

Very Long-Term Memories of the First Year in College

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College alumnae who had graduated 2, 12, or 22 years earlier completed questionnaires in which they recounted the first four memories to come to mind of their freshman year and provided ratings of each remembered experience. For all three alumnae groups, the temporal distribution of memories peaked in September, the beginning of college. Mean ratings of emotional intensity were high, mean ratings of surprise and life impact were below the moderate level and substantial numbers of memories had never been recounted previously. The proportion of memories that focused on specific episodes rather than on general experiences decreased as the number of years since graduation increased. The incidence of specific memories also declined as a function of memory order: Memories reported first were more likely to be specific than memories reported later. The results suggest that transitional and emotional episodes are especially likely to persist in memory for many years.

When participants in a research study are asked to report their memories, the request usually is directed to specific events selected by the experimenter. In laboratory studies, subjects may recall numbers, words, or stories presented a short time earlier. In studies of memories formed in everyday contexts, recollections of specific events also are commonly requested, such as first learning about assassination attempts on U.S. presidents (Brown & Kulik, 1977; Pillemer, 1984; Winograd & Killinger, 1983), having the first menstrual period (Pillemer, Koff, Rhinehart, & Rierdan, 1987), witnessing a crime (Yuille & Cutshall, 1986), and making the decision to terminate a pregnancy (Blackburne-Stover, Belenky, & Gilligan, 1982).

Providing information about pinpointed events is a familiar occurrence, but it is neither the only nor necessarily the most common form of sharing one's past with others. Requests for information may also specify a broad class of events, such as those associated with certain types of personal relationships (e.g., Harvey, Flanary, & Morgan, 1986), time periods (e.g., Robinson, 1986), or activities such as trips (e.g., Messé, Buldain, & Watts, 1981). Although constrained by the parameters specified in the question, the respondent is free to select particular memories. For example, in response to the person cue, "Tell me about Michelle," the respondent may offer recent or remote memories, reply in general terms, or focus on a specific salient interaction.

In this article we examine personal memories cued by reference to a meaningful unit of time: an academic year. Women who had graduated 2, 12, or 22 years earlier described

events from their first year in college and provided ratings of the remembered experiences. Respondents were not asked to recount particular college activities, but rather to describe the first memories to come to mind. The research extends a previous series of studies of memories reported by current college students (Pillemer, Rhinehart, & White, 1986).

The goals of the study were twofold: (a) to describe shared attributes of highly accessible and freely chosen college memories and (b) to identify associated characteristics of the remembered events that may contribute to their persistence in memory for over 2 decades. Because the events recounted by our subjects occurred in the uncontrolled academic and social environments of college, it was not possible to examine the veridicality of memory reports. We ascribe to the growing view that assessing memory accuracy is only one component of a broader scientific agenda (e.g., Rubin, 1986). Long-term personal memories are cognitive entities worthy of study in their own right, apart from the potentially interesting but in this case elusive question of their accuracy.

This article addresses three specific issues. The first concerns the temporal distribution of memories. Previous studies have suggested that personal memories become less accessible with the passage of time (Crovit & Schiffman, 1974; Linton, 1982; Rubin, 1982; Rubin & Kozin, 1984; Thompson, 1982). For example, Rubin (1982, Experiment 2) had college students record and date the first 50 personal events from any time in their past that came to mind. The memories demonstrated a drop-off with time that mirrored distributions found in the laboratory, and Rubin concluded, "episodic memory of a naturalistic, autobiographical nature and episodic memory for lists appear to have the same retention properties" (1982, p. 21).

When memories are sampled from circumscribed time periods marked by significant life events or transitions, temporal distributions do not correspond to a simple decay function. Robinson (1986) had college students report 20 personal memories from the "past year or two" (p. 173) and then date

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each remembered event. There was a clear clustering of memories at the ends of three time periods related to the academic calendar: fall term, winter-spring term, and summer vacation. These ending months marked the occurrence of predictable yet distinctive events in the Kentucky school year: high school graduation (May), the start of the academic year (August), and the winter holidays (December).

