic and semantic aspects of autobiographical memory. The results from the present study as displayed in Figure 1, in contrast, yield positive evidence for a distinction between episodic and semantic aspects of autobiographical memory. While it is hard to know how much weight to give to qualitative differences such as those shown in Figure 1, they do suggest some degree of structure, with generation from semantic tasks such as names of animals and politicians being relatively closely associated and somewhat separate from recall of autobiographical information. This in turn broadly divides into the recall of names and of events.

Observing a dissociation is a necessary, though not sufficient, condition for concluding that one is assessing different domains within a memory system. What can, and what cannot, be concluded on the basis of dissociation has been a subject of much debate (see Tulving, 1984, and peer commentaries—especially those of Baddeley, 1984; Hintzman, 1984; and Roediger, 1984). Most of the evidence discussed in this debate comes from experimental manipulations that affect one task but not another, or from clinical dissociations between abilities on different tasks following brain damage. In both cases the dissociation is

ambiguous, because different tasks are involved in assessing different aspects of systems. It is therefore unclear to what extent dissociation reflects different task demands.

Task demands could also be contributing to the dissociation observed on the fluency task. Subjects might, for example, interpret the same instructions differently for the different categories of tasks. Because the experimenter cannot verify the accuracy of a recollection for personal information but can do so for nonpersonal semantic information, some subjects might adopt a more stringent criterion for reporting information on the nonpersonal as opposed to personal tasks. Similarly, the set size of the categories varies on the fluency task; there are more names of vegetables and animals, for example, than names of British prime ministers. However, findings from the autobiographical fluency task with respect to a dissociation should be more robust than those reported in previous studies. Specifically, the fluency task goes further in minimizing the effects of task demands by always asking subjects to deliberately recollect information as quickly as possible. The principle differences between the tasks consist in whether this information comprises an episode or a fact and in which lifetime period is being sampled. Under these circumstances, it is all the more surprising that a dissociation was observed between personal semantic and personal episodic memory for the tasks involving the retrieval of personal information.

There was another reason why we might not have expected the data to cluster into episodic and semantic categories, and that was the opposing tendency for the memories to have clustered into distinct lifetime periods. It is known that subjects' performance on the Galton-Crovitz tasks is affected by cuing between items of the same lifetime period. Indeed, it has been criticized on these grounds (Rabbitt & Winthorpe, 1988). Furthermore, the autobiographical fluency task that we used was given in sections that corresponded to the lifetime periods. Both semantic and episodic information were sought from the same lifetime period before moving on to the next lifetime period. There was, therefore, ample opportunity for cross-cuing between episodic and more factual information *within* lifetime periods. Finally, Conway and Bekerian (1987) have argued that autobiographical information may be organized in terms of a hierarchy of personal information in the form of categories of lifetime periods and related general events. They based their argument on their empirical work, which demonstrated that retrieval time for autobiographical memories varied depending on whether primed or unprimed semantic cues or personal primes and personal history cues were used. Only personal primes in the form of lifetime periods facilitated the retrieval of autobiographical memories.

Despite this, the cluster analysis did not reveal clustering within lifetime periods. Rather, it showed dissociation (for all lifetime periods) between episodes and personal semantic information, with both being distinguished from general nonpersonal semantic information. It is not

possible to say whether this reflects organizational aspects of memory storage or differences in retrieval strategies.

It might be expected, for example, that different retrieval strategies are required for accessing episodic, personal semantic, and general semantic information, and that the differences in strategies are maintained, whichever lifetime period is being searched. The most likely dimension along which retrieval strategies differ is the extent to which mnemonic cues need to include spatial location and temporal aspects. These will be most important for recollection of episodes and less important for names, where the repetition of the information has stripped them of temporal and spatial specificity to a greater extent, so that accessing through specific spatiotemporal cues will be redundant. Mnemonic cues with specific spatiotemporal information will be least important for general semantic information. Performance on this task will be helped by cues that organize themselves into subcategories (e.g., domestic pets, farm animals, zoo animals, etc.), but little further advantage may be conferred by remembering particular farms or zoos.

In conclusion, the autobiographical fluency tasks provides a useful assessment of different aspects of autobiographical memory without the confounding effect of different types of tasks and without the problem of ceiling effects. It has added to our knowledge, by showing that although in amnesic patients both episodic and personal semantic information are impaired in parallel, nevertheless there is evidence for a dissociation in normals between these two aspects of autobiographical memory, and for a dissociation of both from more standard measures of semantic fluency.

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NOTE

1. Similarity indices based on the postschool friends' names task were excluded from the analysis of variance, because this task produced idiosyncratic results on the cluster analysis.

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