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The Subtle Deceiver: Recalling Our Past

*WE FILTER MEMORIES OF PAST EVENTS THROUGH
THE SCREEN OF OUR PRESENT LIVES.*

BY DAVID C. RUBIN

Shortly after brilliant scientist P. Z. completed his autobiography, he developed a brain disease and severe amnesia. This professor who had just written his life story could still remember his childhood quite well but almost nothing that had occurred during the past several decades of his life. He remembered little about the articles and technical books he had written and could not recall the names of many of his students and colleagues from the past 20 years. His general intelligence,

however, was not greatly affected; he could still act, think and plan. But he had no recollection of his recent actions, thoughts and plans. The professor had lost his "autobiographical memory," a major part of all human memory.

Remembering takes many forms. You may remember how to ride a bicycle, though you would have a hard time explaining in words what you actually remember. You may remember that a bicycle has two wheels but may not recall where or when you learned this. You may remember the experience of riding a bicycle with a friend on a particular sunny day when you were 12 years old. It is the latter kind of memory that this article is about: autobiographical memory—those things you remember about yourself. Specifically, autobiographical memo-

same abilities, values and personality. It can be disturbed by brain disease and injury, neurological disorders such as Korsakoff's syndrome (as in the case of P. Z.) and by electroconvulsive therapy for depression (see "The Case for ECT," *Psychology Today*, June 1985).

One of the most assiduous students of normal autobiographical memory is psychologist Marigold Linton of the University of Utah, who for 12 years studied her own autobiographical memory (see "I Remember It Well," *Psychology Today*, July 1979). Unlike most cognitive psychologists, Linton deliberately sacrificed objectivity for the insights not available to outside observers.

Because what is remembered is affected by how memory is studied, she used a variety of techniques to exam-

only one week, even though most of the events were hardly noteworthy. As time passed, the autobiographical memories became less detailed and harder to recall, less responsive to memory jogs and were less accurately recognized and dated. For events recorded two to six years previously, each year added a 6 percent loss in her ability to recall events described in her diary cards.

The organization of her autobiographical memory also changed, in part because she later reinterpreted some events. On one diary card, Linton had recorded mailing the final version of a manuscript to a publisher, but there were later revisions and still more "final" versions. On another card, she matter-of-factly reported meeting a new person, but many years later, when that person became her husband, the significance of that initially ordinary event changed.

In other words, autobiographical memories for events at one time can be changed by the perception and memory of later events. Further, with time, details are lost, distinct events fuse and new categories evolve.

For recent memories, chronological searches are easy, quick and fruitful. It is possible to start at one date and recall events that followed in simple chronological order. But for memories that are several years old, such searches are not as successful. Instead, categories of experience, such as things done with certain friends or events surrounding a project at work, appear to organize our recall.

Studies similar to Linton's but more objective and having more broadly applicable results have been done by researchers who examine other people's autobiographical memory. Psychologist Craig Barclay asked several graduate students at the University of Michigan to record three events daily for four months. Their memory for different samples of the recorded events was tested five times during a 2½-year period by presenting them with descriptions of events and asking if they were their own. Some were the students' own descriptions, others were their original reports with the emotional reaction, evaluation or details changed and still others were another person's descriptions, recorded in the same period.

Barclay's major thesis is that people do not reproduce the past, they recon-

AUTOBIOGRAPHICAL MEMORY

IS THE SOURCE OF OUR SENSE OF SELF:
THE FEELING THAT WE ARE THE SAME PERSON
WITH THE SAME PERSONALITY OVER TIME.

ries are those you believe are from events in your life for which you have an image or a detailed, firsthand recollection. You may not recall all the details of the event, but you will be certain that it occurred simply because you remember—indeed almost re-live—its happening.

It is not clear to what extent, if any, autobiographical memory ultimately will be considered as a behavioral or physiological system separate from other types of memory. But for now it is a useful theoretical and practical distinction.