Pillemer et al. (1986, Studies 1 & 2) asked advanced college students to report their first four memories of freshman year, with no restrictions on content. The distribution of remembered events across the 9-month academic year showed a marked clustering at September, the point of entrance into college. In a follow-up study (Pillemer et al., 1986, Study 3), college students reported memories from the 9-month period from February of senior year in high school to October of freshman year in college. The temporal distribution again demonstrated a sharp peak in September, with a smaller rise in June, the time of high school graduation.

In our research memories were elicited from alumnae rather than from current students. By sampling memory at increasing time intervals following graduation, we were able to assess the stability of temporal patterning with the passage of time. We expected early transitional events to continue to be over-represented in memory. Initial college experiences may be sufficiently distinctive both in terms of content and associated affect to isolate them from interference caused by later recurring events, even after many years have passed. Or, transitional events may persist in memory because of deep and elaborate initial encoding of information.

The second research issue concerns memory structure and contents. Pillemer et al. (1986) found that freely chosen memories of college shared certain characteristics. When asked for the first memories of freshman year to come to mind, current students usually described specific episodes rather than general or recurring events. The recollections often focused on social themes, most centrally involved other people, and the rememberer's affective response to the situation usually was explicit in the memory narrative.

A different set of attributes may characterize alumnae memories. Of particular interest is the representation of specific episodes in memory. We expected memories of initial college experiences to remain accessible for many years, but there was also reason to expect a decrease over time in the incidence of specific events relative to more general, scripted accounts. When people are asked for personal episodes from any time in their pasts, recent events are reported more frequently than remote events (Rubin, 1982; Rubin & Kozin, 1984). Similarly, memories of pinpointed college episodes may become less accessible as the time interval since graduation increases. Older alumnae may respond more often with generic or thematic narrative constructions. Although the distinction between specific and general personal memories has received increasing emphasis in research (e.g., Gold & Neisser, 1980; Hudson & Nelson, 1986; Linton, 1986; Nelson & Ross, 1980; Williams & Broadbent, 1986), we know of no other large-scale study that directly compared the accessibility of these two types of memories as a function of the passage of many years.

The third research issue involves identifying associated characteristics of the reported experiences that potentially are related to memorability. Subjects rated each remembered event for emotionality, life impact, surprise reactions, and frequency of overt rehearsal. Previous research has suggested that some or all of these factors may influence memory. Brown and Kulik's (1977) pivotal study of "flashbulb memories" focused on recollections of personal circumstances when first learning about catastrophic events, such as a presidential assassination. The authors proposed that flashbulb memories are triggered by events that are both surprising and highly consequential and that they are maintained and elaborated through rehearsal. In a follow-up to Brown and Kulik's study, Pillemer (1984) found that most adults who remembered how they learned about the 1981 assassination attempt on President Reagan reported being emotional and surprised at the time. Yet, neither high consequentiality nor frequent overt rehearsal seemed necessary: Many people reporting memories had judged the event to have little impact on their lives and had not recounted the memory previously.

Pillemer's (1984) findings are consistent with a growing collection of psychological studies that have identified heightened emotionality as an attribute of readily accessible, vivid, elaborate, or persistent episodic memories (Bower, 1981; Goldsmith & Pillemer, in press; Master, Lishman, & Smith, 1983; Pillemer et al., 1986; Reisberg, Heuer, & O'Shaughnessy, 1984; Robinson, 1980; Rubin & Kozin, 1984). Recent neurobiological analyses also supported this connection (Gold, 1987; Pettigrew, 1978).

The evidence for consequentiality and overt rehearsal as common characteristics of vivid personal memories is less compelling. When people are asked for their clearest memories, they usually describe events perceived to be personally important (Rubin & Kozin, 1984). When the request is for the first memories to come to mind, however, substantial numbers of remembered events are rated as having only minor importance (Pillemer et al., 1986; Robinson, 1986), whereas most of the memories receive at least moderate emotion ratings (Pillemer et al., 1986). Frequent overt rehearsal also does not appear to be a necessary component of vivid memories (Pillemer et al., 1986; Rubin & Kozin, 1984; Sheingold & Tenney, 1982; Winograd & Killinger, 1983).

