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## WHO REMEMBERS WHAT?: GENDER DIFFERENCES IN MEMORY

*He: We met at 9.*

*She: We met at 8.*

*He: I was on time.*

*She: No. You were late.*

*He: Ah yes, I remember it well.*

*He: We dined with friends.*

*She: We dined alone.*

*He: A tenor sang.*

*She: A baritone.*

*He: Ah yes, I remember it well.*

("I Remember It Well," sung by Maurice Chevalier  
and Hermione Gingold in *Gigi*)

He remembers meeting at 9, that he was on time, that they dined with friends, while a tenor sang. She remembers meeting at 8, that he was late, that they dined alone, while a baritone sang. There is humor in these differences, which derives in part from highlighting the fallibility in his memory for this "important" social occasion. But the example also brings us quickly to the main question we pose here: When men and women try to recall the past, who remembers what?

Psychologists interested in people's memory for complex events have often been led to ask questions about individual differences. Our focus here is on one such variable, gender. Who is better, males or females, at remembering the day they met? Who is better at remembering the food, or the clothes, or the feelings, the time the

dinner began, or how long it lasted? Is He or is She? If he and she leave the restaurant and witness an armed robbery on the way home, who is better at remembering the event, the way the robber talked, the way he looked, the direction he ran?

To place these questions in perspective, it will be helpful to know something about how memory researchers think about memory. Consequently, in the process of outlining the influence of gender differences on various aspects of human memory, we will attempt to familiarize the reader with important concepts and procedures that have been used to guide memory research. One such concept, the semantic-episodic distinction, will serve as a springboard for identifying three areas of memory research — traditional episodic, autobiographical, and eyewitness memory studies — that we will subsequently consider in our discussion of gender differences.

### EPISODIC VERSUS SEMANTIC MEMORY

Information in long-term memory takes a variety of forms. Tulving posited two distinct classes of memories: semantic memory, or general knowledge about the world, such as the fact that a restaurant is a place to eat, and episodic memory, consisting of our own personal experiences, such as the fact that I met you at 8:00 p.m. when we ate at The Broadway Restaurant last Saturday. In his own words: "Épisodic memory receives and stores information about temporally dated episodes or events, and temporal-spatial relations among these events. . . . Semantic memory is the memory necessary for the use of language. It is a mental thesaurus, organized knowledge a person possesses about words and other verbal symbols, their meaning and referents, about relations among them, and about rules, formulas, and algorithms for the manipulation of these symbols, concepts, and relations" (385–86).

One result of attempting to classify all memory processes within two broad categories is that it forces researchers to consider the components of memory. Tulving's distinction between semantic and episodic memory highlighted the fact that many aspects of episodic memory had been widely ignored. Maccoby and Jacklin's comments on gender differences in learning and memory clearly reflected this gap in our knowledge. While Maccoby and Jacklin were able to discuss how men and women performed on list-learning experiments, they had nothing to say about gender differences for a whole

range of other important types of episodic memory abilities. Their review contained no discussion of memory for spatial information or memory for faces, or memory for real-life, complex events, such as the day that He and She met. Since Maccoby and Jacklin's seminal review of gender differences, much research has been devoted to these frequently neglected aspects of episodic memory. It therefore seems appropriate to reconsider how the two sexes fare in light of the substantially broader range of episodic memory research that has been conducted in recent years.

In undertaking a review of a major individual difference variable such as gender, it is helpful to identify some underlying principles that can generate predictions and unite an otherwise disparate collection of individual findings. Maccoby and Jacklin suggest one principle for understanding gender differences in memory: males and females do not differ in overall memory ability, although interest, motivation and training could affect the content of what is remembered. This principle seems reasonable and is one that we kept in mind as we reviewed the literature. However, it fell short in one important respect; it failed to make any testable predictions other than that one sex should not dominate the other in all aspects of memory. In order to generate some more satisfying predictions we had to take a different approach. It occurred to us that perhaps the best predictions regarding differences between men's and women's memories would come straight from the source, i.e. from men and women themselves. Accordingly, we developed a brief questionnaire that listed a number of different memory situations and asked subjects to predict whether or not men and women would differ, and if so, to estimate the magnitude of that difference. Our hypothesis was straightforward: men's and women's beliefs about sex differences in memory may reflect empirically observed differences. Results of our survey are summarized in Table 1. Having gathered a set of predictions about memory generated by men and women, we then compared them to the findings obtained by researchers in the areas of verbal, spatial, and face memory, as well as autobiographical and eyewitness memory.

