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[Geukes, K., Mesagno, C., Hanrahan, S., Kellmann, M. (2013)
Performing under pressure in private: Activation of self-focus traits.
International Journal of Sport and Exercise Psychology, 11(1): 11-23]
[© Taylor & Francis], available online at:
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Performing under pressure in private: Activation of self-focus traits

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(Received 1 December 2011; final version received 21 August 2012)

Self focus and self presentation traits have been found to predict performance under pressure. The interactionist principle of trait activation indicates that situational demands encourage different traits to be relevant to performance in high pressure situations. Thus, the purpose of the current study was to investigate the relationship of self focus and self presentation traits with performance in a private high pressure setting. Because the private high pressure situation offered motivational incentives but only minimal self presentation cues, only a self focus trait (private self consciousness), but not self presentation traits (public self consciousness and narcissism), was hypothesized to predict performance under pressure in a private setting. After completing personality questionnaires, future physical education university students ($N = 59$) with experience in sport competitions performed eight throws at a target in low pressure and high pressure conditions. The conditions were identical with the exception that the high pressure condition involved a monetary incentive and a cover story. Participants' state anxiety increased from low to high pressure. Neither self focus nor self presentation traits predicted performance under low pressure. Only the self focus trait, but not self presentation traits, negatively contributed to the prediction of high pressure performance. Hence, findings support the applicability of the trait activation principle and underline that the situational demands of private high pressure situations activate self focus personality traits.

Keywords: choking under pressure; narcissism; self consciousness; self presentation; person situation interaction

In the last three decades, quantitative research on performance under pressure has primarily focused on *choking under pressure* (i.e. choking; Baumeister, 1984). Mesagno and Mullane-Grant (2010) defined choking as “a critical deterioration in skill execution leading to substandard performance that is caused by an elevation in anxiety levels under perceived pressure at a time when successful outcome is normally attainable by the athlete” (p. 343). Nevertheless, compared with performances in low-pressure settings, generally, three possible outcomes could occur when performing under pressure: decreased performance (i.e. choking), stable performance, or increased performance (i.e. clutch). Accordingly, in the current study, we refer to performance under pressure outcomes as a continuum ranging from poor to stable to high performance compared with a low-pressure condition.

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Besides the extensive body of research addressing mechanisms that underlie the choking phenomenon (i.e. self-focus and distraction models; e.g. Baumeister, 1984; Beilock & Carr, 2001; Eysenck & Calvo, 1992), researchers have investigated antecedents and conditions that may increase the likelihood for choking to occur in performance situations. Antecedents accompanying a choking episode were found within the task (e.g. Beilock & Carr, 2001; Kinrade, Jackson, & Ashford, 2010), the situation (e.g. Baumeister, Hamilton, & Tice, 1985; Seta & Hassan, 1980), and the performer (e.g. Baumeister, 1984; Kinrade et al., 2010; Masters, Polman, & Hammond, 1993; Mesagno, Harvey, & Janelle, 2012; Wang, Marchant, & Morris, 2004; Wang, Marchant, Morris, & Gibbs, 2004). Specifically when addressing the performer, researchers (e.g. Baumeister, 1984; Mesagno et al., 2012; Wang, Marchant, Morris, & Gibbs, 2004) identified that expressions of personality traits, which are defined to be stable over time (Allport, 1966), determine interindividual differences in performance. Given the stability of personality traits and the situation-specific nature of performance, well-founded reasons are necessary to explain why traits would be relevant to high-pressure situations but not to low-pressure situations. Because personality traits define individuals' characteristics across situations, the hypothesized situational relevance of traits to performance in a specific high-pressure situation requires a situation-based argument. Recently, researchers have argued that statistically significant associations between traits and performances in pressure situations depend on person-situation interactions (Geukes, Mesagno, Hanrahan, & Kellmann, 2012). Previous sport psychology researchers (e.g. Baumeister, 1984; Wang, Marchant, Morris, & Gibbs, 2004) generally acknowledged the interaction of person and situation, but have not explicitly considered the activation (or non-activation) of traits in specific (high-pressure) situations (i.e. situations that contain trait-relevant cues; Kenrick & Funder, 1988; Tett & Gutermann, 2000). Typically, experimental researchers of performance under pressure treated the situational variable of pressure as dichotomous (i.e. using low-pressure and high-pressure conditions), only considering differences in the intensity of pressure (e.g. Wang, Marchant, & Morris, 2004).

