Toy Story: Illustrating Gender Differences in a Motor Skills Task

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To challenge students' stereotypes about gendered performance on motor skills tasks, we developed a classroom active learning demonstration. Four 3-person, same-gender teams received either a Barbie® doll or a Transformer®, and team members dressed the Barbie or manipulated the Transformer from a tank to a robot as quickly as possible, with each person responsible for 1 step of the process. As predicted, the teams were able to complete the assignment more quickly when given a gender stereotype-congruent task than an incongruent task. The demonstration served as a useful tool in helping students think critically about the origin and significance of gender differences, particularly in the area of manual dexterity. Quantitative data confirmed that students believed the demonstration was helpful and beneficial.

A central goal in many introductory psychology, social psychology, and psychology of gender courses involves teaching students to challenge common gender stereotypes. One common belief and research finding is that due to their typically greater physical strength, male performance on physical ability tasks is faster, better, and more accurate than female performance (Housner, 1981; Lips, 2001). However, an equally pervasive but conflicting finding is that women are better at certain types of physical ability tasks because of their generally smaller finger sizes (Peters, Servos, & Day, 1990).

Consequently, some researchers have argued that these conflicting results about who is better at certain physical skills are a result of the different gendered socialization of boys and girls (Greendorfer, 1980). For example, parents often underestimate the physical skills (e.g., crawling) of female infants but overestimate the abilities of male infants (Mondschein, Adolph, & Tamis-LeMonda, 2000), thus potentially creating a self-fulfilling prophecy. Later in the developmental process, masculine and mechanical toys often are given to boy toddlers (e.g., tools, models, video games, blocks; Pomerleau, Bolduc, Malcuit, & Cossette, 1990), thus increasing opportunities to develop their manual dexterity (Serbin, Zelkowitz, Doyle, Gold, & Wheaton, 1990). However, girls do not typically receive encouragement to use these types of toys in childhood (Caldera, Huston, & O'Brien, 1989), and they consequently may not develop certain motor skills as quickly or adeptly. This theory is corroborated by a meta-analysis that revealed that gender differences on manual dexterity tasks usually do not occur until after years of gendered socialization, and then, only occur in traditionally male-stereotypical tasks such as pursuit rotor tracking, hand–eye coordination, and anticipation timing (Thomas & French, 1985).

Certainly, other explanations exist for this pattern aside from gendered socialization through toys; perhaps girls and women have been socialized to disidentify from wanting to succeed on tasks involving speed, strength, and agility. In this instance, stereotype threat (Steele, 1997) might explain their poor performance on manual dexterity tasks. That is, because girls and women might perceive such tasks as involving typically masculine skills, they might devalue and be less motivated to participate and succeed in these tasks. Indeed, research confirms that children try harder and perform better on tasks labeled as gender-appropriate rather than gender-inappropriate (Davies, 1989–1990; Hargreaves, Bates, & Foot, 1985; Littleton et al., 1999).

Because many dexterity tasks involve skills (e.g., strength and speed) developed through experience with masculine toys, perhaps it is this stereotypical nature of the task that drives the successful performance of many male participants. In fact, if the dexterity task involved skills obtained through playing with feminine toys (e.g., dolls or needlework), we would expect girls and women to outperform boys and men. As such, to demonstrate to students that gender socialization can affect subsequent motor skill performance, students participated in a demonstration that tested the agility of male and female team members in a race involving either a traditionally feminine or masculine task.

Method

Participants

For the learning evaluation included in the midterm exam, 113 students in a psychology of gender class participated in this study. However, on the day of the demonstration, only 99 students attended class and observed the active learning task (17 men, 82 women; M age = 20.27; SD = 1.81). From this sample, 6 men and 6 women volunteered to participate in a classroom demonstration without being told its ultimate purpose (to help avoid self-selection bias and to avoid having especially masculine male participants and especially feminine female participants).

Materials and Procedure

Three male and 3 female volunteers formed two lines based on gender next to respective tables and learned that they would be participating in a race against the other team. At the request of the instructor, 3 other men and 3 other women left the room and waited until they were told to return. A Transformer® toy was given to each of the 6 students in the first group along with a picture of what the toy would look like after manipulating the toy from tank form to robot form. Students performed the task in successive order such that the other members of their team would not be able to begin their task until the preceding member had successfully and completely transformed his or her toy. While the race was taking place, the team members were timed as the other students cheered for them. After both teams had completed their respective tasks, the other 6 volunteers returned to the room.

The male and female teams each received a Barbie® doll, and team members were informed that they were to dress the doll as quickly as possible with each person being responsible for dressing the doll with one item of clothing (i.e., dress, jacket, or shoes). The instructor informed the new group of students that the team who completely dressed the doll first would win. Again, the audience applauded and supported the teams as the race was timed. After the demonstration was finished, the instructor thanked all the students for volunteering and asked them to return to their seats. Finally, the class engaged in a discussion about the purpose and implications of the demonstration. Specifically, students generated potential reasons for the differential gender differences on the two tasks and to hypothesize about the broader implications of the results. One month after the demonstration, two separate test items (included as part of the class midterm examination) measured students' objective learning from the demonstration.