Taken together, existing studies indicate that highly accessible personal memories often are associated with elevated emotional reactions, but not necessarily with strong life impact, surprise, or frequent overt rehearsal. Even so, this pattern of event ratings could change as the retention interval increases. Alumnae in the present study were many years removed from the reinstating context of the college environment. It is possible that memories of highly emotional but relatively unimportant experiences would be lost, whereas events viewed as important in retrospect would persevere, in part due to frequent rehearsal. These events would serve as personal benchmarks of the respondents' academic histories (Rubin & Kozin, 1984), kept alive in memory by retellings, reconsideration, and reconstruction (Neisser, 1982). We know of no other large-scale, cross-sectional study that has assessed changes in the associated characteristics of vivid memories.

Method

Subjects

The Wellesley College Alumnae Office provided class lists for all active members of the graduating classes of 1963, 1973, and 1983. Members of these classes who did not graduate from Wellesley were included in the alumnae lists. Inactive members included alumnae who were deceased, alumnae who specifically requested not to be contacted by the college, and alumnae whose current addresses were unknown. The numbers of active alumnae were listed as follows: 449 for the class of 1963 (92% of the total number of alumnae), 505 for the class of 1973 (89% of alumnae), and 586 for the class of 1983 (96% of alumnae).

In late June 1985, questionnaires were sent to three random samples of 160 alumnae each, selected from the active members of the three graduating classes. Stamped return envelopes were provided for all alumnae living in the United States, and an offer of reimbursement for postage was made to alumnae living in other countries. By early August 1985, 212 completed questionnaires had been received for a return rate of 44%. Thirty of the respondents were omitted for one of several reasons: They did not spend their freshman year at Wellesley, they did not graduate from Wellesley, they took time off during college, they did not complete their freshman year within the normal time period, they did not write about freshman year, or they did not provide personal information about college attendance and graduation. The final sample consisted of 182 alumnae: 68 from the class of 1963, 55 from the class of 1973, and 59 from the class of 1983. Because Wellesley is a women's college, all respondents were female.

Questionnaires

Alumnae received two questionnaires in sealed envelopes. A cover letter briefly explained the purpose of the study and gave assurances concerning anonymity. Participants were instructed to "Please fill out both forms at one sitting in a quiet place where you will not be interrupted. Do not open either envelope until you have a half hour or so available to complete both forms." They were also asked to refrain from discussing the study with anyone until they had finished the task. The questionnaire envelopes were labeled with instructions for participants to examine Questionnaire 2 after completing Questionnaire 1.

Questionnaire 1 elicited memories of freshman year in college. The initial question asked about the first memory to come to mind:

We are exploring people's memories of experiences while in college. In the space below, please describe a memory that you have of your *freshman year in college*. We are *not* interested in any particular type of experience; just describe the first memory that now comes to mind. Your description can be as long or as short as you deem necessary. Please be as *precise* as possible; include any remembered details even if they do not seem particularly important now.

Three questions followed, asking for written descriptions of the second, third, and fourth memories to come to mind. Each of the four memory questions appeared on a separate sheet of paper, and respondents were instructed to write on both sides of the page if necessary. Participants also provided the following personal information: age, year of college graduation, whether or not they had attended Wellesley for freshman year, and whether or not they had completed the degree in the usual 4 years.

Questionnaire 2 asked respondents to analyze, one by one, each of the memories described in Questionnaire 1. Using ordered 5-point scales, they rated the intensity of emotion experienced at the time of the event, the degree of surprise they felt, the perceived impact of the event on their lives both at the time of occurrence and also in retrospect, and the clarity of the present memory. They also estimated the date of occurrence of the remembered event, identified the type of emotion felt, indicated the number of times the memory had been recounted previously, and offered possible reasons why the memory came to mind.

Results

Several characteristics of the remembered events were analyzed: date of occurrence, memory structure, memory content, and memory ratings.