Throughout our review we kept two hypotheses in mind: 1) that men's and women's relative memory ability would depend on the specific type of memory in question; and 2) that these differences would be predicted, at least to some degree, by men's and women's beliefs about gender differences.

Table 1. Percentage of Responses for Items  $\times$  Gender Preference for Memory

|   | Males<br><i>much</i><br>better than<br>females | Males<br><i>somewhat</i><br>better than<br>females | No<br>difference | Females<br><i>somewhat</i><br>better than<br>males | Females<br><i>much</i><br>better than<br>males | N   |
|---|--|--|------------------|--|--|-----|
| 1. After listening to a list of 15 common nouns, subjects are asked to remember as many words as possible.        | .86  | 8.9  | 59.0             | 29.1   | 2.2  | 461 |
| 2. After seeing 50 male & female faces, subjects are asked to identify the ones they saw from a set of 100 faces. | .87  | 10.4   | 40.3             | 43.3   | 5.2  | 462 |
| 3. Subjects are asked to view a complex block pattern and asked to reconstruct it from memory.                    | 10.9   | 56.2   | 27.8             | 4.2  | .88  | 457 |
| 4. After having visited a new place only once, subjects are asked to go back to it 6 months later.                | 7.54   | 34.1   | 40.7             | 15.1   | 2.4  | 464 |
| 5. After having a conversation with a friend, subjects are asked to recall what they and the friend said.         | .65  | 5.4  | 35.5             | 45.4   | 13.1   | 465 |
| 6. After having gone to a wedding, subjects are asked to describe what the bride's cousin wore.                   | .21  | 1.5  | 10.1             | 37.8   | 49.7   | 465 |
| 7. Subjects are telephoned in the morning and asked to recall where they put their keys the evening before.       | 1.5  | 16.3   | 58.8             | 19.3   | 4.1  | 461 |
| 8. After having parked the car and shopped for 2 hours, subjects are asked to find their way to their car.        | 8.0  | 31.5   | 45.1             | 12.8   | 2.6  | 461 |
| 9. Subjects witness a murder being committed, and are asked to describe the killer.                               | 9.4  | 31.9   | 45.6             | 12.0   | 1.1  | 351 |
| 10. Subjects view a robbery and are asked to describe the gun the robber was holding.                             | 32.1   | 49.9   | 16.5             | 1.4  | 0  | 351 |
| 11. After seeing a 30-second film of a bank robbery, subjects are asked "How long was the film?"                  | 2.8  | 16.2   | 72.4             | 8.0  | .57  | 351 |
| 12. Subjects are asked to remember the first person they kissed.  | 1.7  | 0  | 31.5             | 39.2   | 26.7   | 352 |
| 13. Do males or females have overall superior memory?   | .74  | 6.9  | 68.8             | 20.9   | 2.7  | 407 |

## VERBAL, SPATIAL, AND FACE MEMORY

In our search of the relevant literature, we started with an original pool of 123 references from the PsychInfo database consisting of journal articles, book chapters, convention presentations, and unpublished dissertations. We supplemented this with hand-searched literature that we considered relevant, discarding studies that were inconclusive with respect to sex differences or did not use a specific memory measure. Our entire literature search started with research reported post 1978 since Maccoby and Jacklin's work had summarized the earlier research.

The most influential work published in the area of gender differences (Maccoby and Jacklin) summarized differences in verbal memory in the following way:

... verbal content in a memory test may give some advantage to girls, but it clearly cannot be said that either sex has a superior memory capacity or a superior set of skills in the storage and retrieval of information, when a variety of content is considered. (59)

Whereas Maccoby and Jacklin's conclusions sound reasonable, we discovered upon examination of the literature they reviewed that out of a total of 22 studies measuring verbal memory, 10 showed female superiority, 12 showed no difference, and none showed male superiority. The results of our review closely resembled those of Maccoby and Jacklin (although, as we shall later discuss, our conclusions may differ somewhat). Out of a total of 35 studies that used a measure of verbal memory, 20 reported female superiority, 13 reported no difference, and 2 reported superior male performance.

The majority of studies reported the use of word lists, and fewer studies used paired associates, digits, prose, or the Weschler memory subscales. The dependent measure most commonly used was free recall, although some used cued recall or recognition, and a small number of studies used a combination.