Recent research on the pressure variable, however, has suggested that pressure situations may differ not only in pressure intensity but also in situational demands. Thus, researchers suggested that there may be differences between situations within the same category of high-pressure situations, depending on the objective situational features (e.g. DeCaro, Thomas, Albert, & Beilock, 2011; Geukes et al., 2012; Mesagno, Harvey, & Janelle, 2011). Mesagno et al. (2011) provided research support for the existence of differences among high-pressure situations when they compared motivational (i.e. relatively private) and self-presentational (i.e. relatively public) pressure manipulations. They found that self-presentation-related pressure manipulations led to greater state anxiety and decreased performance during the high-pressure condition compared with pressure manipulations using motivational factors.

In high-pressure situations that involved audiences as self-presentational cues, researchers found self-presentation-related traits (e.g. fear of negative evaluation: Mesagno et al., 2012; public self-consciousness: Geukes et al., 2012; narcissism: Geukes et al., 2012; Wallace & Baumeister, 2002: Experiment 3; Wallace, Baumeister, & Vohs, 2005) to be relevant to performance under pressure. Geukes et al. (2012) also conducted a study that used public self-consciousness as predictor of performance under pressure. Fenigstein, Scheier, and Buss (1975) defined self-consciousness as "the consistent tendency of persons to direct attention either inward or outward" (p. 522). Fenigstein et al. also differentiated between private self-consciousness (i.e. concern with the attention to one's inner thoughts and feelings) and public self-consciousness (i.e. the constant awareness of oneself as a social, observed, and evaluated object). Public self-consciousness can therefore be categorized as a self-presentation-related trait. Geukes et al.

found that in a public and socially evaluative high-pressure situation (presence of a large audience, up to 2000 audience members), high scores on public self-consciousness minimized choking effects.

Another self-presentational variable that was hypothesized and found to be relevant to performance under pressure is narcissism (Wallace & Baumeister, 2002, Experiment 3; Wallace et al., 2005). The *Diagnostic and statistical manual of mental disorders (DSM IV TR*, American Psychiatric Association, 2000) characterizes a narcissistic personality by a pervasive pattern of grandiosity (in fantasy or behavior) and a need for admiration. Thus, individuals scoring high on narcissism were found to excel when challenged with a monetary incentive (Wallace & Baumeister, 2002) or exposed to public evaluation (Geukes et al., 2012). Thus, self-presentation-related traits were found to be relevant in public evaluative scenarios. Private self-consciousness, which can be categorized as a self-focus trait, however, was found to be irrelevant (i.e. neither facilitative nor debilitating) to performance under pressure in a public high-pressure situation (Geukes et al., 2012). Hence, it can be concluded that self-presentation traits, but not self-focus traits, are relevant to performances in public, socially evaluative high-pressure scenarios.

Most experimental studies employed comparatively private high-pressure situations in which motivation-like cues are used instead of public, socially evaluative cues to manipulate pressure (e.g. Masters et al., 1993; Wang, Marchant, Morris, & Gibbs, 2004). In these studies, self-focus traits (e.g. private self-consciousness and reinvestment) are found to be relevant to performance under pressure. Regarding private self-consciousness, it has been hypothesized and found that pressure leads to the state of being self-aware (Baumeister, 1984) so that individuals who are habitually self-aware (who score high on self-consciousness with a combined score of private and public self-consciousness) should benefit from being accustomed to this state in a pressure situation. Baumeister provided empirical support for the positive association between self-consciousness and performance under pressure, finding individuals who score high on self-consciousness to perform better in a pressure situation than individuals scoring low. More recently, in a sport-specific study, Wang, Marchant, and Morris (2004) found that individuals who scored low on private self-consciousness performed better under pressure than high-scoring individuals. This negative direction between self-focus traits and performance under pressure has received additional empirical support from the research on the reinvestment trait that shares similarities with the (private) self-consciousness trait. Reinvestment describes “interindividual differences in the propensity for reinvesting conscious control into a skill” (Jackson, Ashford, & Norsworthy, 2006, p. 51). Individuals who score high on reinvestment tend to focus attention on the skill execution during well-learned skills and, similar to private self-consciousness, have the habitual tendency of directing attention inward. Individuals who scored low on reinvestment perform better under pressure than their high-scoring counterparts (Masters et al., 1993). Thus, research on the reinvestment trait, which can be categorized as a self-focus trait, supports a negative association between self-focus traits and performance under pressure (e.g. Jackson et al., 2006; Masters & Maxwell, 2008; Masters et al., 1993).

