



Stereotype threat affects the learning of sport motor skills



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ABSTRACT

Studies have shown that stereotypical conditions can affect the performance of academic as well as motor skills (for a review see Chalabaev, Sarrazin, Fontayne, Boiché, & Clément-Guillotin, 2013). The objective of the present study was to investigate the influence of stereotype threat on the learning of a sport skill in women. Participants practiced 15 trials of a soccer dribbling task, and their learning was observed in immediate and delayed retention tests. Before practice, participants were divided into two groups which received instructions introducing the task as either involving athletic speed/power capacities, where women normally perform worse than men (stereotypical condition – ST), or as involving agility/coordination capacities, where women normally can perform similarly than men (nullified-stereotype condition – NST). They also filled out questionnaires measuring self-efficacy. Participants of the ST group showed significant lower motor performance and learning, as well as lower self-efficacy levels, than the NST group. The findings provide evidence that the learning of sport skills can be affected by stereotypical conditions. They add to the growing evidence of the impact of social-cognitive and affective factors on motor skill learning.

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Introduction

Recent findings have demonstrated that human learners are not neutral processors of information, suggesting that motor learning, a process related with practice or experience resulting in relatively permanent changes in the capability for skilled behavior (Schmidt & Lee, 2011), can be affected by motivational factors (for a review see Lewthwaite & Wulf, 2012). Studies have shown, for example, that beliefs about the malleability or stability of key abilities can affect how motor skills are controlled and learned in adults (Wulf & Lewthwaite, 2009), as well as in children (Chiviawosky & Drews, 2014; Drews, Chiviawosky, & Wulf, 2013). In these studies, the introduction of the task as learnable and modifiable through practice, instead of reflecting inherent or stable attributes, resulted in better performance and learning. Other studies demonstrated that positive social comparative feedback, indicating above-average performance, can enhance motor learning in children (Ávila, Chiviawosky, Wulf, & Lewthwaite, 2012) and adults (Lewthwaite & Wulf, 2010; Wulf, Chiviawosky, & Lewthwaite, 2010, 2012).

Similarly, the learning of motor skills is also shown to be influenced by enhanced expectancies related to individuals' performance (McKay, Lewthwaite, & Wulf, 2011; Stoate, Wulf, & Lewthwaite, 2012; Wulf, Chiviawosky, & Lewthwaite, 2012, exp 2). As a whole, these findings demonstrate that social-cognitive and affective expectations and mindsets can strongly impact the learning of motor skills.

Another important social-cognitive variable that has been shown to affect the performance of academic, as well as motor, skills, is the stereotype threat (Beilock & McConnell, 2004; Chalabaev, Sarrazin, Fontayne, Boiché, & Clément-Guillotin, 2013; Steele & Aronson, 1995). Stereotype threat is a situational phenomenon that occurs when a stigmatized group feels pressured by the possibility of confirming or being tested negatively and performs determined tasks below its capacity (Steele, 1997; Steele & Aronson, 1995). Stereotypes can be internalized in an individual years before an evaluative test, by, for example, information linked to role expectations given in childhood by parents (Spence, Helmreich, & Stapp, 1975). It can also be induced minutes before a test through information provided by a researcher (Chalabaev, Brisswalter, et al., 2013; Chalabaev, Sarrazin, et al., 2013). In a seminal study, Steele and Aronson (1995) observed that Black participants performed worse on a stereotype threat condition (when performance on a difficult intellectual verbal test was considered as diagnostic of ability), than in the absence of that

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stereotypical condition. Other studies found similar results comparing Asians and Whites (Aronson et al., 1999), as well as women and men (Spencer, Steele, & Quinn, 1999), regarding stereotypes related to mathematical knowledge. Together, these results confirm the idea that the activation of negative stereotypes can disrupt the performance of stereotyped individuals (Steele, 1997). Studies verifying the effects of stereotypical conditions on learning are, however, very limited. A few exceptions are, for example, the study of Taylor and Walton (2011), where threat-reduction interventions in Afro-American participants produced learning long-lasting benefits, and Rydell, Rydell and Boucher's (2010) study, showing the effects on learning of negative stereotypes about mathematical rules and operations in women.

While several studies investigated the effects of stereotype threat on performance in the academic area (for a review, see Steele, Spencer, & Aronson, 2002), just a few have examined its effects on the motor domain. For instance, it was observed that Black participants underperformed control participants in a golf task when provided with instructions saying that the performance was a diagnostic of "sports intelligence", while Whites underperformed controls when the same golf task was framed as diagnostic of "natural athletic ability" (Stone, Lynch, Sjomeling, & Darley, 1999). In another research, Chalabaev, Sarrazin, Stone, and Cury (2008) observed that the performance of female soccer players was degraded, compared with control participants, when the task was introduced as diagnostic of athletic ability involving strength, speed and power, characteristics stereotyped mainly as masculine traits (e.g., Solmon, Lee, Belcher, Harrison, & Wells, 2003). Similar results were found on performance of other complex motor skills, as basketball (Krendl, Gainsburg, & Ambady, 2012), and golf (Beilock, Jellison, Rydell, McConnell, & Carr, 2006), or also, on performance of simple strength tasks (Chalabaev, Brisswalter, et al., 2013).

