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Self-confidence and performance: A little self-doubt helps

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ABSTRACT

Objectives: To test the hypothesis that a decrease in confidence on a well-learned task will increase effort and performance.
Design: A 2 (group: control, experimental) × 2 (trial: practice, competition) mixed-model with repeated measures on the second factor.
Method: Expert skippers' ($n = 28$) self-confidence was reduced via a combination of task (i.e., change of rope) and competitive demands. Performance was the number of skips in a 1-min period. On-task effort was measured via the verbal reaction time to an auditory probe.
Results: The group × trial interaction ($F\,(1, 26) = 6.73$, $p < .05$, $\eta^2 = .21$) supported the hypothesis: Post-hoc tests revealed a significant decrease in self-confidence and a significant improvement in performance from practice to competition for the experimental group only. No significant effort effects were revealed.
Conclusions: Some self-doubt can benefit performance, which calls into question the widely accepted positive linear relationship between self-confidence and performance. As effort did not increase with decreased confidence, the precise mechanisms via which self-confidence will lead to an increase or a decrease in performance remain to be elucidated.

The relationship between stress, anxiety, self-confidence and performance continues to attract much research attention (e.g., Beilock & Gray, 2007; Woodman & Hardy, 2001). Among the least disputed of these relationships is the positive association between self-confidence and performance. The support for this positive relationship is strong both theoretically and empirically (e.g., Bandura, 1997; Bandura & Locke, 2003; Martens, Vealey, & Burton, 1990; Vealey, 1986, 2001; Woodman & Hardy, 2003). Meta-analyses of the self-confidence – performance relationship show that the mean effect size is greater than that revealed for cognitive anxiety and the vast majority of studies report a positive relationship between self-confidence and performance (e.g., 89% of the exact effect sizes reported in Woodman & Hardy, 2003 were positive).

Bandura's (1997) theory of self-efficacy, which is rooted in social cognitive theory, predicts a positive relationship between self-efficacy and performance by drawing on four key sources of self-efficacy that are thought to impact performance via thoughts and behaviors. Furthermore, in their development of multidimensional anxiety theory, Martens et al. (1990) theorized a positive linear relationship between self-confidence and performance. Similarly, Vealey's (1986, 2001) sport confidence model posits a positive relationship between confidence and performance. Although the majority of research has found support for this hypothesized positive association, there exist some notable exceptions.

In their study of pistol shooters, Gould, Petlichkoff, Simons, and Vevera (1987) revealed a negative relationship between self-confidence and shooting performance. Similarly, Hardy, Woodman, and Carrington (2004) found that high self-confidence was associated with depressed golf performance scores (see also Woodman & Hardy, 2005). One explanation for such findings is that high confidence can lead to risk-taking (Campbell, Goodie, & Foster, 2004) and/or complacency (Jones, Swain, & Hardy, 1993), which in turn may hinder performance. Other models, such as Hardy's (1996) butterfly catastrophe model, also suggest that the relationship between self-confidence and performance is not as simplistic as is commonly accepted.

A further line of research utilizing a within-person approach has revealed negative self-confidence effects. For example, in an analytical task, Vancouver, Thompson, and Williams (2001) found that over time high self-efficacy led participants to commit too

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early to a problem-solving response, which ultimately led them to provide incorrect responses. In a follow-up study, Vancouver, Thompson, Tischner, and Putka (2002) replicated these findings by artificially increasing participants' self-efficacy beliefs. In response to criticisms leveled at their research (Bandura & Locke, 2003), Vancouver and Kendall (2006) explored the possible negative effects of self-efficacy on college student exam study time and performance. They found that over the course of four examinations, as self-efficacy increased by a grade, study time decreased by 15 min and exam performance decreased by nearly a quarter grade (see also Richard, Diefendorff, & Martin, 2006).

In examining why such negative effects may occur, Vancouver and colleagues surmised that high self-confidence can reduce goal discrepancy perceptions which in turn can lead to overconfidence. That is, when people perceive themselves to be close to attaining their goal, their confidence may induce a degree of complacency about the task at hand. This is also the position of Bandura and Locke (2003), who stated that "some self-doubt about one's performance efficacy provides incentives to acquire the knowledge and skills needed to master the challenges" (p. 96; see also Vancouver & Kendall, 2006). This position provides an alternative perspective on the readily accepted view that self-confidence is linearly beneficial to performance.