Of the 24 studies using an adult population, 15 reported better performance by females, 7 reported no difference, and 2 favored males. In the 11 studies with children, 6 showed superior female performance, 5 showed no difference, and none reported superior male performance. Our review of the literature on gender differences in verbal memory suggests a clear pattern: Females, whether adults or children, appear to do better on tasks involving verbal

material. However, it must be kept in mind that over a third of the studies showed no sex differences.

Our questionnaire data showed an interesting pattern of results for the item that asked subjects about their beliefs about whether males or females would remember verbal information better. The majority of subjects (59%) believed that there were no differences in verbal memory (Table 1, item 1). However, when they favored males or females, a female preference dominated. Specifically, 31% believed that females are better, whereas only 10% favored males. We might speculate about the reason for the finding that the direction of the preferences (males better versus females better) matches the research evidence. It is possible that subjects in memory experiments are acting in accordance with the stereotypes regarding sex differences in memory. Another possibility is that the research findings are a true reflection of gender differences in memory in the real world and our subjects' beliefs are based on this experiential data.

Maccoby and Jacklin did not review data on memory for spatial information (presumably since they focused mainly on gender differences in spatial skills in general), and no previous review exists with which we can compare our pattern of data. The literature search made available 16 studies in which memory for spatial information was measured. Overall, males appear to perform better than females: In 8 studies, males outperformed females, 6 studies showed no difference, and 2 studies favored females.

Materials used to test spatial memory included Corsi's Block Tapping test, the Weschler (WISC or WAIS), maps, and blocks. The memory measure was a free recall or recognition task in most cases. One study measured position recall and one used a mental rotation task. In the 10 studies of adults, 5 showed superior male performance, 3 showed no significant difference and 2 showed better female performance. Of the 6 studies using children, 3 showed better male performance and three showed no difference. None showed superior female performance. When memory for spatial information is tested, it appears that the gender advantage favors males. However, a relatively small number of studies were available, and it is difficult to draw any conclusion regarding the significance of this difference.

Again, our survey data indicate that people's beliefs about a gender difference in memory for spatial information matches the

research data: they believe that for spatial information, males rather than females will show superior memory. When memory for a block pattern was the target information, subjects believed that males would be somewhat better at the task than females (67%); only a corresponding 5% thought that females would be better than males (Table 1, item 3). When memory for information about directions was involved, although 41% of subjects believed there was no difference, more than twice the number of subjects believed that males would be better (42%) than those who felt that females would be better (17%) (Table 1, item 4).

For our purpose, a gender difference in memory for faces was particularly interesting because of the direct relevance of these findings to the domain of eyewitness identification. In a summary of gender differences in face recognition, Clifford and Bull concluded that “. . . females are better than males at recognizing faces they have previously seen.” They qualified this statement, however, by cautioning the reader that these findings came from laboratory studies and may not hold up in real life or simulated life-like situations.

In most studies on face recognition, subjects were shown photographs of faces. Later they were asked to identify those faces among a set of randomly presented faces consisting of ones they had seen before as well as new ones. In our literature review, of 11 studies dealing with face recognition, 7 showed superior female performance, 4 showed no difference between males and females, and none showed superior male performance. Two studies in which children are subjects reported no sex difference (Hota; Etaugh and Whittler). In a review, Shapiro and Penrod reported a meta-analysis of facial identification from which they concluded that females are better at recognizing faces than are males. Although several questions need to be answered (e.g., Is this effect restricted to recognition of same sex faces? Does female superiority also surface when the situation is a real-life, affect-laden one?), it appears that at least in laboratory situations and with same sex faces, females do perform better than males.

Why does the research evidence on face memory favor females? A number of potential interpretations are available, and Clifford and Bull suggest at least four: (a) superior female performance may be a function of the greater exposure of females to female faces through the media, providing them with greater opportunity to learn encod-

ing strategies; (b) females' face-recognition superiority may be a function of their greater social attentiveness; (c) personality and cognitive factors as well as motivation may be the cause; and (d) female superiority may have an ontogenetic component.

Interestingly, our survey data indicated that although 40% of subjects believed that males and females would be equally accurate on a face recognition task, 49% favored females, whereas only 11% favored males (Table 1, item 2). Thus, for all three domains (verbal, spatial, and face memory), although most subjects believe there is no memory difference between the two sexes, those who give the advantage to either females or males show intuitions that match the research data.

