MEMORY FOR PERSONAL EVENTS

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> The unrevealed processes of memory are mysterious. Neither unconscious selection nor uncontrolled hazardry can be held responsible for one's recovery of some moment which emerges - actual as ever - in contrast to the generalized indistinctness wherefrom one elaborates the annals of personal experience.
>
> [Sassoon, 1942, p.103.]

Personal events are occurrences that one takes part in or witnesses. It does not take long to discover that they are no exception to Neisser's dictum, "If X is an interesting or socially significant aspect of memory, then psychologists have hardly ever studied X." (1978, p.4). While a computer search of the ERIC and Dialog data bases using the keyword "memory" turns up tens of thousands of references, qualifiers such as "autobiographical," "event," "personal," or "experience," reduce the catch to almost none. The few articles that are uncovered (e.g. Robinson, 1976) usually comment in turn on the paucity of other publications in the field.

This dearth is remarkable, since memory for events is a major psychological phenomenon, a vital aspect of human existence, and of great social, cultural, and educational interest. Socially, most of us like to recall and relate events, and "I remember that I ..." and "When we ..." are common conversational phrases. Cultural interest is shown by the popularity of memoirs and autobiographies, and is epitomised by the reminiscent style used in the novels of Proust, Sassoon, and Powell. In education, teachers build constantly on students' memories for events, with phrases such as "You remember that last term we ..." and "Have you ever ... ".

Despite the frequent reliance teachers place on students' memories for events, it is not common for them to receive much attention from learning theorists. Exceptions are Gagné and White (1978), who specified them, under the same episodes, as one of four types of element in long term memory, and Schank and Abelson (1977), whose term script refers to generalizations drawn from memories of series of similar experiences.

Since memory for events is so important and interesting, there must be powerful reasons why its study has been neglected. Perhaps it is hard to specify the questions which matter, and perhaps it is hard to develop effective methods for answering them.

Some questions which matter are: 1. What proportion of events can be recalled clearly? 2. Are any events totally forgotten? 3. What characteristics of events affect their recall? 4. How accurate are memories for events? 5. Are events tagged in memory with the date and time of their occurrence? 6. Can previously unrecallable events be recovered, and can previously recalled events be lost? 7. How much do the answers to these questions vary between people?

Loftus (1979) describes evidence about the fourth question, but little attention has been given to the others. The present study concentrates on questions 1, 2, 3, 5, and 6.

It is difficult to develop effective methods because the researcher has to rely on whatever the experimental subject chooses to tell, and because most recollections are uncheckable. Linton (1975, 1979) overcame these problems with a brilliant and controversial technique of studying her own memory with considerable objectivity. Her procedure, with variations, was followed in the present investigation,

which is then a case study of my own memory. As with all case studies, there is a weakness in generalizability, but as Dukes (1965) points out, case studies have a history of effectiveness in memory research going back at least as far as Ebbinghaus (1885), and "may, by clarifying questions, defining variables, and indicating approaches, make substantial contributions to the study of behavior." (Dukes, 1965, p.78).

Procedure

Recording of Events

Almost every day, for a whole year from 27.1.79 to 26.1.80, I selected, haphazardly, an event from that day to record. On some days I picked an ordinary, commonplace event, while on others an unusual one, just as the fancy struck me. At some time during the day I wrote a brief description of the event, in a few lines on an A4 sheet which I headed with a brief descriptive phrase or word (see Figure 1). I then scored the event on 11 scales, from frequency to emotional sensation in Figure 1 by putting a cross on each line, and circled any number of the 40 adjectives on the sheet which applied to the event, or wrote in other appropriate ones.

Perhaps the only scales requiring explanation are Participation and Association with Knowledge. On Participation I restricted myself to five values: passive observer, minor participant, secondary but important participant, among the chief participants, and sole or chief participant. On other scales the cross could be placed anywhere on the line. By Association with Knowledge, I meant the degree to which the event illuminated or was an example of some scientific, societal, literary, or other knowledge I possessed. For instance, an event involving a rainbow scored highly on this dimension because it made me think of the paths of rays of light when refracted and reflected in drops of water.