Results

As predicted, the men were able to complete the masculine task more efficiently than the women (123 sec vs. 200 sec), whereas the women were able to successfully complete the feminine task much more quickly than the men (85 sec vs. 300 sec). Students felt very positively about the active learning task, as they indicated that it helped them think about how certain childhood toys might differentially develop adult skills and how dexterity might be influenced by gender-typed tasks. On a 5-point scale with anchors at 1 (*not at all*) and 5 (*very much*), students indicated that the demonstration was enjoyable ($M = 4.75$, $SD = .56$), interesting ($M = 4.70$, $SD = .60$), educational ($M = 4.38$, $SD = .65$), and helpful in thinking critically about gender differences in manual dexterity ($M = 4.00$, $SD = .82$). Furthermore, students highly recommended that it be incorporated into other psychology classes ($M = 4.70$, $SD = .61$).

Moreover, the demonstration seemed to directly affect learning as assessed through pretest and posttest measures of self-reported learning using the same 5-point scale previously used. Two-tailed *t* tests revealed that there was a statistically significant change in participants' perceived knowledge of manual dexterity research, $t(98) = 15.45, p < .0001$; knowledge of gender differences in manual dexterity tasks, $t(98) = 19.93, p < .0001$; and knowledge of the relation among psychology, gender, and manual dexterity, $t(98) = 21.52, p < .0001$.

More important than subjective learning, however, was students' objective learning as measured by the two separate test items. To avoid bias in grading, independent grading assistants not affiliated with the study graded the students' answers. Students ($N = 113$; more than participated in the demonstration because not everyone came to class on the day of the demonstration) had a strong grasp of the implications of the demonstration, as revealed by their responses on the first test item ("As discussed in class, please indicate two possible reasons why there were gender differences in performance on the Barbie/Transformer in-class demonstration."). Specifically, this item indicated that students learned from the demonstration, as 99.1% received full or partial credit for their response (92.0% of students gave two correct reasons, 7.1% gave only one correct reason, and 0.9% gave no correct reasons).

Furthermore, on the second test item students also articulated well the purpose of the study on a short essay ("What was the purpose of the in-class demonstration using Barbie dolls and Transformers?"), as 81.4% of the students received full or partial credit for their answer (61.1% of the class received the full 3 points, 5.3% received 2 points, 15.0% received 1 point, and 18.6% received no points).

Additionally, qualitative data indicated that students enjoyed the active learning task, as many of them specifically indicated on their evaluation sheets that it was their favorite demonstration of the semester. For example, one student wrote, "My favorite class activities are the ones in which you learn while you are having fun—the Barbie doll race was certainly that kind of activity!" Another student similarly said,

> I think that this active learning task worked for many reasons. First off it was a lot of fun! At the same time, we also were able to see some of the concepts that we had already been learning about ... how females have been socialized to be good at that type of [feminine] task because many girls grow up dressing their Barbie dolls. This was an active learning task that stayed with me.

Table 1. Change in Students' Self-Reported Learning

	Pretest		Posttest	
	M	*SD*	*M*	*SD*
Knowledge of manual dexterity research*	1.55	.69	3.18	.94
Knowledge of gender differences in manual dexterity tasks*	1.52	.72	3.55	.88
Knowledge of the relationship among psychology, gender, and manual dexterity*	1.35	.58	3.36	.85

Note. Responses were based on a scale ranging from 1 (*not at all*) to 5 (*very much*).
*$p < .0001$.

Discussion

After the active learning task was completed, the instructor discussed the rationale for and the importance of the demonstration in a 15-min discussion. She explained that the task was designed to reveal that performance on motor skills tasks often depends on the type and gender stereotypicality of the task that is used. Furthermore, the instructor encouraged students to generate hypotheses or reasons why the gender differences on the tasks might have emerged. (All of the following explanations were actually generated by the students in this study, but instructors can generate other potential hypotheses if they like.)

This portion of the exercise was particularly helpful in allowing students to consider and talk about the findings. Consistent with gender socialization theory, many students observed that the different types of childhood toys and games played by boys and girls might have created the difference. Additionally, some students argued that women might excel in tasks involving fine motor skills (e.g., the Barbie task) due to their typically smaller finger sizes, an idea consistent with research by Peters et al. (1990). Other students suggested that the male students (on the Barbie task) and the female students (on the Transformer task) might have felt a stereotype threat (Steele, 1997) and therefore might not have performed according to their potential. Students also indicated that social desirability might have been a factor, as the male team members might not have wanted to "succeed" on a female-typed task in front of a class of their peers.

Furthermore, the demonstration could also provide a forum for discussing other issues relevant to psychology. For example, the class might consider other ways in which playing with stereotypic toys could influence future behavior, such as in the realms of occupational choice (Franken, 1983; O'Keefe & Hyde, 1983) and sport participation (Giuliano, Popp, & Knight, 2000). The instructor could also ask students why they automatically cheered for the team members who were the same sex as them (as most of the students in this study did) and whether this same-gender support might implicitly encourage greater division between and stereotyping of men and women. If the class is composed of upper level undergraduates, they might also discuss methodological issues such as controlling for gender bias when using the scientific method. Additionally, students can hypothesize how the demonstration's results might have differed with a gender-neutral task. In general, this task helps students recognize and challenge their gender stereotypes and serves as a stimulating and effective tool to encourage them to think critically about gender differences and their implications.

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Notes

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