Date of Occurrence

Respondents were asked to date each of the remembered events. Most memories (70%) were assigned a specific month of occurrence. Memories that described general events spanning more than 1 month were omitted from the temporal analyses. Figure 1 contains the distribution of remembered events across the 9-month academic calendar for each graduating class. There was a clear clustering of memories in September for all three groups of alumnae: The proportions of memories occurring in September were 41%, 38%, and 41% for the classes of 1963, 1973, and 1983, respectively. The second most frequently assigned month was October, with 15%, 18%, and 14% of memories for the classes of 1963, 1973, and 1983, respectively. Although the retention interval ranged from 5 to 25 years, the distributions are strikingly similar. They also closely resemble the distribution of freshman year memories provided by current college students (Pillemer et al., 1986).

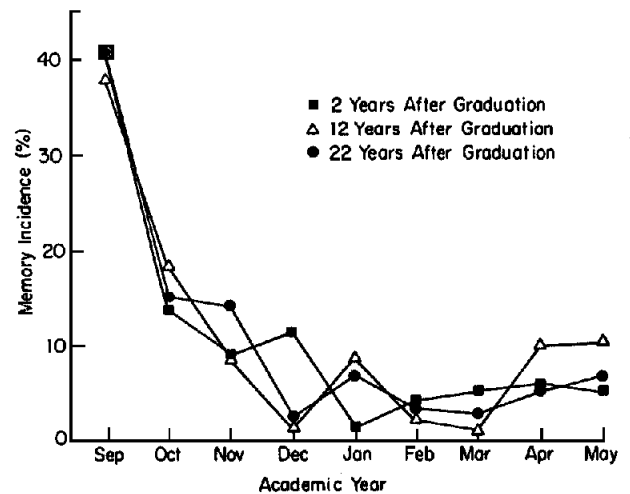


Figure 1. Temporal distributions of freshman year memories for three alumnae groups.

Because the temporal patterns for the three alumnae groups were similar, statistical analyses were conducted on the total sample. The goodness-of-fit of the observed distribution to a uniform distribution of memories across the 9 months was examined for each of the four memories. The differences between the observed and uniform distributions were highly statistically significant for the first memory, $\chi^2(8, N = 153) = 476.59, p < .001$; second memory, $\chi^2(8, N = 132) = 100.50, p < .001$; third memory, $\chi^2(8, N = 116) = 57.48, p < .001$; and fourth memory, $\chi^2(8, N = 110) = 19.93, p = .011$. Clustering was especially dramatic for the first reported memory: 65% of first memories fell in September, compared with 34%, 31%, and 22% for the second, third, and fourth memories, respectively.

Memory Structure

Coding categories developed by Pillemer et al. (1986) were used to assign memories to one of three structural categories. *Specific* memories contained an explicit description of a circumscribed, one-moment-in-time event. The event was the focus of the memory. *General* memories consisted of a non-specific discussion of events or feelings, or they presented a theme for numerous events. *Mixed* memories clearly contained both specific and general components. Two individuals coded the entire data set. Inter-coder agreement on memory structure was 82%. Codings were compared periodically and disagreements were resolved by discussion and occasional consultation with the first author.

Over half of the memories described specific episodes (55%), with smaller percentages categorized as general (28%) or mixed (17%). The proportions of specific memories for the three alumnae groups are separately presented in Table 1. There was a clear decrease in the proportion of specific memories as the number of years since graduation increased. The total proportions of memories classified as specific are 73%, 52%, and 42% for the classes of 1983, 1973, and 1963, respectively. The differences between the alumnae groups in the proportions of specific memories were statistically significant for the first memory, $\chi^2(2, N = 182) = 20.93, p < .001$; second memory, $\chi^2(2, N = 182) = 8.85, p = .012$; third memory, $\chi^2(2, N = 182) = 6.35, p = .042$; and fourth memory, $\chi^2(2, N = 181) = 18.52, p < .001$. For each of the four memories, the proportion of specific memories decreased significantly with increasing time since freshman year.

