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RESEARCH ARTICLE

Effects of Gender Stereotypes on Balance Performance and Learning in Men

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ABSTRACT. The purpose of this study was to examine the effects of gender stereotypes on the performance and learning of a balance task in men. Before practice, forty-eight participants received instructions involving the comparison of balance between males and females: males normally perform worse than females (stereotype threat condition - ST), females usually perform worse than males (stereotype lift condition - SL), or no instructions regarding gender stereotypes (control condition). One day later, they performed a retention test. The results show that the SL group outperformed the other groups during practice, but not retention. ST participants reported lower perceived competence. The findings show that gender stereotypes can affect perceptions of competence and balance performance, but not balance learning, in men.

Keywords: stereotype lift, stereotype threat, motivation, expectancies, balance

Introduction

Beliefs about the characteristics of a group of individuals (i.e., stereotypes; Stangor, 2000) have the potential to modify behaviors. For example, individuals who fear ratifying negative stereotypes about their own group have impaired performance (Steele & Aronson, 1995). In a seminal study, Steele and Aronson (1995) observed that Black participants performed worse in a stereotype threat condition, considering performance on a difficult intellectual verbal test as diagnostic of ability, than in the absence of such a stereotypical condition. Similar results were found when comparing women and men (Spencer et al., 1999) when the stereotype was related to mathematical knowledge.

Motor performance research on this situational phenomenon, termed stereotype threat (Steele, 1997), has also increased considerably in recent years (e.g., Beilock et al., 2006; Hively & El-Alayli, 2014), and has been extended to learning (Cardozo et al., 2021; Cardozo & Chiviacowsky, 2015; Chiviacowsky et al., 2018; Heidrich & Chiviacowsky, 2015). For the most part, these studies have prioritized understanding the effects of gender stereotypes related to women's performance. Also important, to date, no study has addressed motor learning effects of gender stereotypes in the male population. When threatened, women's performances are usually negatively affected, a phenomenon observed in distinct motor skills, such as soccer dribbling (Chalabaev, Sarrazin, et al., 2008; Chalabaev et al., 2014; Heidrich & Chiviacowsky, 2015), golf putting (Stone & McWhinnie, 2008), car driving (Moè et al., 2015), tennis skills (Hively & El-Alayli, 2014), and gender-neutral skills such as basketball free-throws (Hively & El-Alayli, 2014; Laurin, 2013). For instance, Heidrich and Chiviacowsky (2015) observed lower levels of self-efficacy and worse motor performance and learning when women practiced soccer dribbling after receiving the instruction that the task involved athletic abilities such as speed and power, where women normally perform worse than men, than in the absence of a stereotype condition. Cardozo et al. (2021), in addition, detected that not only explicit gender stereotype, but also subtle or implicit gender threat, such as sex of the experimenter, negatively impacted soccer performance and learning in women. In fact, the belief that sport and physical activity are considered male-dominated (Chalabaev et al., 2013) and that men possess higher skill levels compared to women (Clément-Guillotin et al., 2013) is predominant.

While the differences between the sexes in performance can be explained in part by biological aspects, they may also exist because people believe they exist (Chalabaev et al., 2013, Chalabaev, Stone, et al., 2008). Society has been induced to consider sports from a gender perspective (Wilde, 2015). Men are typically encouraged and taught to participate in sports involving exhaustion, aggressiveness and competitiveness, while women are commonly oriented toward enjoyable esthetic activities such as gymnastics, figure skating, and synchronized swimming (Schmalz & Kerstetter, 2006). This thinking results in individuals judging not how competent they are in an activity, but whether the activity is appropriate to their gender (Riemer & Visio, 2003). Based on gender appropriateness, some sports are therefore categorized as masculine (e.g., boxing and soccer), feminine (e.g., dance and gymnastics), or neutral (e.g., bowling and badminton) (Matteo, 1986). This categorization has been shown to influence the choices as well as the persistence within the chosen sports activities (Koivula, 1995; Matteo, 1986).

