Psychology of Sport and Exercise 18 (2015) 42–46

Contents lists available at ScienceDirect

Psychology of Sport and Exercise

journal homepage: www.elsevier.com/locate/psychsport

Stereotype threat affects the learning of sport motor skills

Caroline Heidrich, Suzete Chiviacowsky*

Federal University of Pelotas, Brazil

ARTICLE INFO

Article history:
Received 18 August 2014
Received in revised form
16 December 2014
Accepted 19 December 2014
Available online 26 December 2014

Keywords:
Mindsets
Gender
Self-efficacy
Sport skills

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.

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 (Chiviacowsky & Drews, 2014; Drews, Chiviacowsky, & 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, Chiviacowsky, Wulf, & Lewthwaite, 2012) and adults (Lewthwaite & Wulf, 2010; Wulf, Chiviacowsky, & 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, Chiviacowsky, & 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

* Corresponding author. Escola Superior de Educação Física, Universidade Federal de Pelotas, Rua Luís de Camões, 625, CEP 96055-630 Pelotas, RS, Brazil. Fax: +55 53 32732752.
E-mail address: suzete@ufpel.edu.br (S. Chiviacowsky).

http://dx.doi.org/10.1016/j.psychsport.2014.12.002
1469-0292/

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

condition participants received instructions introducing the task as "involving athletic speed/power capacities", tasks where "women normally perform worse than men", while NST condition participants received instructions introducing the task as "involving agility/coordination capacities", where "women normally perform similarly than men" (nullified-stereotype condition – NST). The practice phase consisted of 15 trials. The immediate (10 min) and delayed (day 2) retention tests consisted of 5 trials each. Feedback regarding the time used to complete each trial was given during the practice phase, but not during retention tests.

Data analysis

A one-way analysis of variance (ANOVA) was used in order to verify possible differences in the pre-test. Time scores in the practice phase were analyzed in 2 (group: NST versus ST) × 15 (trials), with repeated measures on the last factor. For both immediate and delayed retention tests, time scores were analyzed in separated 2 (group: NST versus ST) × 5 (trials) ANOVAs, with repeated measures on the last factor. Self-efficacy ratings on each questionnaire were averaged across the four task difficulty levels (30, 25, 20 and 15 s) and separately analyzed in one-way ANOVAs. Alpha level for significance was set at .05 for all analyses.

Results

Time scores

On the pre-test, there was no significant difference between groups, *F*s (1, 22) < 1 (Fig. 1).

During practice, the participants reduced the time to complete the slalom course (Fig. 1). The main effect of trial, $F(14, 308) = 4.65$, $p < .001$, $\eta_p^2 = .17$, and group, $F(1, 22) = 11.82$, $p = .002$, $\eta_p^2 = .35$, were significant, while the group × trial interaction, $F(14, 308) = 1.12$, $p = .34$, was not significant.

On the immediate retention test, 10 min after the practice phase, the NST group outperformed the ST group (Fig. 1). The main effect of group was significant $F(1, 22) = 10.89$, $p = .003$, $\eta_p^2 = 0.33$, while the main effect of trial, $F(4, 88) < 1$, and the group × trial interaction, *F*s (4, 88) < 1, were not significant.

Similar results for the main effect of group was found on the next day on the delayed retention test, with the NST group outperforming the ST group, $F(1, 22) = 11.01$, $p = .003$, $\eta_p^2 = 0.34$. The main effect of trial, $F(4, 88) = 2.85$, $p = .03$, $\eta_p^2 = 0.11$, was also significant, while the group × trial interaction, *F*s (4, 88) = 1.46, $p = .22$, was not significant.

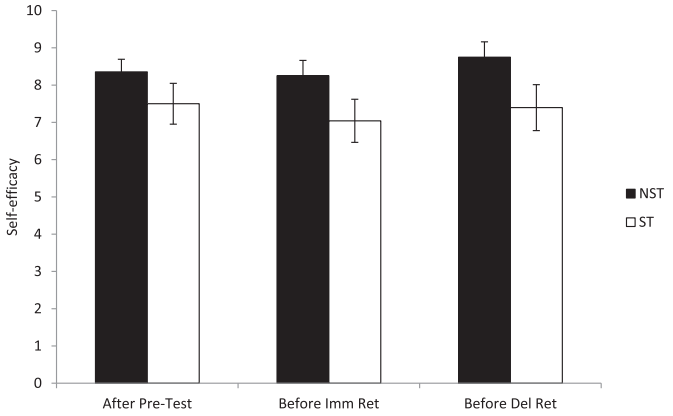

Fig. 2. Self-efficacy scores after the pre-test, before immediate retention (Day 1), and before delayed retention (Day 2). Note: Error bars indicate standard errors.