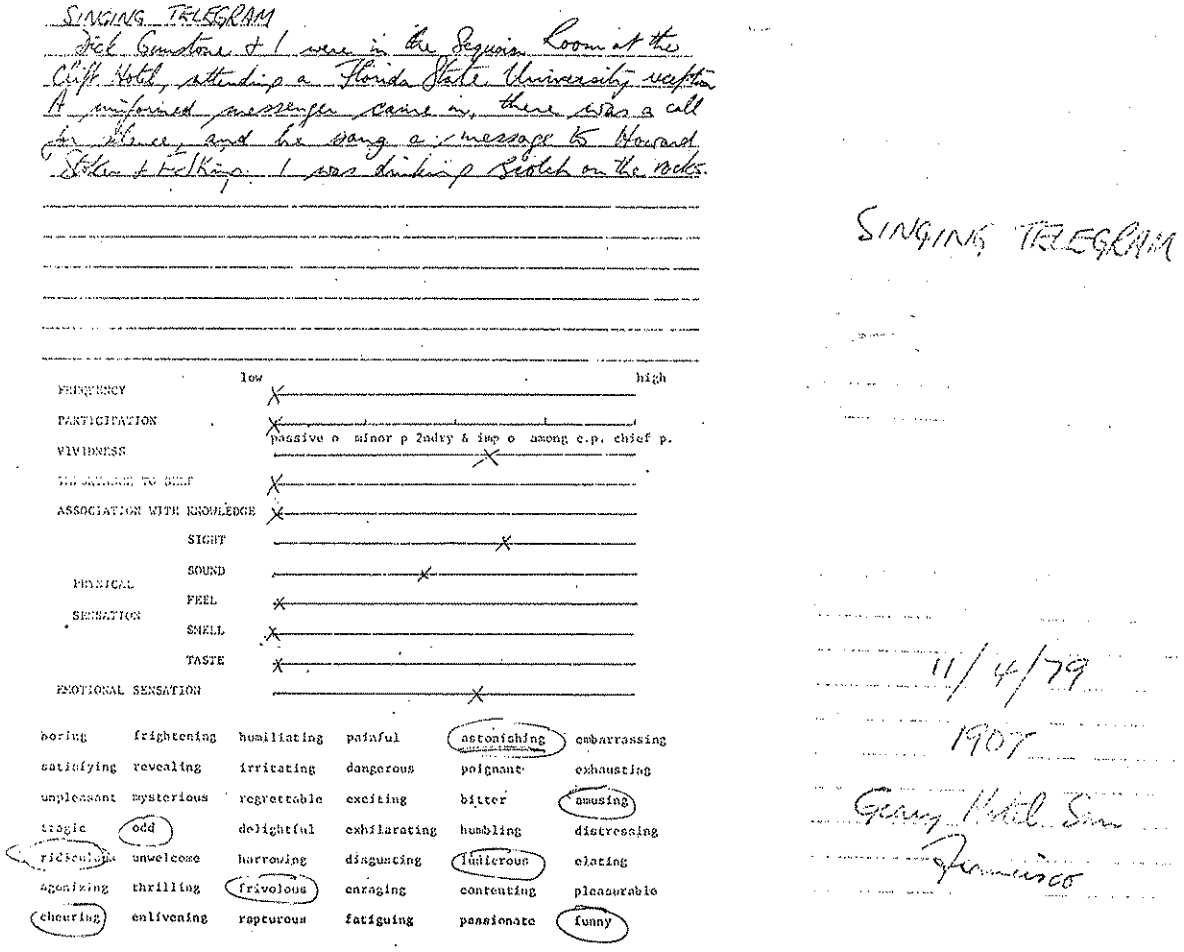

Figure 1. A4 recording sheet (reduced) and both sides of corresponding card.