### AUTOBIOGRAPHICAL MEMORY STUDIES

We asked our group of men and women a number of questions regarding their relative memory abilities for autobiographical information. Women were believed to have better memories than men for conversations, 59% of subjects favoring women versus 6% favoring men. In addition, 87% of subjects believed that women would be better at remembering what someone was wearing as compared to only 2% of subjects who favored men. The story was somewhat different for spatial autobiographical memories. For some spatial memories, such as remembering where one's car is parked, men were given the upper hand, with 39% favoring men compared to 15% favoring women. For other spatial memories such as remembering where they had left their keys the evening before, men and women were not predicted to differ (Table 1, items 5-8). Armed with these predictions, we searched the autobiographical memory literature. Unfortunately, in many cases the nature of autobiographical studies did not allow us directly to evaluate our subjects' predictions. Nevertheless, some interesting sex differences did emerge.

In autobiographical memory studies people are typically asked about their own past personal experiences. Occasionally a very ambitious researcher will record his or her experiences over an extended period of time, and will later be tested to see what is remembered. Psychologist Marigold Linton studied her own memory every day for a six year period from 1972-1977. She wrote on cards individual memories such as "I have dinner at the Canton Kitchen; delicious lobster dish" or "I land at Orly Airport in Paris."



By 1977 she had written down descriptions of more than 5000 items. Every month she tested her memory.

Linton's analyses revealed that by the end of any one year, she had forgotten 1% of the items written during that year. By the time those items were about two years old, she had forgotten about 5% more. Forgetting continued so that by the time the study ended, she had forgotten over 400 items of the 1350 she wrote down for 1972, or about 30%. What kinds of things did she remember? Most of the memories were about unusual, nonrepeated events, like a traffic accident, or surprising events, like a tennis game in which one of the players was injured. But overall, Linton's results suggest that specific memories are regularly dropping out.

Another psychologist, Willem Wagenaar, began recording his memories — one or two per day — at the age of 37. He was 43 when he stopped and began testing. Among other things Wagenaar found that pleasant events were better recalled than neutral or unpleasant events. The reason cannot be that pleasant events were rare; in fact they were much more frequent than the unpleasant events. The reason also cannot be that pleasant events were more salient than unpleasant events; they were not more salient. For some reason, however, the unpleasant events were relatively suppressed in memory.

There are a number of implications of these studies for the personal recollections of both men and women. First, personal memories may be lost at a fairly alarming rate. Although unique and salient events might be better retained in memory, there is no guarantee that simply because an episode seems important at the time, it will still be available for recall a year or so later.

Though tempting, it is not appropriate to say anything about the memories of men versus women as a consequence of these two studies. Not only can we not generalize from an examination of one man's and one woman's memory, but the specific procedures used by this one man and this one woman were sufficiently different that their results are not comparable.

Another technique for studying autobiographical memory involves providing subjects with single words and asking them to generate the first memory for an event that comes to mind (Galton). For example, when given the word "flower," a subject might describe her first date with her boyfriend. Robinson used this technique to compare the types of memories that were elicited by object

words (e.g. "book"), activity words (e.g. "open") and affect words (e.g. "interested"). Robinson's variables included recency of the event, type of event described, latency to generate an event, and age of the subject at the time of the incident. Some interesting observations emerged about how people recall autobiographical memories. For example, affective words elicited more recent memories than did object or activity words. Of greatest interest for us, however, were reasonably reliable sex differences. Specifically, women tended to generate more recent memories and tended to think of memory associations more quickly than men. In other respects, however, the two sexes were quite similar in their performance. Men and women were equally likely to generate the three most common types of autobiographical experiences: accidents and injuries, romantic episodes, and first experiences. In addition, differences in the types of episodes that were generated in response to the three types of word prompts were similar for men and women. Thus, while sex differences in autobiographical memory recollections were observed, they were not particularly pronounced. Robinson concluded that "For the present, the sex differences obtained in this study must remain an intriguing problem which future research may clarify" (594).