Self-efficacy

After the pre-test, there was no difference between groups regarding self-efficacy levels (see Fig. 2). The main effect of group, $F(1, 22) = 1.66$, $p = .21$, was not significant.

After practice and before the immediate retention test, the group NST reported higher levels of self-efficacy than the ST group. However, the main effect of group did not reach significance, $F(1, 22) = 3.14$, $p = .09$, $\eta_p^2 < .012$.

Difference between groups was observed on the second day, however, with higher levels of self-efficacy for the NST group related to the ST group. The main effect of group, $F(1, 22) = 8.05$, $p = .01$, $\eta_p^2 = .27$, was significant.

Discussion

The present study was designed to examine if stereotype threat can affect sport motor learning. More specifically, we examined the effects of a stereotyped condition on the learning of a soccer motor skill in women. Previous findings related to the negative effects of stereotype threat on the motor domain, until now, were observed only regarding performance (for a review see Chalabaev,

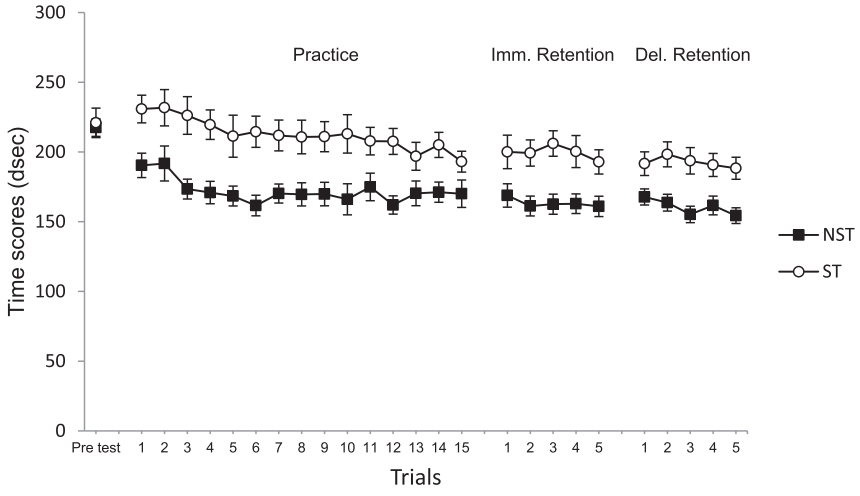

Fig. 1. Time scores of the groups on the pre-test, during practice, immediate retention (Day 1), and delayed retention tests (Day 2). Note: Error bars indicate standard errors.

Brisswalter, et al., 2013; Chalabaev, Sarrazin, et al., 2013), and it remained unclear if more permanent effects, such as effects on motor learning, would also be found for this variable.

Our results show that stereotypical conditions can degrade sport motor learning. The induction of a stereotype introducing the soccer task as involving athletic speed/power capacities, where women normally are considered to perform worse than men, resulted in worse time scores during both practice and retention tests, related to a nullified stereotype condition. These findings are in accordance with a previous study using the same task, which demonstrated that the stereotype associated with low athletic ability affects expert women's momentary soccer performance (Chalabaev et al., 2008). They also extend it, showing a relatively more permanent (motor learning) effect in non-expert participants. It is noteworthy that differences between conditions were observed during all experimental phases, demonstrating how impacting the stereotype threat phenomenon can occur on both, immediate performance as well as on learning.

A number of underlying mechanisms involving cognitive, affective, and motivational processes have been considered to explain performance deficits under stereotype threat conditions (Fiske, 2000; Schmader, Johns, & Forbes, 2008). For Schmader et al. (2008), interrelated mechanisms including physiological stress, active monitoring of performance, and self-regulation efforts to suppress negative thoughts and emotions, combine to disrupt performance. Previous research in fact showed that stereotype threat situations can lead to a prevention-self-regulatory focus or motivation to avoid failure, a situation where people feel concerned with responsibilities/safety and performance is associated with careful processing style, instead of to a promotion-self-regulatory focus or performance-approach, a situation where people are normally concerned with attainment of aspirations/accomplishments (Chalabaev et al., 2008; Seibt & Förster, 2004). Other findings indeed demonstrated increased conscious monitoring in stereotype threat situations, a condition where performance suffers when too much attention is directed to processes that usually run automatically (Beilock et al., 2006).