Autobiographical memory is the basis for most "talking cure" psychotherapies, especially Freudian types, which try to uncover and interpret people's reports of the past. It is also the source of eyewitness testimony and is the basis for much of history and literature. Most importantly, autobiographical memory is the source of our sense of self: the feeling that over time we are the same person with the

ine the contents and organization of her memory and how they changed with time. For instance, Linton's technique of simply asking herself to recall everything she could from a particular year revealed something about the organization of autobiographical memory, since related events were recalled together. However, since many events could not be recalled using this technique alone, Linton also noted involuntary memories (those that just come to mind unbidden). She relied most heavily, however, on recording events daily on diary cards, then later examining selected cards to see if she could recall the events described and date them correctly.

Linton found that events from the most recent year were easier to recall with memory cues, were recalled in more detail and were better recognized and more accurately dated than those from earlier times. For instance, in recalling events from one year earlier, Linton's average dating error was

struct it in accord with "self theories" of how they are likely to act. These theories, like normal scientific theories, help us to organize knowledge and allow us to make predictions. To the extent that such theories are accurate, they describe how each of us would expect to act under given situations. When we recall events from our lives, we behave more like authors writing autobiographies than like videocassette recorders. We convey in precise and honest terms a plausible and consistent record of our own intentions and actions, but this record need not be, and in fact cannot be, complete and accurate. Our autobiographical memories reflect not only our past but also our personalities and beliefs about ourselves. This is one reason our memories provide a useful basis for many psychotherapies.

If Barclay's thesis is correct, people should accept false descriptions that are consistent with their self theories. People are more likely to accept a false description as the resemblance between the false and original descriptions increases and as time passes.

This is exactly what happened. All false memories were likely to be rejected at first. But, Barclay found, after five months, people were as likely to accept as to reject false descriptions in which the emotional content or the descriptive details of the originals had been changed. These findings help us understand why we believe that our autobiographical memories are accurate even though we know, from extensive experience and research, that other aspects of our memory are not that reliable.

Memories themselves change, as Linton and Barclay have emphasized. Psychologist Joseph Fitzgerald of Wayne State University adds a point: Remembering is a transaction between an individual's history and development. An individual's state when remembering can change the memory, and the memory can change the individual. Consider Linton recalling the first time she met the man she later married: She cannot recall the event the way it was then because she has changed. Moreover, recalling an event may change a person's future behavior. For example, a clever fund-raising appeal that evokes a pleasant memory from your college life might make you more willing to donate money to your alma mater.

How do people recall particular memories in a system of autobio-

YOUR STATE
WHEN REMEMBERING
CAN CHANGE
THE MEMORY, AND
THE MEMORY CAN
CHANGE YOU.

graphical memory like the one proposed by Linton or Barclay? Although more complex, the issue resembles the problems computers face when retrieving information from large, complex data bases.

Working from an artificial-intelligence framework, psychologists Brian Reiser of Carnegie-Mellon and John Black and Peter Kalamarides of Yale University proposed that in recalling individual autobiographical memories, people use retrieval strategies to direct and narrow the search process, in part by constructing a plausible context for an event. Ironically, however, the context set up by the search helps to accentuate the reorganization, distortion and false recognition found by Linton and Barclay.

To study people's retrieval strategies, Reiser and his coworkers asked Yale undergraduates to think aloud as they recalled a specific instance of an event such as going to a museum, feeling happy or not getting what they ordered at a restaurant.

Several kinds of search strategies were common among the students. They often used the particular activities, goals, people or time periods they thought were involved to find the general context of a memory as well as to limit the search to certain kinds of memories. For instance, when asked for a time when they felt happy, students might search for activities that usually made them happy; might ask which goals, if met, would make them happy; or might try to search for memories of people or time periods in which they were usually happy.

In general, people used the same kinds of strategies to search memory that they would use to understand a new event. That is, their strategies appeared to be general mechanisms for

reasoning about experiences, past or present.