From a trait perspective, it is still unclear whether habitual self-focus impairs (e.g. Masters et al., 1993; Wang, Marchant, Morris, & Gibbs, 2004) or improves (Baumeister, 1984) performance in private high-pressure settings, yet situation relevance of self-focus traits can be inferred. The studies that established a negative relationship between self-focus traits and performance used mainly gross motor tasks (Jackson et al., 2006: dribbling; Masters et al., 1993: golf putting; Wang, Marchant, Morris, & Gibbs, 2004: basketball free throw) that at an expert stage are processed outside working memory (Beilock & Carr, 2001; Fitts & Posner, 1967). In Baumeister’s (1984) studies, however, a comparatively fine motor task (roll-up game; Experiments 1-5) and a video game (Experiment 6) that place demands upon participants’ working

memories were used. Both the roll-up game and the video game are tasks that involve that participants use, monitor, and adjust strategies during performance. The differences in placing demands upon working memory between the tasks may have determined the mixed results and the direction of the correlational association between self-focus traits and performance under pressure: when the working memory is involved in the task execution, being accustomed to being self-focused (high scores on self-focus traits) appears to be beneficial (positive relationship). When the task execution is processed outside working memory, low scores on self-focus traits appear to be beneficial. Because a gross motor task (i.e. handball throwing) was used in this study, a negative relationship between self-focus traits and high-pressure performance was hypothesized. Only private self-consciousness, however, was included as an example of self-focus traits.

Hence, the purpose of the current study was to investigate the predictions of the interactionist principle of trait activation for self-focus and self-presentation personality traits in a privately oriented high-pressure condition (i.e. providing minimal cues for public evaluation). Specifically, we hypothesized that private self-consciousness would be negatively associated with high-pressure performance. We also expected that public self-consciousness and narcissism would not contribute to the prediction of high-pressure performance. We also hypothesized that there would be no contributors to the explanation and prediction of low-pressure performance.

Method

Participants

The study participants were 59 German, future physical education and exercise students ($M_{\text{age}} = 21.64$, $SD = 3.14$), with 18 (31%) being female, who were involved in various sports and had at least three years competitive playing experience in their respective sports ($M_{\text{years}} = 9.17$, $SD = 5.20$). Participants who considered themselves to have poor throwing ability were not included in the study.

Measures

Demographic questionnaire

The demographic questionnaire included questions about age, gender, type of sport, and competitive sporting experience. Throwing ability was self-rated on a four-point Likert scale ranging from 1 (*poor*) to 4 (*very well*).

Private and public self consciousness

A modified German version of the self-consciousness scale (Fenigstein et al., 1975) was used to measure private (13 items) and public (14 items) self-consciousness (Fragebogen zur Erfassung dispositioneller Selbstaufmerksamkeit [Questionnaire Measuring Dispositional Self-Consciousness] (SAM); Filipp & Freudenberg, 1989). The participants answered the 27 SAM items on a five-point Likert scale, ranging from 1 (*very rarely*) to 5 (*very often*). Scores ranged from 13 to 65 for the private self-consciousness subscale and from 14 to 70 for the public self-consciousness subscale. Cronbach's alpha values of 0.87 for private self-consciousness and 0.88 for public self-consciousness reflect satisfactory internal consistencies (Filipp & Freudenberg, 1989). Example items are *I realize that I am observing myself* (private self-consciousness) and *I feel uncomfortable when observed by others* (public self-consciousness).