Motor domain has been traditionally considered masculine (Chalabaev et al., 2013, Matteo, 1986), favoring the male population to feel more competent, to value sports more than their female counterparts (Boiché et al.,

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2014), and to potentially be less affected by gender stereotypes. Only a few studies have addressed this question, however, in the literature, and none have verified motor learning effects. Beilock et al. (2006) showed that gender stereotype threat is associated to worse performance accuracy among expert men during a golf putting task. On the other hand, gender stereotype threat did not affect the performance of men in motor skills such as soccer dribbling, a task traditionally considered more masculine (Chalabaev et al., 2014), and in tasks whose gender appropriateness may be considered neutral, such as basketball free throw, or balance tasks (Chalabaev, Stone, et al., 2008; Laurin, 2013).

In the Chalabaev, Stone, et al. (2008) study, a positive stereotype (stereotype lift) effect, but not threat, was found in participants asked to maintain balance on a platform as long as possible, without touching the floor, during 4 min of practice. The authors discussed the low degree of difficulty of the balance task used in the experiment as one possible reason for the absence of the stereotype threat effect in men. While stereotype threat experiments typically induce threat in tasks where the stereotypes are already widely known, research has also demonstrated that the salience of stereotypes is more likely to impact performance when tasks are considered difficult (O'Brien & Crandall, 2003). In fact, chronic stereotyping is not necessary for performance to be impaired, while it is necessary for the individual to be sufficiently concerned about good performance to be bothered by the implication of a stereotype that they may not have the ability to do so (Aronson et al., 1999).

Given these arguments and the dearth of studies looking at this subject (see also Deshayes et al., 2019), we judged important to test potential stereotype effects in men performing a more challenging task whose gender appropriateness may be considered neutral. More important, no studies have yet looked at neither positive nor negative gender stereotypes potential effects on motor learning in men. The objective of the present study was, therefore, to investigate these questions. It was expected that participants receiving negative gender stereotype induction would demonstrate disadvantages in the performance and learning of a challenging balance task compared to the control group, while the participants receiving positive gender stereotype instructions would outperform the control group.

In addition, performance loss under stereotype threat conditions has been explained by mechanisms involving motivational, affective, and cognitive processes (Fiske, 2000; Schmader et al., 2008). Active monitoring of performance, physiological stress, and self-regulation efforts to suppress negative thoughts and emotions can be combined to disrupt performance (Schmader et al., 2008). Motivation to avoid failure or prevention-self-regulatory focus, instead of promotion-self-regulatory focus or performance-approach, can also occur (Chalabaev et al., 2008; Seibt & Förster, 2004). Increased conscious monitoring, a condition where the performance of experts deteriorates when attention is directed to processes that usually run automatically can arise (Beilock et al., 2006); on the contrary, decreased attention or monitoring activity regarding important aspects of the task in efforts to counteract negative feelings resulting from practice under stereotyped conditions, may degrade beginners' learning (Heidrich & Chiviacowsky, 2015). Chalabaev, Stone, et al. (2008) experiment showed also perceived confidence as a possible mechanism involved in stereotype effects in men, since participants in the stereotype lift group reported higher self-confidence and more involvement to perform the task immediately before practice (after the stereotype manipulation) relative to the stereotype threat and control groups. Social comparison has already shown to affect motor learning while affecting participants' perceived competence and nervousness levels (e.g., Ávila et al., 2012). Decreased feelings of competence (Heidrich & Chiviacowsky, 2015), affective levels (Cardozo et al., 2021) and motor learning were indeed observed in women under gender stereotype threat conditions. As such, in the present experiment, we wanted to further explore if satisfaction with performance, nervousness, and enjoyment related to task performance would differ between the groups.

Materials and Methods

Participants

Forty-eight undergraduate students (all men; average age: $M = 23.2$ years, $SD = 4.70$) voluntarily participated in the study. Previous stereotype threat studies in sport psychology have usually been conducted with similar or small samples (e.g., Chalabaev, Brisswalter, et al., 2013; Chalabaev, Sarrazin, et al., 2013; Hively & El-Alayli, 2014). The participants had no prior experience with the task and gave their informed consent before being involved in the experiment. The study was approved by the university's institutional review board (Federal University of Pelotas Ethics Committee) under the number CAAE: 78192917.2.0000.5313.