One frequently used search strategy was to think about events in a given period. Temporal organization is, in fact, one of the most obvious properties of autobiographical memory. We remember events as occurring before, after or about the same time as other events, and those from the same time tend to be recalled together when amnesia occurs and remits.

Described more accurately, time is not organizing autobiographical memory; rather, autobiographical memories are organizing time. People experience time not only as the physical ticking of a clock but as the passage of the events, routines and seasons that mark their lives. This latter notion of time seems to be preeminent in the way we order events in memory.

Psychologist John Robinson of the University of Louisville used a clever technique to study how routine life events affect our sense of time. Most students unconsciously divide their school years into three distinct periods: fall semester, spring semester and summer vacation. The boundaries between these periods are often marked by changes in activity. The periods themselves contain cyclical, predictable events such as the first day of class, Thanksgiving, Christmas and final exams.

Robinson asked his students each to recall 20 events from the most recent two years of their lives. He found that the last month of all three school-year periods produced the most autobiographical memories, with a fairly steady drop in frequency until the first month of each period.

In particular, the number of memories recalled in each month increased from January through May, with a marked drop in June followed by an increase in July and August, with another marked drop in September. The school year was never mentioned to the students, but it clearly affected their recall. Further, memories tended to be recalled in clusters from the same time periods. Robinson found that the school year had similar effects on students' ratings of their moods and overall activity, with the highest ratings in the last month of each school term.

Psychologists Norman Brown, Steven Shevell and Lance Rips at the University of Chicago used a different technique to study how autobiographical memories order time. They gave

students descriptions of public events, such as Prince Charles's marriage to Lady Diana Spencer, and asked them to think aloud as they tried to date them. Half of the events were political and fit nicely into a narrative of American history, since the timing of any one event could be put into a logical sequence of other public events. Thus, if you were asked when Sandra Day O'Connor was named to the Supreme Court, you might try to remember the events that led up to her appointment, how they fit into history and who was President at the time. The other event descriptions were nonpolitical, such as disasters, crimes and awards that could not be as easily placed into a historical narrative.

Although all the events were well-known and had occurred within four years of the time students were questioned, they could date only 8 percent with the correct month and year. Nonetheless, they made few errors that inverted the order of events—a pattern of results that would be expected if people were dating events in terms of other personal and private events and not in terms of calendar dates.

In dating political events, the students relied most heavily on the Presidential term (35 percent of the events), followed closely by other public events (32 percent) and by autobiographical events (31 percent). For dating nonpolitical events, Presidential terms were rarely used (4 percent of the events), as were other public events (9 percent). Far more important were autobiographical events, which were used to date 50 percent of the nonpolitical events.

Brown and his colleagues also tested the same idea in a slightly different manner. They used political and nonpolitical public events, but this time they asked half the people to decide whether the event occurred when they were in high school or in college and asked the rest to decide whether it happened during the Carter or Reagan administration. People and events were selected so that if the correct answer was high school, it would also always be the Carter administration, and if the correct answer was college, it would also always be the Reagan administration.

Brown and colleagues found that people decided most quickly when political events were put in a public context (Carter administration versus Reagan administration) and when nonpolitical events were put in a private

context (high school versus college).

Both these Chicago studies and those of Robinson in Louisville lead to the same conclusions: People use memories of events from their lives to build a continuous, ordered sense of time. They use events from a similar domain (public or private) when possible, but they can use events from other domains if they must. For example, students in Chicago dated events as remote as the Jonestown suicides in terms of exams they were taking at the time.

Some public events have an extremely dramatic quality that imprints the moment vividly in memory. Psychologists Roger Brown of Harvard University and James Kulik of the University of California at San Diego asked people what was happening to them when they heard of such events as President Kennedy's assassination. They called these autobiographical memories "flashbulb memories" be-

cause of the surprise, short duration and indiscriminate illumination that usually accompany them (see "Flashbulb Memory," *Psychology Today*, June 1981). The memories are autobiographical since they are about the person experiencing them, not about the news event itself. They intrigue psychologists because, although the details of where the person was and what happened there are not at all important, they can be recalled decades later. Moreover, although the details often are not accurate, the person is usually quite confident that they are.