However, mechanisms other than explicit monitoring processes (e.g., Chalabaev, Brisswalter, et al., 2013; Chalabaev, Sarrazin, et al., 2013) could explain the effects of the stereotype threat, especially regarding learning. In fact, different from previous studies examining the performance of experts, where the stereotype threat is suggested to act mainly increasing explicit monitoring processes and disrupting automaticity of well-learned tasks, there is a possibility that the stereotypical condition of the present study actually resulted in decreased attention or monitoring activity of non-experts to important aspects of the task, whereby degrading beginners' learning.

Specific mechanisms are being offered, more recently, to explain how several motivational socio-cognitive and affective variables are able to affect motor learning. Practice or performance conditions that can produce low motivational states, as information inducing fixed instead of malleable conceptions of ability (Chiviacowsky & Drews, 2014; Drews et al., 2013), negative instead of positive social-comparison (Lewthwaite & Wulf, 2010; Wulf et al., 2010), feedback after bad instead of good trials (Badami, VaezMousavi, Wulf, & Namazizadeh, 2012; Chiviacowsky & Wulf, 2007), and experimenter-controlled instead of self-controlled practice (Chiviacowsky, 2014; Chiviacowsky & Wulf, 2002; Fairbrother, Laughlin, & Nguyen, 2012; Ste-Marie et al., 2013), present the potential to provoke implicit access to the self, in order to control an individual's thoughts and emotions (Wulf & Lewthwaite, 2010). According to the authors, this kind of processing can exceed an individual's attentional capacity, producing "micro-choking" episodes, consequently undermining motor performance and learning. Thus, the stereotype threat condition manipulated in the present study may have increased self-focus of participants of the ST group in relation to participants of the NST group, with consequences on learning.

The questionnaire results, where participants of the ST group reported lower levels of self-efficacy than participants of the NST group, suggest that the stereotype used in the present study was able to affect the degree to which the participants felt competent during the motor learning process, reinforcing the role motivational mechanisms can play during practice under stereotype threat. In fact, self-efficacy has already been found to be strongly linked to motor performance (for a review see Moritz, Feltz, Fahrbach, & Mack, 2000), and more recently to the learning of motor skills (Chiviacowsky, 2014; Chiviacowsky et al., 2012; Stevens et al., 2012).

In conclusion, our results give us reasons to infer that stereotypical conditions can affect self-efficacy levels as well as the learning of sport motor skills in women. Even when receiving the same opportunities for practice, participants of the ST group did not show the same learning and psychological benefits as participants of the NST group. These findings highlight the role of motivational influences on motor learning, adding to a growing literature (for a review see Lewthwaite & Wulf, 2012). However, although the present study provided evidence that stereotypical conditions can impact motor learning, the specific mechanisms underlying these effects still need to be tested. The use of a bigger sample size and more elaborated questionnaires, in future studies, could help to investigate such mechanisms. Measuring self-efficacy immediately after manipulation, as well as more frequently across blocks of trials, could better reflect how perceived competence is affected by the stereotype threat before and during practice. It would also be interesting to examine, in future research, variables that potentially could interact with the effects found, e.g., gender of the experimenter, athletic ability of participants, and social settings of the practice environment, aspects that have not been examined in the present study. Lastly, it would be fruitful to investigate if the results found can be generalized to other complex motor tasks, as well as to different populations.

References

Aronson, J., Lustina, M. J., Good, C., Keough, K., Steele, C. M., & Brown, J. (1999). When white men can't do math: necessary but sufficient factors in stereotype threat. *Journal of Experimental Social Psychology, 35*, 29–46.

Ávila, L. T., Chiviacowsky, S., Wulf, G., & Lewthwaite, R. (2012). Positive social-comparative feedback enhances motor learning in children. *Psychology of Sport and Exercise, 13*(6), 849–853.

Badami, R., VaezMousavi, M., Wulf, G., & Namazizadeh, M. (2012). Feedback about more accurate versus less accurate trials: differential effects on self-confidence and activation. *Research Quarterly for Exercise and Sport, 83*(2), 196–203.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist, 37*(2), 122–147.

Beilock, S. L., Jellison, W. A., Rydell, R. J., McConnell, A. R., & Carr, T. H. (2006). On the causal mechanisms of stereotype threat: can skills that don't rely heavily on working memory still be threatened? *Personality and Social Psychology Bulletin, 32*(8), 1059–1071.