In order to further investigate differences in men's and women's recollections of autobiographical memories, we attempted a follow-up of Robinson's study in which we simply asked people to describe a memory from their past and then to answer various questions about that memory. There are various ways in which males' autobiographical memories might be expected to differ from females'. For example, a common belief among lay people is that women are more emotionally oriented than men (Broverman, Vogel, Broverman, Clarkson, and Rosenkrantz). If there is some validity to this intuition, then one might expect women to rate their memories as being more emotional as compared to men. In addition, in Robinson's study it was observed that memories produced in response to affective words were more recent than those generated in response to the other types of words. It was also observed that women recalled more recent memories than men. It thus seemed plausible that women might recall more emotional memories than men, and this might account for the difference in the recency of their recollections. The factors that we thought might distinguish the autobiographical recollections of men and women were: emotionality, abstractness, personal significance, frequency with which they thought about the

Table 2. Mean Evaluations of Self-Generated Autobiographical Memories

|  | Males<br>(n = 94) | Females<br>(n = 113) | T value |
|--|-------------------|----------------------|---------|
| Emotionality<br>(1 not emotional, 7 very emotional)                          | 4.45              | 4.80                 | 1.32*   |
| Abstractness<br>(1 concrete, 7 abstract)                                     | 2.24              | 2.54                 | 1.55*   |
| Life change associated with event<br>(1 no life change, 7 major life change) | 3.27              | 3.68                 | 1.38*   |
| Frequency of thinking about the event<br>(1 never, 7 frequently)             | 4.39              | 4.41                 | .55*    |
| Pleasantness<br>(1 unpleasant, 7 pleasant)                                   | 4.56              | 4.58                 | .07*    |

\* =  $p > .05$

memory, and pleasantness. After describing memories from their past, we asked subjects to rate them on seven-point scales, one for each of the above dimensions. Our results are presented in Table 2.

As can be seen in Table 2, in general men and women were similar in their evaluations of their self-generated autobiographical memories. Although none of these differences reached statistical significance, there was a slight trend for women to describe their memories as being more emotional, more abstract, and representing greater life change. It thus remains plausible that when queried, women may spontaneously generate slightly more emotional, personally significant memories than men. Of course such an interpretation must be viewed as suggestive conjecture, since in addition to not being statistically significant, these differences may be confounded by differences in men's and women's willingness to self-disclose, as well as by variations in their use of interpretation of ordinal scales.

In order to explore further possible differences in the elicited autobiographical memories of men and women, we did a content analysis of a subportion of the memory descriptions. We entertained a number of specific hypotheses about potential differences in the focus and content of men's and women's memories. The first hypothesis that we considered was that women's memories would be more likely to focus on social situations than men's memories. We considered three aspects of social situations: 1) whether the memory

involved other people, 2) whether the memory described a conversation, and 3) how other people in the memory appeared. An example of a memory including other people is: "The other day I went out to the University, messed around with some friends until late at night and then went home and watched a movie on a video cassette recorder." An example of a memory that contains a conversation is "High school graduation day: the senior luncheon was held that afternoon. When I arrived home relatives were there from out of town. My aunt and uncle called to say they wouldn't make it and I cried. I told my parents I didn't want to go to the ceremony. I went anyway; it was boring." An example of a memory that describes how other people appeared is: "I remember making the state qualifying time in the 50 free style at districts last year. I remember lifting my hand up and seeing that I touched first. But most of all, I remember my timer's face as she smiled and gave me my time."

A second hypothesis that we considered was that women would be more likely than men to mention their feelings. An example that described a feeling is "I remember how I felt at a party where I was meeting new people. I felt anxious inside and sometimes nervous. I felt impatient at times like I want to have a lot of fun at the immediate moment."

A third hypothesis that we considered was that men would be more likely than women to provide spatial information while describing their memories. An example of a description that contained spatial information is "This morning I walked to class a different way. I left my house, walked down the sidewalk and crossed the street as usual. Then I walked a short ways and crossed another street (this I do not usually do). Then I cut across some grass to class instead of walking on the pathway like I usually do."

As can be seen in Table 3, this content analysis, like the comparison of the subjective memory evaluations, revealed few differences between the memories of men and women. The one significant difference observed was that men were more likely than women to include spatial information in their memory descriptions:  $z = 1.88$ ,  $p < .05$  (one tailed). This result dovetails with our earlier observations that men tend to have better memories for spatial details.