Apparatus and Task

Similar to prior stereotype threat studies (Cardozo & Chiviacowsky, 2015; Chiviacowsky et al., 2018) the task involved participants to try to keep balance on a stabilometer, as close to horizontal as possible during each trial. The apparatus consisted of a wooden platform, 130-cm long x 140-cm wide, with a maximum oscillation of 18 degrees to the left or right sides. To increase task difficulty relative to previous experiment testing stereotype threat in men (Chalabaev et al., 2008), we considered the

platform as being "in balance" only when inside ± 3° degrees deviation from horizontal, instead of considering the platform as being "in balance" while not touching the ground. A millisecond timer was used to measure time in balance (i.e., platform angle within ± 3°).

Procedure

Participants were randomly assigned either to the negative (stereotype threat - ST) or positive (stereotype lift - SL) stereotype groups, or to the control group. All participants were informed that the task involved keeping the platform on the horizontal position inside a 3° maximum deviation from left or right as long as possible during each 60-s trial, with 90-s interval between trials. They were also instructed to step on the platform approximately 15 s before the beginning of each trial. Once a start signal was given, the participants began to move the platform and data collection began. Participants performed one pretest trial. After the pretest, participants in the ST group were informed that we were interested in examining differences in balance ability between men and women, that prior studies showed that men have problems to keep balance in comparison with women, and that we were trying to understand why they had these difficulties. Participants in the SL group were informed that we were interested in examining differences in balance ability between men and women, that prior studies showed that women have problems to keep balance in comparison with men, and that we were trying to understand why they had these difficulties. Participants in the control group did not receive stereotype-related instructions.

Participants then performed 10 trials (practice phase). One day later, all participants performed 5 trials (retention phase), without any stereotype induction. At the end of each experimental session, immediately after the last trial, all participants filled out a questionnaire to assess their subjective experience related to the task. The questions involved to report from 0 (not at all) to 10 (very much), their perceived levels of enjoyment, satisfaction with performance and nervousness while performing the balance task. Participants were then debriefed.

Data Analysis

One-way analyses of variance (ANOVA) tested for possible group differences in time in balance during the pretest and in questionnaire responses. Time in balance in the practice phase were analyzed in a 3 (groups) x 10 (trials) two-way ANOVA, with repeated measures on the last factor, and in a 3 (groups) x 5 (trials) two-way ANOVA, with repeated measures on the last factor, for the retention test. Partial eta-squared values were computed to estimate effect sizes (η_p^2), and for all analysis the alpha was set at 0.05.

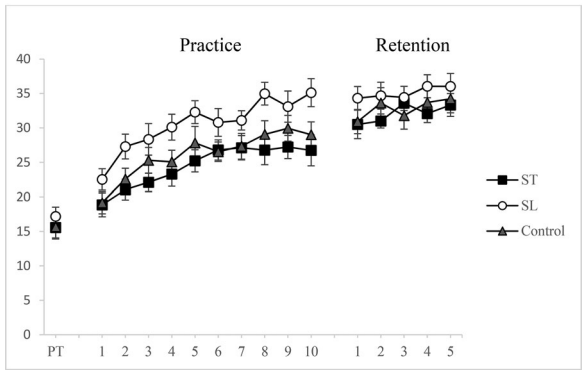

FIGURE 1. Time in balance in the stereotype threat (ST), stereotype lift (SL), and control groups during pretest, performance, and retention. Error bars indicate standard errors.

Results

Time in Balance

Pre-Test

There was no significant difference in balance between groups during the pretest, F (2, 45) = 0.452, p = .639, η_p^2 = .020 (Figure 1).