A common characteristic of these studies on the motor behavior context, however, is that stereotype threat effects were only observed regarding motor performance, without considering possible learning effects. So a question still remains regarding whether the negative effects of stereotype threat on task performance are only temporary or if they can also result in relatively permanent effects on the learning of motor skills. Given the association of stereotypes with individuals' sport perceptions of competence, participation, and value (Eccles & Harold, 1991; Fredricks & Eccles, 2005), we felt it important to address this research problem. To our knowledge, the influence of stereotypical conditions on the learning of sport motor skills has not yet been directly examined.

The purpose of the present study was to verify the effects of stereotype threat on the learning of a sport motor skill in women. It is well known that gender stereotypes have pressured women and men to behave in certain ways in order to meet society's expectations (Eagly & Steffen, 1984). Usually women are stereotyped as biologically and physically inferior to men and this cultural notion has been passed from one generation to another through education, community, media and parents (Harrison, Lee, & Belcher, 1999), possibly limiting the involvement of women in various sports and physical activities, especially activities that are vigorous in nature. In the present experiment, all participants practiced a soccer-dribbling task, and learning was observed by two (immediate and delayed) retention tests. Before practice, after conducting a pre-test, participants received instructions introducing the task as involving the athletic abilities of strength and power (stereotypical condition – ST), or as involving agility/coordination abilities (nullified stereotype condition – NST). Previous studies have shown that stereotype threat impacted females' sport performance, when women were reminded of their poor athletic abilities related

to men (Chalabaev et al., 2008; Stone & McWhinnie, 2008). In addition, before practice, and retention tests, all participants completed a questionnaire measuring self-efficacy. Perceived self-efficacy is concerned with judgments or beliefs of how well a person can execute an action (Bandura, 1982), and it has been found to be affected by stereotypical conditions (Franceschini, Galli, Chiesi, & Primi, 2014; Kit, Mateer, Tuokko, & Spencer-Rodgers, 2014), as well as being a potential mediator of motor learning (Chiviacowsky, 2014; Chiviacowsky, Wulf, & Lewthwaite, 2012; Ste-Marie, Vertes, Law, & Rymal, 2013; Stevens, Anderson, O'Dwyer, & Williams, 2012). We hypothesized that participants in the ST group would demonstrate significant disadvantages in motor learning, as well as lower levels of self-efficacy, relative to participants of the NST group.

Method

Participants

Twenty four women ($M = 23.8$ years, $SD = 3.33$), all undergraduate students without mental or physical disabilities and little or no experience playing soccer, participated in the study. Previous stereotype threat studies in sport psychology have usually been conducted with similar small samples (e.g., Chalabaev, Brisswalter, et al., 2013; Chalabaev, Sarrazin, et al., 2013; Hively & El-Alayli, 2014). The participants were naive as to the purpose of the experiment and informed consent was obtained from them. The study was approved by the university's Institutional Review Board.

Apparatus and task

The task, the same used in the Chalabaev et al. (2008) study, involved participants dribbling a soccer ball with the dominant foot, as fast as possible, through a slalom course composed of six cones one meter distant from each other. Participants were asked to conduct the ball with the dominant foot, without touching the cones. They were also asked to stop, place the ball on the side of the preceding cone, and continue the slalom, when an error occurred. The task was performed individually in an indoor gymnasium-type surface, with the presence of the participant and experimenter only, and the time taken to complete each trial served as the dependent measure.

Procedure

Participants were randomly assigned to one of two conditions, a stereotypical condition (ST), or a nullified stereotype condition (NST). The resulting groups, with 12 participants each, were informed about the goal of the task and were instructed to perform, as fast as possible, the soccer-dribbling task. Then they performed a one-trial pre-test. After the pre-test, and prior to the stereotype conditions manipulation, all participants filled out a self-efficacy questionnaire. On this questionnaire, they were asked to rate, on a scale from one ("not at all") to 10 ("very"), how confident they were that after 15 practice trials they would be able to conduct the ball through the slalom course in a time shorter than 30, 25, 20 and 15 s, respectively. The same questionnaire was filled out by all participants immediately after the practice phase and before the retention test on the next day. Feedback about the time used to complete the trial was provided after each trial during the practice phase.

The instructions provided to participants in the ST and the NST conditions were similar to those used in the Chalabaev et al. study (2008), presenting the task as diagnostic (ST group) or non-diagnostic (NST group) of masculine abilities. More specifically, ST

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