
Once Upon a Time There Was a Math Contest: Gender Stereotyping and Memory

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In this classroom exercise, students observe gender stereotypes influencing memory processes. A student retells a story to a classmate, who in turn repeats it to a third classmate, who retells the story to the entire class. The gender of the main character changes how others remember and retell the story. The exercise also demonstrates other memory concepts and Allport and Postman's (1947) classic concepts of leveling and sharpening. Student evaluations of the exercise reveal that comprehension of gender stereotyping improved significantly after participating in the demonstration. Thus, this demonstration helps students learn about memory processes and the influences of gender stereotyping on behavior.

When asked, most students believe they can avoid gender stereotyping and that such biases are a thing of the past. This exercise illustrates the continued pervasiveness of gender stereotypes and the ways in which stereotypes influence memory processes.

Classic memory research by Allport and Postman (1947) showed that people made systematic omissions when retelling stories they had heard. One type of omission, referred to as *leveling*, occurred when listeners dropped certain details because they did not fit the cognitive categories or assumptions that listeners held. A second type of omission, referred to as *sharpening*, occurred when listeners emphasized details of a story that were consistent with their cognitive framework. Bernstein and Goss (1999) described a classroom demonstration showing these memory phenomena and utilized a procedure similar to the demonstration reported here. In particular, a student hears a story that he or she must repeat to another student who did not hear the original telling of the story. This "rumor chain" continues until five students have heard and retold the story. The story's content changes dramatically from the first to the fifth telling, and the class discusses these differences. This study expands on the findings of Bernstein and Goss by adding to the story and manipulating a critical variable: the gender of the main character in the story. This variable, untested by Bernstein and Goss, allows students to witness how listeners forget or add different details, depending on the gender of the protagonist.

In addition to gender leveling and sharpening, gender stereotypes may further influence recall of information because gender may serve as a prime for the way in which listeners process and later remember information (Bargh, 1994). Similarly, Bem's (1981) research on gender schemas and sex typing revealed that many people utilize gender-related filters

when processing information. Such people are likely to make more confident, faster, and easier decisions about their world when they process information with respect to gender. For instance, they might decide that a target person is compassionate because she is wearing pink, a feminine color. Although other classroom demonstrations have focused on general memory processes (e.g., Miserandino, 1991), this demonstration specifically shows how memory can be influenced by such filters and more general gender stereotypes. According to Bargh's and Bem's research, those who use such primes and sex typing will be particularly likely to adapt the story to fit gender-stereotype congruent expectations.

We believed that students would learn about memory processes from experiencing the repeated retelling of the story, examining how the gender of the initial main character influenced the results, and discussing as a class the processes and implications. To test this hypothesis, we first validated the demonstration (Phase 1) by conducting it with a number of groups outside of the classroom. Then, we conducted the demonstration in the classroom (Phase 2) and collected student feedback to observe their reactions and the extent to which they learned.

Method

Participants

For Phase 1, two female experimenters approached 51 students (32 men and 19 women) and members of a running club, all of whom (17 to 45 years of age) were socializing outside an academic building and campus pub. The experimenters asked 3 individuals at a time if they would like to participate in a brief study. They all agreed to participate. Thus, 17 groups participated. In Phase 2, 40 students (16 men and 24 women) observed and evaluated the demonstration in a classroom setting as part of an Introductory Psychology course.

Materials

This demonstration requires the use of two passages, "John's story" and "Sylvia's story." Table 1 depicts John's story, and Sylvia's story is identical with the exception of the name change and all references to the gender of the main character.

Table 1. John's Story

John received a letter in the mail notifying him that he had lost the Texas State Achievement in Math Competition. He had wanted to win and was unhappy with the results. He had been the best student in his math class last year. Losing really hurt his self-esteem. He found out that Terry Browning had done better than him. He hated Terry Browning for that. To make himself feel better he cried, baked cookies, beat pillows, kicked something, took a long bath, and talked to his best friend. After that, he went to the mall where he shopped and played video games in the arcade until he had beaten all the records. He then went running and came home to watch *The Princess Bride*.

Design and Procedure

To test whether the demonstration worked (Phase 1), one experimenter (who audiotaped all interactions after having participants sign informed consent forms) read one of the story versions to the first participant. The second experimenter stayed with the second and third participants (out of earshot but visible to the first experimenter) and directed these participants one at a time to join the first experimenter when she waved her hand, signaling that the current story's telling had ended. Thus, when the experimenter finished telling the story to the first participant, the second participant joined the group and listened to the first participant recreate the story. Then, the third participant listened to the second participant and finally retold the story to the entire group. Next, the experimenters debriefed the participants and told them about the other story version. Experimenters also discussed with participants how their stories changed from beginning to end. Participants then completed a brief questionnaire. This questionnaire asked them to evaluate the demonstration using 7-point scales ranging from 1 (*not at all*) to 7 (*very much*) and to offer any additional open-ended comments about the study.

To conduct this demonstration in the classroom (Phase 2), the professor selected six student volunteers to leave the room and then told the rest of the class to record on paper how the story they were about to hear changed as it was retold. The first of the six volunteers returned to the classroom and the instructor read one of the two stories.

When this student had heard the entire story, a second student reentered the room and the first student retold the story. Afterward, the third student reentered and the second student retold the story. Finally, the third student repeated the story to the entire class. For the second group of three students, the professor used the same procedure, but changed the protagonist's gender to manipulate gender across the two groups. To complete the demonstration, the instructor displayed an overhead of the actual story and the class discussed both facts remembered, forgotten, and altered. The class also discussed other more general memory concepts (e.g., primacy and recency effects).