Although the comparison of men's and women's self-generated memories can demonstrate interesting gender differences in the type of autobiographical memory that comes most easily to mind, we must be cautious in using this type of data to draw conclusions about

**Table 3. Percentage of Memory Descriptions Containing Various Features**

| Feature                         | Men<br>(n = 34) | Women<br>(n = 34) |
|---------------------------------|-----------------|-------------------|
| Included another person         | 64 %            | 61 %              |
| Described a conversation        | 12 %            | 12 %              |
| Mentioned the person's feelings | 29 %            | 21 %              |
| Described someone's appearance  | 3 %             | 0 %               |
| Included spatial information    | 45 %            | 21 %              |

differences in memory ability. For example, Robinson's observation that women tend to recall more recent memories than men does not demonstrate that women have more accurate memories for the present, nor that men have a better memory for the past. While it is possible that differences in memory accessibility account for this finding, it is equally likely that women are simply more interested in more recent memories. In short, differences in the unverified memories that men and women elicit when asked to generate a memory are more indicative of their memory preferences than their memory ability.

Since the autobiographical studies mentioned above cannot really measure accuracy, it is not possible fully to evaluate our subjects' predictions regarding autobiographical gender differences. Nevertheless, it is worth noting that many of our subjects predicted that women would be more likely to recall conversations and what people were wearing than men, yet no difference emerged in our analysis of the frequency with which the two sexes mentioned these items. On the other hand, our subjects predicted that men would be more likely in many cases to recall spatial details than women, and in fact spatial details were more often mentioned by men. Since our subjects' intuitions were often correct when it has been possible to validate them, future research might attempt to study autobiographical memory in ways that permit verification, such as recalling the details of a lecture that was also videotaped. If our subjects' intuitions are accurate, women might be more likely to recall the appearance and conversations involving the lecturer and audience, while men might be better able to generate a map of the auditorium in which the lecture was given.

## SURVEY RESEARCH

Although usually very specific in scope, there are some autobiographical memory studies that can be verified for accuracy of memory. Data from large-scale surveys designed to measure people's recollections of automobile accidents, hospitalizations, and crime victimizations can reveal useful information about how people generally process important events, and how the sexes might differ in terms of their recall. Use of such data nicely complements the great majority of psychology experiments that typically involve college students in university laboratory settings who work on tasks that bear little resemblance to their everyday activities (Fienberg, Loftus, and Tanur; Loftus, Fienberg, and Tanur).

Gender differences were found, for example, in a survey designed to evaluate injuries by motor vehicles. The study consisted of interviews with approximately 300 Michigan residents known to have been in motor vehicle accidents during the 12-month period preceding the interview. Information obtained from each respondent during the interview was compared with data on official report forms (Henson, Cannell, and Lawson). While the difference was small (.77 versus .73), it was statistically significant in favor of more accurate reporting by females. Unfortunately, the report did not give a breakdown on which items females reported more accurately and which, if any, were more accurately reported by males. Thus, it is entirely conceivable that females are better able to remember some details (like the number of occupants in the car) while males are better able to remember other details (like the weather or the make and model of the car) but when a combined accuracy score is derived covering 39 items, the advantage goes to females.

A second survey example comes from the U.S. National Health Interview Survey, a major data collection program designed to secure health statistics. One part of the project concentrated on people's ability to report their own hospitalizations and the hospitalizations of significant others ("Reporting of Hospitalization"). The respondents in this survey were approximately 1500 persons who were interviewed up to a year after a family member had been discharged from the hospital. The investigators hypothesized that since it is usually the women's role to care for sick or recuperating family members, women might be less likely to underreport hospitalizations than men. However, this result was not observed. There

was little difference between men and women in reporting either for themselves or for other members of the family. The percent underreporting their own hospitalizations was 11 for men and 10 for women. The percent underreporting the hospitalizations of their children was 12 for men and 14 for women. The percent underreporting hospitalizations of other adult family members was 16 for men and 14 for women. When deliveries were excluded from the analysis, women were slightly poorer reporters for themselves than were men for themselves. However, women reported somewhat better for other adults than did men (8).

### EYEWITNESS MEMORY STUDIES

Eyewitness memory studies have an advantage over many autobiographical memory studies in that it is an easy matter to know whether a given witness is accurate or not. In these studies, subjects typically view a complex event, such as a film of a crime or accident, and are later tested.

One common observation is that the way a question is asked can affect the answer a person gives. Asking people who have seen an auto accident, "How fast were the cars going when they smashed into each other?" leads to a higher estimate of speed than the same question asked with the verb "hit." Another common observation in these studies is that after an event has been experienced, new information about the event sometimes comes to the person's attention and becomes incorporated into memory. The result is that the memory is supplemented or altered. When exposed to misleading post-event information, subjects have misrecalled the color of a car that was green as being blue, a yield sign as a stop sign, broken glass or tape recorders that never existed, and even recalled something as large and conspicuous as a barn when no barn was ever seen (see Loftus; Wells and Loftus).