Practice

Participants in all groups increased their time in balance across the practice phase, with the SL group showing more effective balance on the stabilometer task relative to the ST and the control groups (Figure 1). The main effect of block was significant, F (9, 405) = 26.264, p < .001, η_p^2 = .369. The main effect of group was also significant, F (2, 45) = 4.846, p = .012, η_p^2 = .177. *Post-hoc* tests confirmed that the SL group had higher time in balance than the ST (p = .004) and control groups (p = .038). The group x block interaction, F (18, 405) = .642, p = .866, η_p^2 = .028, was not significant.

Retention

The groups did not differ in balance performance on the retention test, F (2, 45) = 1.889, p = .163, η_p^2 = .077. The main effect of block, F (4, 180) = 1.907, p = .111, η_p^2 = .041, and the group x block interaction, F (8, 180) = .607, p = .772, η_p^2 = .026, were also not significant (Figure 1).

Questionnaire Results

After Practice

Differences were found between groups regarding satisfaction with performance, F (2, 45) = 5.840, p = .006, η_p^2 = .206, with participants in the stereotype threat

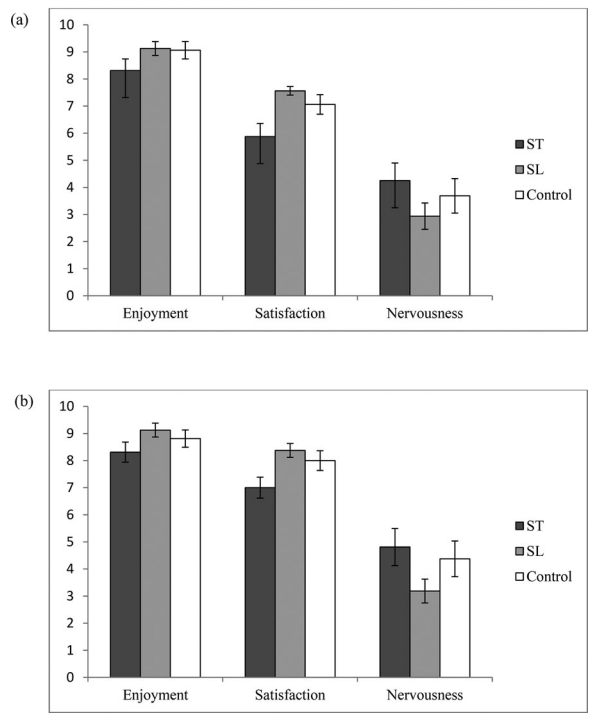

FIGURE 2. Punctuation ratings on the enjoyment, satisfaction and nervousness scales of the stereotype threat (ST), stereotype lift (SL), and control groups after practice (a) and retention (b). Error bars represents standard errors.

group (M = 5.875) reporting significantly lower feelings of satisfaction in comparison to the stereotype lift (M = 7.562) and control (M = 7.062) groups (Figure 2). Participants in the ST group showed lower enjoyment, F (2, 45) = 1.750, p = .185, η_p^2 = .072, (M = 8.312), relative to participants in the SL (M = 9.125), and control (M = 8.812) groups, but these differences were not significant. Participants in the SL group reported also lower levels of nervousness, F (2, 45) = 1.222, p = .304, η_p^2 = .052, (M = 2.937) relative to participants in the ST (M = 4.250), and control (M = 3.687) groups (Figure 2), but the differences were not significant.

After Retention

Participants in the stereotype threat group again reported lower feelings of satisfaction with performance (M = 7.000) in comparison to the stereotype lift (M = 8.375) and control (M = 8.000) groups after retention, F (2, 45) = 4.343, p = .019, η_p^2 = .0162 (Figure 2). Differences regarding enjoyment, F (2, 45) = 1.643, p = .205, η_p^2 = .068, in participants in the ST group, (M = 8.312), SL (M = 9.125), and control (M = 9.000) groups were not found. Participants in the SL group (M = 3.187) also reported lower levels of nervousness, F (2, 45) = 1.938, p = .156, η_p^2 = .079, relative to participants in the ST (M = 4.812), and control (M = 4.375) groups, but differences were not found (Figure 2).