I repeated the descriptive phrase on a small card, on the other side of which I recorded the date, place, and time of day of the event (see Figure 1.).

I then dropped the A4 sheet and card through a slot into a sealed box.

I neglected this task on 11 days, scattered singly over the year, so I have records of events from 354 days.

Recall Procedure

On 24.8.80, nearly seven months after the last record, an assistant opened the box and placed all the small cards in random order with the descriptive phrase upwards. During the day I looked at each phrase, pondered it, and graded my recall of the event as: 5, total degree of recall; or 4, high degree of recall; or 3, some details recalled but aware of considerable loss; or 2, aware that some such event occurred, but hardly any detail recallable; or 1, no recollection of such an event.

Two days later, aided by a calendar, I recorded my impression of the date and time of day of each event, again looking only at the descriptive phrase. I went through the events graded 3, 4, or 5 first, then fitted those graded 1 and 2 into the remaining dates.

On 28.8.80 I went through the cards again, this time with the assistant telling me the place where the event occurred (recorded on the back of the card), and once more graded my recall on the 1-5 scale.

I then waited 11 days, till 8.9.80, when the assistant gave me the A4 sheets arranged in random order. I read the description of the event which I had written at the time, and again graded my recall of it and estimated the date when it had occurred.

In the course of the succeeding month I performed the mechanical task of scoring each sheet on the 11 scales. Participation was graded 1, 2, 3, 4, or 5, depending on which of the five points I had checked, and the other ten scales were scored as the number of millimetres the cross was from the left end of the line (maximum value 100).

All materials were then put aside until 3.8.81, when I went through the A4 sheets again, once more grading my recall of the event and estimating the date at which I thought it had occurred.

Results

What Proportion of Events Can be Recalled Clearly?

Evidence is provided by the histograms of Table 1.

Table 1

Histograms of Recall Estimates for Events

		Recall Estimate				
Date	Form of Cue	1	2	3	4	5[1]
24.8.80	Descriptive phrase	214	59	49	31	1
28.8.80	Phrase and place	183	60	79	31	1
8.9.80	Full description	142	64	57	90	1
3.8.81	Full description	161	83	54	56	0

[1]This solitary well-recalled event is classed with those graded 4 in all subsequent tables.

There are at least three problems in interpreting these results: the selection of events was haphazard, rather than random when all events have an equal chance of selection; the memories of them

were reinforced by the process of recording; and they are personal, not generalizable to anyone else. Nevertheless, the histograms do indicate that a large proportion of events is lost. Also, their tendency towards bimodal distribution is consistent with a main reason for failure to recall being that the event is not processed and stored initially, rather than that there is a gradual, steady decay of detail.

What Characteristics of Events Affect Their Recall?

Table 2 shows correlations of magnitude greater than .20 between all variables. The correlations of most interest are those involving the third and fourth recall estimates, of September 1980 and August 1981, when cued by the full description of the event.

Table 2

Matrix of Correlations of Magnitude Greater than .20

	Frequency	Participation	Vividness	Important to Self	Association with Knowledge	Sight	Sound	Feel	Smell	Taste	Emotional Sensation	Real Day	Real Time	Time Estimate (1)	Day Estimate (1)	Day Estimate (3)	Day Estimate (4)	Recallability (1)	Recallability (2)	Recallability (3)	Recallability (4)
Frequency			-33								-30							-36	-44	-53	-47
Participation			-30			-31	-25	22			-24									-20	-18
Vividness				39	38	72	32				71	-41						36	39	47	43
Importance to Self							20				64	-26									
Association with Knowledge						42					23	-25									
Sight											42	-48				-22		23	27	31	30
Sound											32	-25									
Feel									33												
Smell																					
Taste																					
Emotional Sensation												-26						30	29	33	30
Real Day														26	40	26					
Real Time													48								
Time Estimate (1)																					
Day Estimate (1)															37	27					
Day Estimate (3)																43					
Day Estimate (4)																					
Recallability (1)																			85	62	46
Recallability (2)																				75	80
Recallability (3)																					85
Recallability (4)																					

Note: Decimal points omitted. (1), (2), (3), and (4) refer to the occasions when events were graded on recallability.