The eyewitness studies on the malleability of memory suggest that some information residing in a person's memory may be altered by post-event information. This work constitutes evidence for the greater relative vulnerability of episodic memories about which Tulving hypothesized. This means that even the best laid plans of men and women for producing accurate recollections may be stymied by a natural and unfortunate byproduct of the reconstructive and malleable nature of memory. When He remembered that they

met at 9, and She said it was 8, perhaps she influenced him to be wrong.

In terms of suggestibility, there is an ancient belief, mentioned by Stern among others, that women are more suggestible than men. Stern wrote that suggestive questions "operate with special force in the case of young and uneducated persons; more with women than with men" (273). If Stern had lived another 70 years, he would have been faced with empirical research that contradicted his intuitions. An important consideration in terms of whether females will appear to be more suggestible than males or not is the particular items that are considered critical in the experiment. Research published some 70 years after Stern's remarks suggests that both women and men pay more attention to items that catch their interest and consequently store more or better information in memory about those items. If a subsequent test asks about female-oriented items, women outperform men. The converse is true if the testing concerns male-oriented details (Powers, Andriks, and Loftus). In this research subjects saw a simulated incident and some were later exposed to misleading information about four critical items. Two critical items were male-oriented in that males—in a previous study—had been more accurate in recalling them. One of these was a question about the male main character and another was about a nearby automobile. Two critical items were female-oriented; they concerned the female main character.

The results were clearcut. Males were more accurate and less suggestible about the male-oriented items while females were more accurate and less suggestible about the female-oriented items. This finding provided clear support for the hypothesis that females and males tend to be accurate on different types of items, perhaps indicating their differential interest in particular items and corresponding differential amounts of attention paid to those items. One consequence of this differential interest is that there is a difference in the effect on men and women of misleading information about these specific items. This reasoning is in line with Eagly, who pointed out in her review of sex differences in the related area of influenceability of attitudes that "individuals are more readily influenced to the extent that they lack information about a topic or regard it as trivial and unimportant" (96). The specific items, then, are critical. The fact that past research sometimes shows males to be more accurate



than females may be largely due to the specific items on which those males and females were tested.

One study suggests that different processes might be involved when males and females succumb to suggestive information (Tousignant). In this work, males and females watched several simulated events. Some were exposed to misleading information while others were not. All were tested. In addition, they were given a variety of other tests designed to measure 1) their need to present themselves in a socially desirable manner, 2) the extent to which they habitually reflect upon themselves and their environment, 3) their beliefs about their own memory ability, and 4) their visual imagery ability, along with other tests.

In this particular study females were more susceptible to misleading information than were males. But of greater interest was the finding that the two sexes seemed to be influenced by misinformation for different reasons. For males, those who were good at visual imagery were less likely to be influenced by misleading information. For females, those who acquiesced to external sources of information and claimed to have a *good* memory were more influenced by misleading information. This analysis suggested that males may be misled because of a distortion in their memory while females may be misled because of response bias considerations. Clearly more research is needed to support or refute the hypothesis that different mechanisms are at work when males and females are exposed to misleading information.

Probably the best evidence for the hypothesis that neither sex has superior memory ability, but that they do differ in terms of what is remembered, comes from studies of general eyewitness accuracy. The eyewitness literature is filled with studies in which both men and women participated as subjects. In terms of who performs better, the results have been equivocal. Some studies have shown that females perform better than males (e.g., Ellis, Shepherd, and Bruce; Lipton). Other studies have shown that males perform better (e.g., Trankell). Still others indicate no differences in the accuracy of women and men (Bird; Cady; Geiselman, Fisher, MacKinnon, and Holland). A few studies have produced what might be called rather complicated results. For example, Clifford and Scott showed that men and women were equally accurate in recalling details of a nonviolent event, but males were better in recalling the details of a violent one. Yarmey and Jones showed that males and females were

generally equivalent in their ability to recall details of a simulated assault and to recognize people previously seen. The only significant accuracy difference between men and women was a greater tendency for women to report that they had not seen an individual earlier when in fact they had. However, a close examination of the data reveals an interesting trend. The event that was shown was a simulated assault and rape. Subjects later tried to identify two people—the suspect and the victim. When given a test that did not contain the correct individuals, females made more errors (more false alarms, fewer correct rejections) than males on the suspect while males made more errors on the victim. This suggests that men and women may be paying attention to different things.