The proportion of specific memories also varied as a function of memory order. This effect was statistically significant for the class of 1963, Cochran's $Q(3, n = 67) = 9.04, p = .029$; the class of 1983, $Q(3, n = 59) = 14.48, p = .002$; and approached significance for the class of 1973, $Q(3, n = 55) = 7.66, p = .054$. As indicated in Table 1, in each instance the proportion of specific memories was higher for the two memories reported first than for the two memories reported last.

Memory Content

The memory narratives were substantial ($M = 114$ words, $SD = 84$) and sufficiently detailed to enable meaningful content analyses. Coding rules developed by Pillemer et al. (1986) were used to analyze memory contents. Memories were assigned to one of four thematic categories: academics (scholastic activities such as examinations, grades, or studying), housing (physical space, moving in or out, conflicts over the living situation), romance (explicitly romantic intentions or interactions), and recreation and leisure (pleasure seeking and free-time activities except romance). Two individuals coded all narratives; inter-coder agreement was 83%. The two most common thematic categories were housing (34%) and recreation and leisure (33%), followed by academics (24%) and romance (6%). Only 3% of memories did not fit one of the four categories.

Memories were assigned to one of two social orientation categories: interpersonal or individual. Interpersonal memories either centrally involved other people or focused on the absence of other people (e.g., homesickness). Inter-coder agreement on social orientation was 97%. Memories of the first year in college reported by alumnae almost always included other people: 92% of memories were interpersonal.

Two types of emotional expression were coded: explicit mention of one's own feelings and other people's feelings. Inter-coder agreement was 93% for own affect and 86% for others' affect. Feelings were commonly described: 82% of the narratives identified personal reactions, and 47% mentioned others' emotional reactions. In Questionnaire 2, respondents identified the emotions associated with each memory as either positive, negative, mixed positive and negative, or neutral. The proportions of memories falling into these categories were 34%, 27%, 35%, and 4%, respectively.

Contents of memories reported by the three alumnae groups were compared. Group differences were not large and

Table 1
Proportions of Freshman Year Memories Describing Specific Events

Group	n	Memory Order				Four Memories Combined
		First	Second	Third	Fourth	
Class of 1983 (2 years after graduation)	59	85	78	58	71	73
Class of 1973 (12 years after graduation)	55	60	60	46	42	52
Class of 1963 (22 years after graduation)	68	46	53	35	34 ^a	42
Total sample	182	63	63	46	49 ^b	55

^a n = 67 for this value. ^b n = 181 for this value.

did not demonstrate a consistent pattern across all four memories reported by respondents.

Memory Ratings

Questionnaire 2 elicited ratings of reactions to the remembered events that might be associated with memory vividness and accessibility: emotional intensity, degree of surprise, perceived impact on the subject's life at the time of occurrence, and perceived life impact in retrospect. Reaction ratings were made on ordered 5-point scales. Subjects also rated memory clarity on a 5-point scale and estimated the number of times they had previously recounted the memory.

Mean reaction ratings for the three graduating classes are separately presented in Figure 2. The ratings provided by the three alumnae groups were very similar. Most respondents rated the remembered experiences as emotional: 86% of all memories were rated as at least moderately emotional, and only 1% of memories were rated as unemotional. Smaller proportions of memories were rated as at least moderately surprising (54%), as having at least a moderate life impact at the time of occurrence (52%), or as having at least a moderate life impact in retrospect (48%). Mean ratings of emotion were between moderate and strong for the classes of 1963 ($M = 3.48$, $SD = .94$); 1973 ($M = 3.65$, $SD = 1.02$); and 1983 ($M = 3.72$, $SD = 1.01$). In contrast, mean ratings of surprise ($M = 2.61$, $SD = 1.28$; $M = 2.70$, $SD = 1.34$; $M = 2.56$, $SD = 1.34$), life impact at the time ($M = 2.71$, $SD = 1.13$; $M = 2.76$, $SD = 1.22$; $M = 2.81$, $SD = 1.26$), and life impact in retrospect ($M = 2.70$, $SD = 1.17$; $M = 2.68$, $SD = 1.24$; $M = 2.61$, $SD = 1.22$) for the classes of 1963, 1973, and 1983 were below the moderate level. Although previous recountings were common, frequent overt rehearsal did not appear to be an essential component of memory: 31% of memories were reported never to have been recounted previously.