Bandura and Locke's (2003) theorizing suggests that a reduction in self-confidence (i.e., an element of self-doubt) may lead to an increase in effort, which may subsequently benefit performance. However, this position has not yet been directly tested and is the focus of the present study. We hypothesized that performers who experience a reduction in self-confidence would invest extra effort on the task and subsequently perform better.

Method

Participants

Twenty-eight participants (M_{age} = 26.86; SD = 9.71; 17–48 years; n = 4 men, n = 24 women) volunteered for the experiment. The ability to skip with a rope continuously for at least 1 min was required to ensure that participants were practiced at the task and at least moderately confident in their skipping ability. The protocol received institutional ethics approval and written informed consent was obtained from all participants. Confidentiality was assured throughout.

Measures

Performance

The number of skips performed by the participant in each 1-min trial, as counted by the experimenter, was used as the measure of performance. Two rope colors were used: gray and white.

Effort

In order to measure spare processing capacity as a reflection of on-task effort, we measured participants' verbal reaction time to an auditory probe (in milliseconds) via a computer program. The microphone that recorded reaction time was inserted into a handle in the skipping rope, which was connected to the computer. Seven auditory tones (bleeps) were sounded randomly during a 1-min period and the mean reaction time was used for subsequent analysis. Randomization of the auditory probes was important to control for expectancy effects (McLoed, 1980). Vocal response modality was used because using a secondary probe requiring the same response modality as the primary task (physical in this case) interferes with task requirements and reaction time (McLoed, 1980).

Self-confidence

The State Sport Confidence Inventory (SSCI; Vealey, 1986) comprises thirteen statements rated on a Likert scale of 1 (*low confidence*) to 9 (*high confidence*) indicating the extent to which participants feel confident compared to the most confident athlete they know. To better reflect the task demands, we changed the wording from "competition" to "upcoming trial" where appropriate. The Cronbach alpha coefficient was .98 for both Time 1 and Time 2.

Design and procedure

Participants were randomly assigned to either a control group (n = 14) or an experimental group (n = 14) before completing a practice trial and a competition trial. The practice trial required participants to skip with a gray rope for 1 min while orally responding with "*now*" to each auditory tone. The competition trial consisted of the same task except that participants were told that there was a £25 (approx. US$45) prize for the person performing the most skips and the quickest mean reaction time on the secondary task. The manipulation for the experimental group consisted of a different instructional set that was associated with a change in skipping rope. Experimental participants were instructed that the new (white) rope would be more difficult to use and would possibly interfere slightly with performance due to differences in weight, length, and stiffness. In reality, the two skipping ropes were identical except for their color. The aim was to induce doubt in the participants' ability to skip with the new rope in order to reduce self-confidence. Each participant was tested individually.

Upon arrival at the laboratory, participants provided written informed consent and demographic details. After giving the experimental instructions, we asked participants to remove any footwear and then to warm up with the gray skipping rope for 1 min. Before the first trial, participants completed the State Sport Confidence Inventory. After the first trial participants rested for 5 min and were then given the competition information. At this time, the experimental group also received the new white skipping rope and the manipulation protocol. Before the competition trial, participants completed the State Sport Confidence Inventory again. On completion, all participants were debriefed appropriately. The experimental design was a 2 (group: control, experimental) × 2 (trial: practice, competition) mixed-model with repeated measures on the second factor.

Results

Self-confidence

A 2 (group) × 2 (trial) mixed-model ANOVA on self-confidence revealed no significant main effect for trial, $F(1, 26) = 3.09$, $p > .05$, $\eta^2 = .11$, or for group, $F(1, 26) = .82$, $p > .05$, $\eta^2 = .03$. However, the analysis revealed a significant interaction, $F(1, 26) = 4.76$, $p < .05$, $\eta^2 = .16$. Tukey's post-hoc tests revealed that this was due to a significant decrease in state confidence from practice to competition for the experimental group only (see Table 1). Furthermore, a univariate ANCOVA controlling for self-confidence in practice revealed that, in competition, the self-confidence of the experimental group ($M_{adj} = 66.13$, $SE = 3.16$) was significantly lower than that of the control group ($M_{adj} = 75.80$, $SE = 3.16$), $F(1, 25) = 4.69$, $p < .05$, $\eta^2 = .16$. The experimental manipulation was thus successful.

Performance and effort

A 2 (group) × 2 (trial) mixed-model ANOVA on performance revealed a significant main effect for trial, $F(1, 26) = 9.62$, $p < .01$, $\eta^2 = .27$, and no main effect for group, $F(1, 26) = 2.04$, $p > .05$,