Discussion

The present study examined the effects of gender stereotypes on the performance and learning of a balance task in men. The findings confirm previous gender stereotype balance results (Chalabaev, Stone, et al., 2008), showing that positive but not negative gender stereotype affect balance performance in men. They are also the first to demonstrate that neither the positive nor the negative gender stereotype impact balance learning in the male population, with both manipulated groups performing more similarly to the control group in the retention test. The results are as well in agreement with studies in which the groups provided with information questioning the ability or value of members of an external group (stereotype lift) showed positive outcomes like increased perceived competence (Walton & Cohen, 2003) and self-esteem (Laurin, 2013).

Practice conditions providing a greater sense of competence or enhanced level of performance expectancies during action are considered to increase motivation for the same action, consequently benefiting performance and learning (Ryan & Deci, 2000; Wulf & Lewthwaite, 2016). That was in fact observed in experiments using, for example, positive feedback (Abbas & North, 2018; Chiviacowsky & Wulf, 2007), relatively easy criteria of good performance (Chiviacowsky et al., 2012; Trempe et al., 2012; Ziv et al., 2019), or malleable conceptions of ability (Chiviacowsky & Drews, 2014; Wulf & Lewthwaite, 2009). Enhanced expectancies for performance are suggested to benefit goal-action coupling, a mechanism considered to optimize motor performance and learning (Wulf & Lewthwaite, 2016).

Questionnaire results showed that negatively stereotyped participants were less satisfied with performance while balancing compared to the participants in the SL and control groups. Situations that threaten participants such as overweight, age, and gender negative stereotypes, when confirmed as self-traits (Steele & Aronson, 1995), have shown to contribute to decreased competence, reducing task-relevant attentional control during practice, disrupting motor performance and learning in women (Cardozo et al., 2021; Cardozo & Chiviacowsky, 2015; Chiviacowsky et al., 2018; Heidrich & Chiviacowsky, 2015). However, the questionnaire results were not followed by motor performance or learning effects in the present experiment.

The lack of the gender negative stereotype effect on motor performance and learning in the male population may have distinct explanations. Stereotype threat is considered more likely to arise when individuals encounter

difficulty with the task (O'Brien & Crandall, 2003). The present experiment increased task difficulty relative to a previous one, considering platform "in balance" only when inside ± 3° degrees deviation from horizontal instead of considering platform "in balance" while not touching the ground (Chalabaev, Stone, et al., 2008). Nevertheless, the task may have not challenged men to the point of affecting their performance and learning. In another experiment (Laurin, 2013), the effects of the stereotype threat in men performing a basketball free-throw task were also not found, with such results being attributed to the lack of enough task difficulty for male participants. Another possible explanation is linked with the neutrality of the task in relation to gender typification (Chalabaev, Stone, et al., 2008; present study). It is possible that instructions involving negative stereotypes do not modify motor performance and learning in male population in more neutral gender tasks. In fact, studies investigating stereotype threat effects on motor learning have used tasks where negative stereotypes are relevant and socially known, such as the case of women in a football task (Heidrich & Chiviacowsky, 2015), older adults in balance tasks (Chiviacowsky et al., 2018), or overweight individuals threatened regarding potential individual differences, including balance (Cardozo & Chiviacowsky, 2015). Other explanation is that sport and physical activity are in general considered male activities (for review see Chalabaev et al., 2013, Koivula, 1995, Matteo, 1986), with the male population not traditionally being a target of negative social stereotypes. In fact, men usually demonstrate a high sense of competence and a higher positive expectancy to practice sports compared to women, since adolescence (Boiché et al., 2014). In this case, male participants could perhaps have questioned the veracity of the induced negative information about gender differences in the specific balance task, nullifying stereotype threat potential effects.

In conclusion, the results add to the literature showing that gender stereotypes affect men balance performance and perceptions of competence, but not learning, in tasks where gender typing is considered neutral. The question if positive and negative gender stereotypes would influence balance performance and learning in tasks where appropriation is considered feminine (e.g., dance pirouette) is, thus, worth of examination. Future studies could also further investigate underlying mechanisms of gender stereotypes effects in the male population.

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