Brown and Kulik think such memories may be part of an adaptive system that fixes in memory details surrounding important events so that they can be sorted out later. Psychologist Ulric Neisser of Emory University suggests that flashbulb memories may be the way in which we tie the story of our own lives to history.

My student Marc Kozen and I want-

MAKING MEMORY'S FLASHBULBS POP

Cues	Percent*
<i>A car accident you were in or witnessed</i>	85
<i>When you first met your roommate at Duke</i>	82
<i>The night of your high school graduation</i>	81
<i>The night of your senior prom (if you went or not)</i>	78
<i>An early romantic experience</i>	77
<i>A time you had to speak in front of an audience</i>	72
<i>When you got your admissions letter from Duke</i>	65
<i>Your first date—the moment you met him/her</i>	57
<i>President Reagan was shot in Washington</i>	52
<i>The night President Nixon resigned</i>	41
<i>The first time you flew in an airplane</i>	40
<i>The moment you opened your SAT scores</i>	33
<i>Your 17th birthday</i>	30
<i>The day of the first space shuttle flight</i>	24
<i>The last time you ate a holiday dinner at home</i>	23
<i>Your first class at Duke</i>	21
<i>You heard that President Sadat of Egypt was shot</i>	21
<i>When you heard that the Pope had been shot</i>	21
<i>The first time your parents left you alone for some time</i>	19
<i>Your 13th birthday</i>	12

*Percent of Duke students in memory experiment who reported events on experimenter's list were of "flashbulb" quality

F LASHBULB MEMORIES MAY BE A WAY OF TYING THE STORY OF OUR OWN LIVES TO HISTORY.

ed to know what other types of events would lead to memories as vivid as those reported by Brown and Kulik. We asked Duke University undergraduates to report the three most vivid autobiographical memories of their lives.

These memories were almost all of personally important rather than of nationally important events. They tended to center around an injury or accident (18 percent), sports (11 percent), members of the opposite sex (10 percent), animals (9 percent), deaths (5 percent), the first week at college (5 percent) and vacations (5 percent). Although the circumstances leading to the vivid events were not always judged as being surprising, consequential or emotional—and not all vivid events were rated as flashbulb memories—those that had these properties were more likely to be judged as having “flashbulb” clarity.

The students who participated in this study also answered questions about their memories for 20 events that we thought, based on earlier work, would evoke vivid recollections. The table, “Making Memory’s Flashbulbs Pop,” lists the 20 event descriptions that we used and the proportion of undergraduates who rated them as of “flashbulb” clarity.

What about events that cannot be remembered at all? Amnesia provides the most dramatic example of loss of autobiographical memory. One form, childhood amnesia, seems to occur almost universally, without any brain injury or disease; we have relatively few memories from before age 7 (see “Our First Memories,” in this issue). But what does “relatively few” mean? Could this simply be a case of normal forgetting?

Psychologists Scott Wetzler of the Albert Einstein Medical School and John Sweeney of Cornell University tested an idea I had proposed earlier, based on work by psychologists Herbert Crovitz and Harold Schiffman, both of Duke: The distribution of autobiographical memories over time may represent a “retention function.” That is, on average, people probably encode the same number of memories each day and forget some autobiographical ones at the same rate that they forget other types of memory. If there were only normal forgetting and not childhood amnesia, then it should be possible to predict how many early autobiographical memories (from birth to age 6) 18-year-olds should have by extrapolating from their memories from age 7 to 18. Wetzler and Sweeney did just that and found far fewer early autobiographical memories than would be expected, indicating that childhood amnesia does exist.