While some of the correlations are consistent with what I believe most people would expect, others are surprising. The less frequent, more vivid, and emotionally intense events are more recallable, but perceived importance and association with knowledge are not related to recall, nor is any physical sensation other than sight.

The more central I was to the event, the less well I recalled it. This effect occurred because many of the humdrum events recorded, such as driving to work or eating breakfast, involved no-one else. This is reflected in the negative correlation between participation and vividness and a positive correlation of .17 between participation and frequency.

Many of the variables other than the recall estimates are related, so there may be some interpretative value in a regression equation.

Separate regression equations were established for the third and fourth recall estimates, those cued by the full description in September 1980 and August 1981 respectively. On the other side of the equations were the five variables that had correlations of magnitude greater than .20 with the two estimates, frequency, participation, vividness, sight, and emotional sensation, and their first order interactions. The five were entered into the regression simultaneously, and then the interactions were entered as a second block. For both recall estimates the interaction terms added less than 5% to the explained variance, and have been omitted from further consideration. Only two of the five main variables, frequency and vividness, showed a significant relation with either of the recall estimates. Together they explain 37% of the variance in the 1980 recall estimate and 30% in the 1981, while the remaining three contribute about 1½% in each case.

It appears that the recall of an event is a function of its rarity and vividness, and that physical and emotional intensity and level of participation have negligible effect beyond that involved in determining the vividness of the effect.

Further analysis of the relation between the third recall estimate and frequency showed that none of the 73 events with frequency rating of 30 or more was graded 4 for recall, and only one was graded 3 (see Table 3). Many infrequent events were forgotten, however. Rarity thus appears to be a necessary but not sufficient condition for recall.

There is a different form of relation between vividness and recall: a few dull events are recalled, and a few vivid ones are forgotten (Table 3), but there is no suggestion of necessity.

Table 3

Cross-tabulations of Third Recall Estimate with Frequency and Vividness

Recall	Frequency Rating										Vividness									
Estimate	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99
1	45	17	18	15	13	4	17	8	5	0	68	41	19	8	4	1	1	0	0	0
2	40	10	4	5	3	0	1	1	0	0	14	20	15	8	3	3	1	0	0	0
3	49	5	2	0	1	0	0	0	0	0	5	17	18	10	0	3	3	1	0	0
4	84	5	2	0	0	0	0	0	0	0	2	16	30	21	8	6	6	1	1	0

As well as the relations between the 11 scales and recall, we have the 40 adjectives. The surprises here involve the absence of some expected relations rather than unusual inclusions. Thus it is not surprising to find high recall of events labelled ridiculous, enlivening, humiliating, frivolous, exhilarating, enraging, astonishing, ludicrous, amusing, elating, or funny, but one might also have anticipated the same relation for unpleasant, cheering, revealing, irritating, regrettable, harrowing, exciting, poignant, bitter, embarrassing, or distressing. There is some hint here of suppression of unpleasant memories, so a further analysis was made.

I sorted the 40 adjectives into five groups, differing in their perceived degree of pleasantness. The recall estimates for every event with which an adjective was associated were totalled and averaged, and these values were in turn averaged for each of the five groups. These means did not differ

significantly at the .05 level, although the least pleasant adjectives, which include some of the most extreme emotions such as enraging, had the second-lowest mean of recall values and the lowest mean was for the next-to-least pleasant group.

While the lack of statistical significance means that too much should not be made of the possible tendency to suppress unpleasant memories, it is worth further study as it has implications for instruction and for wider social situations.

How Accurately are Events Dated and Timed?

The correlations between the actual sequence of events and the three estimated sequences are moderate and positive (see Table 2). When the differences between the real date and the estimated ones are examined more closely, however, erratic performance is revealed. Figure 2 illustrates that throughout the year errors occur of any size up to the maximum possible.