Beilock, S. L., & McConnell. (2004). Stereotype threat and sport: can athletic performance be threatened? *Journal of Sport and Exercise Psychology, 26*, 597–609.

Chalabaev, A., Brisswalter, J., Radel, R., Coombes, S. A., Easthope, C., & Clément-Guillotin, C. (2013). Can stereotype threat affect motor performance in the absence of explicit monitoring processes?: Evidence using a strength task. *Journal of Sport & Exercise Psychology, 35*, 211–215.

Chalabaev, A., Sarrazin, P., Fontayne, P., Boiché, J., & Clément-Guillotin, C. (2013). The influence of sex stereotypes and gender roles on participation and performance in sport and exercise: review and future directions. *Psychology of Sport and Exercise, 14*, 136–144.

Chalabaev, A., Sarrazin, P., Stone, J., & Cury, F. (2008). Do achievement goals mediate stereotype threat?: An investigation on females' soccer performance. *Journal of Sport & Exercise Psychology, 30*, 143–158.

Chiviacowsky, S. (2014). Self-controlled practice: autonomy protects perceptions of competence and enhances motor learning. *Psychology of Sport and Exercise, 15*, 505–510.

Chiviacowsky, S., & Drews, R. (2014). Effects of generic versus non-generic feedback on motor learning in children. *PLoS One, 9*(2), e88989.
Chiviacowsky, S., & Wulf, G. (2002). Self-controlled feedback: does it enhance learning because performers get feedback when they need it? *Research Quarterly for Exercise and Sport, 73*, 408–415.
Chiviacowsky, S., & Wulf, G. (2007). Feedback after good trials enhances learning. *Research Quarterly for Exercise and Sport, 78*, 40–47.
Chiviacowsky, S., Wulf, G., & Lewthwaite, R. (2012). Self-controlled learning: the importance of protecting perceptions of competence. *Frontiers in Psychology, 3* (Article 458).
Drews, R., Chiviacowsky, S., & Wulf, G. (2013). Children's motor skill learning is influenced by their conceptions of ability. *Journal of Motor Learning and Development, 1*, 38–44.
Eagly, A. H., & Steffen, V. J. (1984). Gender stereotypes stem from the distribution of women and men into social roles. *Journal of Personality and Social Psychology, 46*(4), 735.
Eccles, J. S., & Harold, R. D. (1991). Gender differences in sport involvement: applying the Eccles' expectancy-value model. *Journal of Applied Sport Psychology, 3*, 7–35.
Fairbrother, J. T., Laughlin, D. D., & Nguyen, T. V. (2012). Self-controlled feedback facilitates motor learning in both high and low activity individuals. *Frontiers in Psychology, 3* (Article 323).
Fiske, S. T. (2000). Stereotyping, prejudice, and discrimination at the seam between the centuries: evolution, culture, mind, and brain. *European Journal of Social Psychology, 30*(3), 299–322.
Franceschini, G., Galli, S., Chiesi, F., & Primi, C. (2014). Implicit gender–math stereotype and women's susceptibility to stereotype threat and stereotype lift. *Learning and Individual Differences, 32*, 273–277.
Fredricks, J. A., & Eccles, J. S. (2005). Family socialization, gender, and sport motivation and involvement. *Journal of Sport & Exercise Psychology, 27*, 3–31.
Harrison, L., Lee, A. M., & Belcher, D. (1999). Race and gender differences in sport participation as a function of self-schema. *Journal of Sport & Social Issues, 23*(3), 287–307.
Hively, K., & El-Alayli, A. (2014). "You throw like a girl:" the effect of stereotype threat on women's athletic performance and gender stereotypes. *Psychology of Sport and Exercise, 15*(1), 48–55.
Kit, K. A., Mateer, C. A., Tuokko, H. A., & Spencer-Rodgers, J. (2014). Influence of negative stereotypes and beliefs on neuropsychological test performance in a traumatic brain injury population. *Journal of the International Neuropsychological Society, 20*(02), 157–167.
Krendl, A., Gainsburg, I., & Ambady, N. (2012). The effects of stereotypes and observer pressure on athletic performance. *Journal of Sport & Exercise Psychology, 34*(1), 3–15.
Lewthwaite, R., & Wulf, G. (2010). Social-comparative feedback affects motor skill learning. *The Quarterly Journal of Experimental Psychology, 63*(4), 738–749.