But what about more serious amnesias? P. Z. provides one of the few examples in which we have a detailed, objective record of a patient’s autobiographical memory before amnesia began. Psychologists Nelson Butters of the University of California at San Diego School of Medicine and Laird Cermak at Boston University School of Medicine tested P. Z.’s autobiographical memory using questions about relatives, colleagues, collaborators, conferences and publications he had mentioned in his autobiography. They found severe amnesia for events that had occurred long before the disease began. The extreme length of this memory loss is a property of Korsakoff’s syndrome and does not occur in most other types of amnesia. It may be due, in part, to weaker memories’ being encoded during the long period

of alcoholism that precedes the syndrome. But it is clear from P. Z.’s autobiography that the events tested were once in memory.

Psychologists Alan Baddeley at the Medical Research Council Applied Psychology Unit in Cambridge, England, and Barbara Wilson of Rivermead Rehabilitation Center in Oxford, England, studied loss of autobiographical memory in patients suffering from a number of disorders and found many different impairments across and within diagnostic groups. Some patients with little ability to encode new information had normal autobiographical memories for the period before their injury, while others with less severe memory problems for recent events showed marked amnesia for events farther in the past. Some of the amnesiacs who had damage to the brain’s frontal lobes falsely remembered events. This behavior suggests they could not properly use retrieval mechanisms such as those studied by Reiser and colleagues.

For instance, one patient, R. J., reported clear memories for the death of a brother who never existed. He also remembered a whole series of implausible events that occurred while he was unconscious, as well as a football game among patients, most of whom, in fact, had difficulty walking. Baddeley and Wilson caution that these are not the autobiographical memories of someone who is merely trying to cover up a memory problem. R. J. recalled similar events when he wasn’t being tested, described them with great conviction and often acted upon them even when no one seemed to be present. For example, he was once found standing on a toilet seat looking for luggage he remembered storing in a nonexistent loft in the

SOURCES OF VIVID MEMORIES INCLUDE INJURIES AND ACCIDENTS, SPORTS, MEMBERS OF THE OPPOSITE SEX, ANIMALS, DEATHS AND VACATIONS.

ceiling.

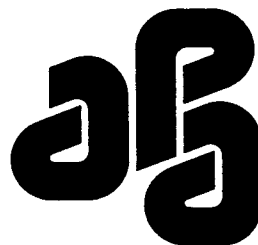
Examples such as these led Baddeley and Wilson to suggest that, in addition to possibly having lost some memories, certain amnesiacs with frontal-lobe damage seem unable to search their memories in a systematic way or to verify what they recall. Unlike patients who cannot remember actual events that happened to them, these patients "remember" any thought as a valid memory.

Can anything be done to recover the lost memories of amnesiacs? Psychologist Herbert Crovitz works primarily with patients who have amnesia due to severe blows to the head. One patient, Mr. A., even after three years, could remember little that happened during the months before his motorcycle collided with a truck. Mr. A. particularly wanted to remember details surrounding a discovery he was told he and his brother had made. Crovitz cued Mr. A.'s memory with randomly chosen concrete words, such as "brick," "girl" and "house," and for each word, asked him to try to remember an event that had occurred very close to the time of the discovery. The task was not easy. Mr. A. often spent a minute searching for a memory before finding one. In the course of two hours, however, much to his amazement, he was able to recall the event he sought.

This example points out one of the most fascinating aspects of autobiographical memory. Mr. A. had been told of the event he wanted to remember; he could not remember it for himself—the sense of recognition just was not there. Crovitz provided this for Mr. A., but then he was puzzled by what he had done: Had he, indeed, restored a specific memory, or created the sense that a memory was Mr. A.'s own? □

*David C. Rubin is an associate professor of psychology at Duke University. This article is based on *Autobiographical Memory*, a book edited by Rubin, which is to be published by Cambridge University Press in spring of 1986.*

*A cassette tape, "Learning and Memory," by Tony Buzan, is available. To order, see the *Psychology Today* Tape advertisement in this issue.*



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