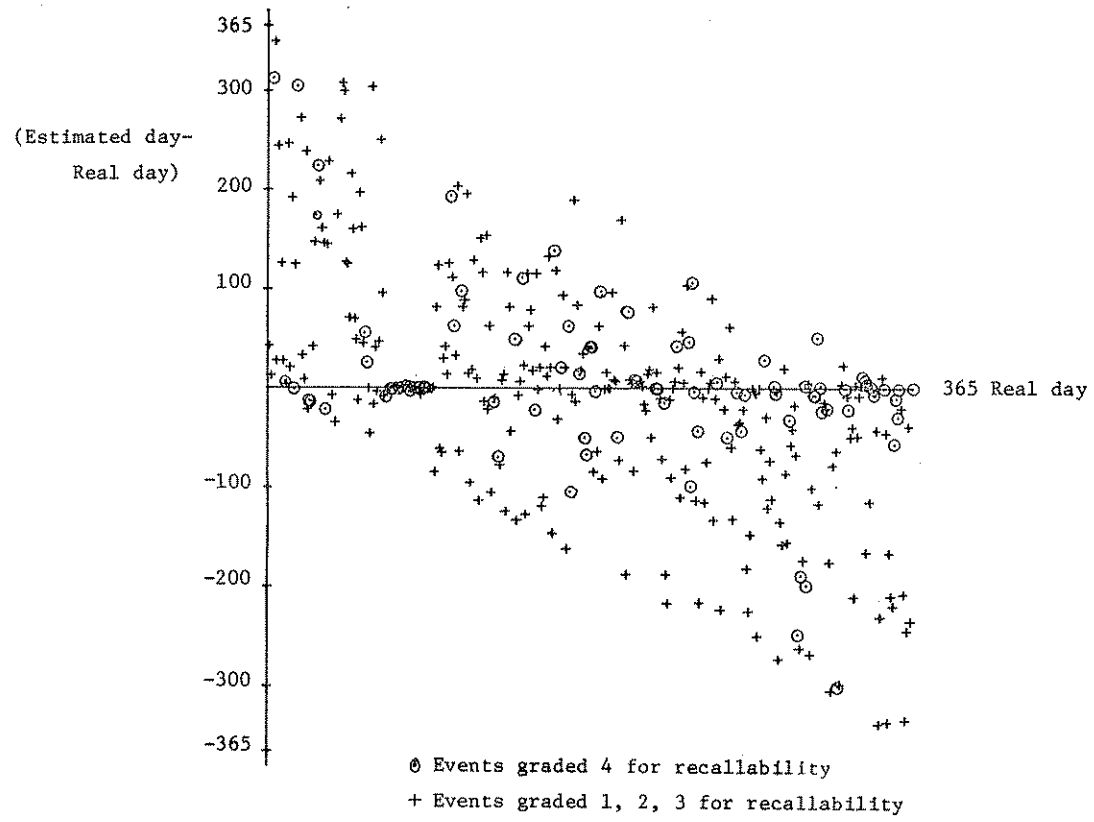

Figure 2. Pattern of errors in estimating date of event, third recall.

Not surprisingly, better recalled events show more accurate dating, but even for events graded 4 on the recall scale wild estimates often occur, as the circled points in Figure 2 show.

On examination of the figure, one period, covering a three-week visit I made to the United States, stands out as almost error-free. It was easy to date events in this period because the dates of departure and return were well-ingrained, because during it I recorded and indeed experienced few humdrum events, and because there was a definite sequence of movement from place to place.

Apart from that special period, however, the dating of events is not impressive. From the 354 events, $\binom{354}{2}$ pairs can be drawn; I was correct in saying one event preceded the other in 64% of these pairs, compared with a chance value of 50%.