To assess the effectiveness of the demonstration, students completed a 5-item multiple-choice and short-answer quiz on gender stereotyping before and after the demonstration. Although the professor assigned students to read a chapter on gender stereotyping prior to coming to the class in which

the demonstration was conducted, the professor distributed the first version of the questionnaire before conducting the demonstration in class. Example items on the quiz asked students to indicate whether "our memories of stories can be significantly altered as the gender of the main character changes" and to describe the concept of "sharpening" as it relates to gender stereotyping. Students also indicated on a 9-point scale, ranging from 1 (*not at all*) to 9 (*very much*), the extent to which the demonstration taught them about gender stereotyping. Finally, students recorded any additional, open-ended responses that they had to the demonstration.

Results

Phase 1: The Demonstration's Validity

Of the nine groups of participants that heard John's story and eight groups that heard Sylvia's story, consistent themes unfolded across the retellings of these different versions of stories (see Table 2). The percentages presented in Table 2 reflect the occurrence of errors in memory recall. A coder, naive to the study's purpose, created these percentages by listening to the audiotapes and tabulating whether the tapes contained such incidences.

One of the most notable findings was that when participants heard John's story, they perceived John to be an overly aggressive man whose anger led him to semiviolent and competitive acts. However, participants leveled feminine-based details such as his baking cookies and talking to a friend. Such results did not happen for Sylvia, who participants instead perceived to be more gentle, frail, and emotional. Participants sharpened her shopping trip and emotional outbursts, whereas they omitted details of her competitive and aggressive behaviors. Interestingly, participants tended to refer to the competitor "Terry Browning," who excelled in math but whose gender was unspecified, as a man.

The 51 participants also evaluated the demonstration using a 7-point scale ranging from 1 (*not at all*) to 7 (*very much*). They indicated that the demonstration "would be a positive addition to a psychology class" ($M = 5.22, SD = .83$) and that "they learned from it" ($M = 6.06, SD = .71$). Their free responses included: "Very good exercise—very informative," "You would have thought those people heard two completely different stories," and "Gender stereotypes were definitely reinforced, they forgot John baked cookies and cried but they remembered Sylvia did!"

Phase 2: Students' Reactions to the Classroom Demonstration

Results from the gender-stereotyping quiz revealed that students' comprehension of gender stereotyping significantly improved after the demonstration ($M = 4.37$ out of 5, $SD = 0.70$) compared to beforehand ($M = 0.5$ out of 5, $SD = 0.85$), $t(39) = 3.73, p < .001$. In addition, students indicated that the demonstration successfully taught them about gender stereotyping ($M = 7.45, SD = 0.88$). All of the 11 follow-up comments were positive and included "Great demo"

Table 2. Common Observations Across Groups

Gender schemas and stereotypes	
Sylvia's Story	
Gender leveling	Students forgot that Sylvia hated Terry (67%), beat pillows (83%), and went running (92%)
Gender sharpening	Fifty-four percent of students added information consistent with female stereotypes. For instance, student added that Sylvia "hugged her teddy bear," "complained and pouted," "shopped all day long," and "worried about her weight."
John's Story	
Gender leveling	Students forgot that John cried (89%), took a long bath (85%), baked cookies (67%), and talked to his best friend (89%)
Gender sharpening	Forty-four percent of students added information consistent with male stereotypes. For instance, students added that John "played violent video games," "became very aggressive," "played basketball," "worked out," "broke things," "beat his head against the wall," and "drank a beer."

and "I believe it made me realize how much we stereotype even though we try not to."

Discussion

This study shows that the demonstration successfully taught students how gender affects memory processes. A class discussion after the activity can stimulate the learning process and might focus on some of the following points and questions:

1. Discuss the stories that evolved. What sorts of behaviors were students more likely to ascribe to Sylvia? to John? What were most common instances of leveling and sharpening?
2. Discuss the stereotypes students use in remembering details. When and why are stereotypes about men and women likely to influence memory? Are people more likely to use these stereotypes when the individual in the story is a close friend or a stranger?
3. Compare the conclusion of John's story with the conclusion of Sylvia's story, as presented in Table 2. What strategies might people adopt that lead to more accurate recall? Discuss possible real-world ramifications of the effects of gender stereotypes on memory.
4. In addition to demonstrating gender effects, this activity is also a forum for students to observe how the order of information has an influence on memory (e.g., see Bousfield & Wicklund, 1969). For instance, people should show superior recall of information close to the end of a list (recency effect), good recall of information close to the beginning of the list (primacy effect), good recall of unique items on a list, and relatively poor recall of words in the middle of the list (for a review, see Sternberg, 1999).

In sum, this classroom demonstration has striking results that assist students in understanding more clearly the effects

of gender stereotypes. The empirical data collected in Phase 1 of this study reveal a number of responses that instructors can anticipate when conducting this demonstration. The sum of these findings reveals convincingly that people remember and retell stories differently as a function of the gender of the main character. Finally, the data from Phase 2 reveal that students educationally benefit from observing such differences in the classroom.

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Notes

1. We thank the participants, particularly those in the Bayou City Road Runners running club. We also thank Julie Roach for her helpful comments on an earlier draft of this article.
2. Send correspondence and requests for examples of participant storytelling to Michelle Hebl, Department of Psychology, Rice University, 6100 South Main Street MS-25, Houston, TX 77005; e-mail: hebl@rice.edu.

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