To examine statistically the consistency of reaction ratings, we conducted a 3×4 (Graduating Class \times Memory Order) analysis of variance for each scale (emotion, surprise, life impact at the time of occurrence, life impact in retrospect, memory clarity). There were no statistically significant ($p <$

.05) effects of graduating class and no significant two-way interactions. There were significant memory order effects only for emotion ratings, $F(3, 519) = 16.16$, $p < .001$, and clarity ratings, $F(3, 531) = 16.46$, $p < .001$. From the first to the fourth memory, there were declines in ratings of emotional intensity ($M = 3.99$, $SD = .79$; $M = 3.60$, $SD = 1.02$; $M = 3.46$, $SD = .96$; $M = 3.37$, $SD = 1.05$) and memory clarity ($M = 3.88$, $SD = .82$; $M = 3.52$, $SD = .91$; $M = 3.44$, $SD = .92$; $M = 3.37$, $SD = .94$). The decline in emotion ratings as a function of memory order replicates the pattern found for memories reported by current college students (Pillemer et al., 1986, Study 1).

The overall mean rating of memory clarity ($M = 3.55$, $SD = .92$) was between moderately and very clear. To determine if stronger reactions were associated with clearer memories, we computed Pearson correlations between reaction ratings, rehearsal, and perceived clarity for each of the four memories. Emotional intensity and life impact at the time of occurrence showed significant positive correlations with clarity for all four memories, life impact in retrospect and surprise were positively related to clarity for three of the four memories, and frequency of rehearsal was positively related to clarity for two of the four memories. Significant correlations ($p < .05$, two-tailed) ranged from .19 to .42.¹

Discussion

College alumnae were asked to recount the first four memories to come to mind of their freshman year. Although the retention interval ranged from 5 to 25 years, the memories were strikingly similar in several respects. There was a pronounced temporal clustering of memories in September, the beginning of the academic year. The remembered experiences usually were interpersonal and rich in affective content. Respondents' memory ratings indicated that elevated emotional reactions, but neither strong life impact nor frequent overt rehearsal, were usually associated with the remembered events. These general characteristics of alumnae memories closely resemble characteristics of memories reported by current college students (Pillemer et al., 1986).

The 9-month academic year memory distributions did not demonstrate the higher incidence of recent than remote events that has been reported by other researchers (e.g., Rubin, 1982; Rubin & Kozin, 1984). Events that happened longest ago—those at the beginning of freshman year—were the most likely to be recounted. The request in the present study was for memories falling within a circumscribed time interval marked by a major life transition: entry into college. Our data suggest that memories of transitional or novel events are likely to remain highly accessible for many years.

Why are memories of transitional events especially vivid and long lasting? Initial college experiences may be distinctive enough both in terms of content and associated affect to remain isolated from interference by later events. Repetition of events strengthens generic memory representations but



Figure 2. Mean ratings of reactions to remembered events for three alumnae groups.

¹ Nonparametric correlations produced a similar pattern of results. Detailed statistical results are available from the first author.

lessens the ability to identify specific episodes (Brewer, 1986; Linton, 1982; White, 1982). Our respondents frequently recounted first-time happenings, such as the first class, examination, date, or argument, and 37% of September memories explicitly described activities occurring on the very first day at Wellesley. A first-year student may have countless interactions with her roommate in the course of the academic year, but the circumstances and feelings surrounding the initial encounter are unlikely to be closely replicated.

An alternative explanation for the asymmetric memory distributions is the use of a particular retrieval strategy. People may simply start their search at the beginning of a given time interval and thus "find" more memories there. To examine this possibility, Pillemer et al. (1986, Study 3) elicited memories of events within the 9-month period from February of senior year in high school to October of freshman year in college. The distribution again showed a marked peak in September, even though this month fell near the end of the specified time interval. There were few reported recollections of events in February, the initial month in the sequence. The overrepresentation of September events in memory does not appear to be an artifact of the way people approached the task.