I made only one estimate of the time of day that each event occurred, and that correlated .48 with the actual time. Some of this correlation could have arisen from reconstruction as much as from recall. For instance, given the description "Lunch on terrace," it is not hard to guess it occurred

somewhere round midday. Some indication of the recall of a time tag is provided by comparing the correlations between actual and estimated times for groups of events which differ in recall estimate. For those graded 1 at the first recall estimate (when the time estimate was made), the correlation is .42; graded 2, .24; graded 3, .78; and graded 4, .86. The very high correlations for the last two groups indicate that time of day is generally part of the memory of an event, and seems to be more strongly part of the episode than the date.

Can Previously Unrecallable Events be Recovered, and Can Previously Recalled Events be Lost?

Table 4 is a contingency table of recall estimates made for events when reading their full descriptions in September 1980 and August 1981.

Table 4

Contingency Table for Recall Estimates in September 1980 and August 1981

Recall Estimate September 1980	Recall Estimate August 1981			
	1	2	3	4
1	129	13	0	0
2	24	33	7	0
3	6	32	16	3
4	2	5	31	53

The table shows that altogether 231 events received the same values on the two occasions. Only 23 improved one point over the year, and none more than that. There were 87 which dropped back a point and 13 two or three points.

The few improvements may be recoveries, but I am inclined to regard them as variations in assessment, reflecting the subjective nature of the grading. Therefore I interpret the result as indicating that previously unrecallable events remain unrecoverable, given similar conditions of cueing. If it were possible to provide even more intense cueing than the description written at the time, then some could come back.

The 87 slight and 13 large deteriorations indicate that previously recalled events can be lost. The 13 large shift events have two identified characteristics: they were given lower estimates on the first two ratings before receiving a 3 or 4 on the third occasion, and though they were relatively unique when they occurred similar events were experienced in the year between the third and fourth estimates. It seems more likely that the second characteristic is responsible for the decay in recallability.

Taken as a whole, Table 4 shows considerable stability in memory for real events. Of course, the 142 events graded 1 in 1980 could not be recalled any worse. Of the remaining 212, 99 received a lesser grading in 1981, but the majority were still recalled much the same. I interpret this, together with the histograms of Table 1, as indicating that while there is decay of memory for events, a more potent effect is whether the event was processed securely into long term memory in the first place.

Discussion

Some comments follow on experimental method and on implications of some of the results.

There is a problem of change in some of the subjective procedures. There is no certainty, for instance, that a recall estimate of 4 in September 1980 is equivalent to a 4 in August 1981. Also, the correlations between Real Day and several of the descriptive scales indicate that either I began to select more humdrum events or my assessments changed. Because nearly all scales were affected, the

former is more likely. Probably these shifts do not affect the present conclusions, but they need to be considered in the design of future experiments.

Another problem concerns generalizability. While it is obvious that the results apply definitely only to me, it should also be recognized that the very terms in which they are stated are idiosyncratic. For example, what do I mean by "vividness"? Maybe the variables involving physical and emotional sensations did not show up on the regression equations because I unwittingly took them into account in making my vividness assessment, and that may not be true for other people.

A final point about method concerns cueing. I was responding to written words, in a calm situation. Perhaps different modes of cueing and different emotional states would have enabled me to recover many of the apparently lost events. Mood has been shown to affect the type of episode recalled (Teasdale & Fogarty, 1979), and it seems probable that scenes, smells, sounds, and other stimuli that closely resemble those experienced at the time could be more powerful aids to recall than words.

At the third recall I had no recollection of 40% of events. As I interpret Linton's (1978) graph, she forgot about 6% in the same period. Perhaps the difference lies in our choice of events or our procedures, but it does suggest that there is as big a range in individual differences with respect to event memory as there is for other human characteristics. Teachers, and others, may not take this into account as much as they should.

My interpretation that much of my "forgetting" was due to poor initial processing, has obvious implications for teaching. Teachers need to encourage students to process events, just as they do with subject matter. Attention to this point in activities such as laboratory work and excursions, where processing may too often be left to chance, could be productive.

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