Lewthwaite, R., & Wulf, G. (2012). Motor learning through a motivational lens. In N. J. Hodges, & A. M. Williams (Eds.), *Skill acquisition in sport: Research, theory & practice* (2nd ed.). (pp. 173–191). London: Routledge.
McKay, B., Lewthwaite, R., & Wulf, G. (2011). Enhanced expectancies improve performance under pressure. *Frontiers in Psychology, 3* (Article 8).
Moritz, S. E., Feltz, D. L., Fahrbach, K. R., & Mack, D. E. (2000). The relation of self-efficacy measures to sport performance: a meta-analytic review. *Research Quarterly for Exercise and Sport, 71*(3), 280–294.
Rydell, R. J., Rydell, M. T., & Boucher, K. L. (2010). The effect of negative performance stereotypes on learning. *Journal of Personality and Social Psychology, 99*(6), 883–896.
Schmader, T., Johns, M., & Forbes, C. (2008). An integrated process model of stereotype threat effects on performance. *Psychological Review, 115*(2), 336.
Schmidt, R. A., & Lee, T. (2011). *Motor control and learning: A behavioral emphasis* (2nd ed.). Champaign: Human Kinetics.
Seibt, B., & Förster, J. (2004). Stereotype threat and performance: how self-stereotypes influence processing by inducing regulatory foci. *Journal of Personality and Social Psychology, 87*(1), 38–56.
Solmon, M. A., Lee, A. M., Belcher, D., Harrison, L., & Wells, L. (2003). Beliefs about gender appropriateness, ability, and competence in physical activity. *Journal of Teaching in Physical Education, 22*(3), 261–279.
Spence, J. T., Helmreich, R., & Stapp, J. (1975). Ratings of self and peers on sex role attributes and their relation to self-esteem and conceptions of masculinity and femininity. *Journal of Personality and Social Psychology, 32*(1), 29.
Spencer, S. J., Steele, C. M., & Quinn, D. M. (1999). Stereotype threat and women's math performance. *Journal of Experimental Social Psychology, 35*, 4–28.
Steele, C. M. (1997). A threat in the air: how stereotypes shape intellectual identity and performance. *American Psychologist, 52*(6), 613–629.
Steele, C. M., & Aronson, J. (1995). Stereotype threat and the intellectual test performance of African Americans. *Journal of Personality and Social Psychology, 69*, 797–811.
Steele, C. M., Spencer, S. J., & Aronson, J. (2002). Contending with group image: the psychology of stereotype and social identity threat. *Advances in Experimental Social Psychology, 34*, 379–440.
Ste-Marie, D. M., Vertes, K. A., Law, B., & Rymal, A. M. (2013). Learner-controlled self-observation is advantageous for motor skill acquisition. *Frontiers in Psychology, 3* (Article 556).
Stevens, D., Anderson, D. I., O'Dwyer, N. J., & Williams, A. M. (2012). Does self-efficacy mediate transfer effects in the learning of easy and difficult motor skills? *Consciousness and Cognition, 21*, 1122–1128.
Stoate, I., Wulf, G., & Lewthwaite, R. (2012). Enhanced expectancies improve movement efficiency in runners. *Journal of Sports Sciences, 30*, 815–823.
Stone, J., Lynch, C. I., Sjomeling, M., & Darley, J. M. (1999). Stereotype threat effects on Black and White athletic performance. *Journal of Personality and Social Psychology, 77*, 1213–1227.
Stone, J., & McWhinnie, C. (2008). Evidence that blatant versus subtle stereotype threat cues impact performance through dual processes. *Journal of Experimental Social Psychology, 44*(2), 445–452.
Taylor, V. J., & Walton, G. M. (2011). *Stereotype threat undermines academic learning*.
Wulf, G., Chiviacowsky, S., & Lewthwaite, R. (2010). Normative feedback effects on learning a timing task. *Research Quarterly for Exercise and Sport, 81*(4), 425–431.
Wulf, G., Chiviacowsky, S., & Lewthwaite, R. (2012). Altering mindset can enhance motor learning in older adults. *Psychology and Aging, 27*(1), 14–21.
Wulf, G., & Lewthwaite, R. (2009). Conceptions of ability affect motor learning. *Journal of Motor Behavior, 41*, 461–467.
Wulf, G., & Lewthwaite, R. (2010). Effortless motor learning? An external focus of attention enhances movement effectiveness and efficiency. In B. Bruya (Ed.), *Effortless attention: A new perspective in the cognitive science of attention and action* (pp. 75–101). Cambridge, MA: MIT Press.