Because the remembered events were dated retrospectively, the assigned dates could be inaccurate. Nevertheless, there are two reasons why the observed distributions probably are not attributable to systematic dating errors. First, Rubin (1982, Experiment 5) evaluated college students' subjective dating of their autobiographical memories by comparing estimated dates with dates recorded in personal diaries. The estimated dates were quite accurate and were not biased in any particular time direction. Second, slight differences between the distributions for the three groups of alumnae accurately reflected changes in the Wellesley academic calendar. Members of the class of 1983 reported almost no January memories, whereas some January events were recounted by members of the classes of 1973 and 1963 (see Figure 1). Members of the two earlier classes were on campus in January, but most students attending Wellesley in later years did not remain on campus for an optional, noncredit January winter session. It is unlikely that these schedule changes would be accurately represented in memory if major dating errors were the rule.

Although the spread of memories across the academic year did not correspond to a decay function, the comparisons of alumnae groups identified a different sort of temporal decline. There was a significant decrease in the proportion of specific memories as the time interval since freshman year increased. There was also a marked drop in the proportion of specific episodes as a function of memory order for all three alumnae groups, suggesting that specific memories become less available as the individual's memory search continues. Interestingly, a majority of each of the four memories reported by members of the class of 1983 was specific, and the overall proportion of specific memories for these recent alumnae (73%) was identical to that for current students (Pillemer et al., 1986, Study 2). The decline in accessibility of specific freshman year memories apparently occurs sometime after a 5-year retention interval.

Respondents' memory ratings revealed a consistent pattern. Most of the remembered events were rated as at least moderately emotional, whereas mean ratings of life impact and surprise were below the moderate level, and a substantial number of memories had never been recounted previously. Unlike the subjects in studies of flashbulb memories, our subjects were not instructed to recount salient or emotional events; they were simply asked to describe the first memories to come to mind. Elevated emotionality appears to be a common associated characteristic of highly accessible college memories.

Like most studies of personal memories, ratings of reactions to the remembered events were made after the fact. It is possible that strong emotions were attributed to the events only retrospectively: Respondents may have assumed that because the events were vividly remembered, they must have felt highly emotional at the time of occurrence. There are problems with attributing the elevated emotion ratings solely to reconstruction. First, it is not clear why subjects would have selectively reconstructed only their emotion ratings. Second, the only ratings that showed significant declines as a function of memory order were emotion and memory clarity. Events recounted first were rated as more emotional and more clearly remembered than events recounted later. This is precisely what one would expect if emotionality is related to memory vividness and accessibility. It is difficult to explain this pattern of ratings by reconstructive errors.

Another possible explanation for the elevated emotion ratings is biased sampling. The sample consisted of alumnae who voluntarily responded to a questionnaire about college memories. It is possible that only those alumnae who felt very emotional about their college experience responded to the survey. Nevertheless, there are several reasons why biased selection is unlikely to account for the observed pattern of results. First, there is no obvious reason why subject self-selection should have a biasing effect only on emotion ratings. It is just as reasonable to expect that alumnae who felt that college had had a profound impact on their lives would be especially eager to respond to the questionnaire. Second, alumnae memory ratings were very similar to ratings provided by undergraduates who participated on campus to fulfill a course requirement or for monetary incentives (Pillemer et al., 1986). These participants were not subject to the same selection factors as were alumnae.

Another potential limitation of the sample is that men were not represented. Pillemer et al. (1986, Study 1) directly examined gender differences. Although women reported stronger emotional reactions to remembered events than did men, the pattern of memory ratings was similar for the two gender groups.

Although the association between elevated emotions and vivid memories is consistent with a growing body of research on autobiographical memory, the relationship between emotion and memory appears to be complex and multidimensional. For example, very strong emotions can interfere with memory for impersonal details, and this type of memory may be an important part of eyewitness testimony (Loftus & Burns, 1982). Searching for absolute laws is likely to prove futile,

because the effects of emotion on memory probably depend on the particular aspects of memory being assessed. A more productive approach would be to continue to refine and expand existing memory typologies (see Brewer, 1986) and to design research studies that examine interactions between emotionality and various types of memory performance.

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