It is surprising that women are not routinely better at recognizing people in the eyewitness studies, given that they outperformed men in the more traditional face recognition studies. Many people in our survey anticipated, paradoxically, that women would be better than men at recalling faces in the traditional recognition studies, while not holding such an advantage in eyewitness situations. In fact, people may have overcompensated for the difference between men's and women's face recognition performance in a traditional and eyewitness situation by predicting an advantage for men. Approximately 41% believed that men would be more likely to recall the appearance of a murderer, as compared to 13% favoring women (Table 1, item 9). It seems likely that this reversal in people's intuitions about gender differences in face recognition reflects a belief that women may be differentially affected by the stress of an eyewitness situation.

There is in fact some evidence indicating that women do respond to eyewitness situations with a greater degree of stress, and that this greater stress may, in at least one respect, produce more inaccurate recollections. Loftus, Schooler, Boone, and Kline showed subjects a videotape depicting a bank robbery. Women reported higher levels of anxiety than men and in addition overestimated the duration of the robbery to a greater extent than did men. In a follow-up study, subjects witnessed two versions of the bank robbery, one more violent and stressful than the other. Although both versions lasted the same amount of time, the more violent version was estimated as taking more time and induced greater anxiety; thus level of anxiety was implicated as a source of time overestimation. Taken together, these studies suggest that women may overestimate the duration of

violent events to a greater degree than men as a result of the higher anxiety that they experience in response to such events.

Although most subjects in our survey did not believe there would be a difference in time estimations, the above result is consistent with their intuitions when they indicated a preference. Approximately 10% of those queried believed that men would be more accurate in recalling the duration of a film depicting a bank robbery, compared to 9% who believed that women would be more accurate (Table 1, item 11).

## CONCLUSIONS

The current review suggests that neither sex can be said to have a better memory per se; rather the two sexes differ in terms of what type of information they remember best. Unfortunately most of the studies that we reviewed were not designed to explore gender differences in memory for different types of items. Our review suggests that interactions between gender and type of memory item would be a fruitful topic to pursue.

We also demonstrated empirically some interesting aspects of people's beliefs about gender differences in memory. First, we showed that generally people believe there are no gender differences in memory for most items. When they favor males or females, however, their beliefs mirror the research data (e.g., females better at verbal memory and face recognition, males better at spatial memory). When asked about overall memory, over 20% favor women as compared to less than 8% favoring men (Table 1, item 13). This observation is striking in light of other data that suggest that for both men and women, males command more attention (Robinson and McArthur), are more influential (Fry), and are remembered better when they speak (Gruber and Gaebelein, cited in Bridgewater). These observations have caused some researchers to claim that people expect men to be more competent, intelligent, and knowledgeable than women (Bridgewater). So why, we ask, do people think that women have better or equal memories compared to men, but at the same time fail to respond to women in the same positive way? Perhaps, memory is not considered to be an important dimension of competence. (The stereotypical secretary remembers her boss's appointments; the wife remembers the family birthdays.) Anecdotal evidence in support of this contention comes from the observation

that people are more than willing to confess "I do not have a particularly good memory," but they are loathe to admit "I am not particularly intelligent." Thus a slight favoring of women's overall memory ability may not compensate for people's seemingly lower evaluations of women in other important respects. Even if people realize that memory is an important aspect of intellectual functioning, they may nevertheless be less attentive to or influenced by women as a result of habit stemming from a long tradition of men holding positions of greater authority.

Considerable caution should be used in attempting to explain the gender differences in memory that have been identified in this review. Other researchers (e.g., Kimura) have noted the inescapable fact that men and women differ genetically, physiologically, and psychologically. In addition, differences in the historical social roles of the two genders have undoubtedly contributed to the development of different interests as well as different expectations regarding the types of activities at which each gender should excel. Thus, variations between men's and women's memory performance may be due to their physiological capabilities, their interest, their expectations, or some complex interaction of these factors. Though presently unexplainable, the gender differences identified in this study still provide an important insight: If She remembers better than He that they met at 8, that he was late, that they dined alone while a baritone sang, there will be something else that He will remember better than She.

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