Narcissism

Subclinical narcissism (ambitious personality style) was measured using a 10-item subscale of the German personality style and disorder inventory (Persönlichkeits-Stil-und-Störungs-Inventar (PSSI); Kuhl & Kazén, 2009). The PSSI consists of 14 subscales that assess subclinical expressions of all personality disorders described in the *DSM IV TR* (American Psychiatric Association, 2000). We only included the “ambitious style and narcissistic personality disorder” subscale because we intended to measure narcissism alone. The participants responded on a four-point Likert scale, ranging from 1 (*I do not agree*) to 4 (*I strongly agree*). Total scores accordingly ranged from 10 to 40. The scale has an internal consistency value of 0.76 (Kuhl & Kazén, 2009). An example item on this PSSI subscale is *The thought of being a famous person appeals to me*.

Competitive state anxiety

Competitive state anxiety was measured using the 12-item state subscale of the German competition anxiety inventory (Wettkampfangstinventar (WAI); Brand, Ehrlenspiel, & Graf, 2009). The WAI state scale consists of three subscales with four items in each. A four-point Likert scale, ranging from 1 (*not at all*) to 4 (*very much so*), was used as the response format, with each subscale total ranging from 4 to 16. Internal consistency values (Cronbach’s alpha) of the subscales are 0.81, 0.74, and 0.82 for somatic anxiety, cognitive anxiety, and self-confidence, respectively (Brand et al., 2009). Example items include *I feel queasy* (somatic anxiety), *I am concerned that others might be disappointed by my performance* (cognitive anxiety scale) and *I am confident to master this challenge* (self-confidence; all translations by authors).

Experimental task, equipment, and performance

A throwing accuracy task was used, which resembled a standard 7-m penalty throw in handball. A handball goal (dimensions of 3 m by 2 m) was covered by a tarpaulin, which was attached to its posts and bar (Figure 1). The center of the tarpaulin provided a circular target hole with a diameter of 40 cm. On the tarpaulin, four rings, altering in red and white colors and each with a width of 20 cm, were displayed around the target hole. The task was to throw the handball through the target hole. Standard handballs were used with a diameter of approximately 17.5 cm.

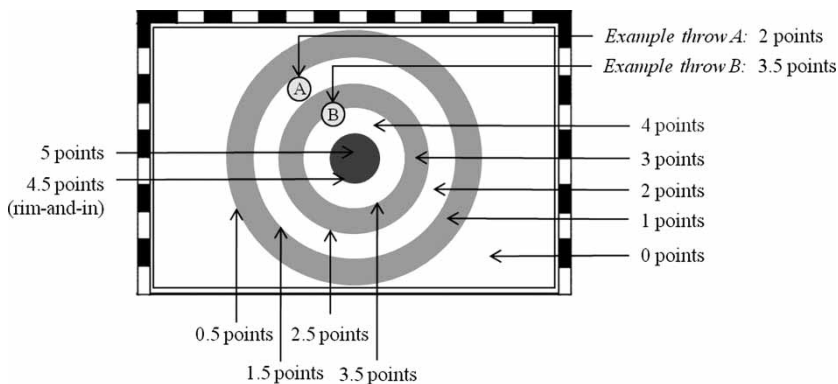


Figure 1. Schematic display of the goal with attached tarpaulin (dark gray area is the target hole) including point system and two example throws (A and B).

An interval-scaled measure, ranging from 5 to 0 points per throw, was calculated for each of the eight throws per condition (Figure 1). The sum score, accordingly, ranged from 0 to 40 points. Clear scores (i.e. ball through the target hole) received 5 points and “rim-and-in” scores 4.5 points. Points for misses (i.e. throws that did not travel through the hole) were assigned according to their distance from the target hole, with increasing distance from the target hole equating to a decreasing number of points (4 to 0 in 0.5 increments; Figure 1). A pre-test to validate the task and the point system with four independent raters indicated a high inter-rater consistency (98%).

Procedure

The participants were recruited during a physical aptitude test at a German university, which takes place at the end of every semester. It is compulsory for future students of physical education and exercise science to pass this test before enrolling for their studies at a German university. The test consists of 13 events from different sports and the attendees’ success depends on their performance outcomes as well as their technical skills. In an official statement of the organizers of the test, attendees were asked to participate in this study in the waiting period between test completion and presentation of their certificates. It is worth noting that all the participants successfully passed the test.

Volunteering participants were asked to complete a demographic information sheet and an informed consent form, which included information about the institution’s ethical approval. If the participants fulfilled the inclusion criteria (i.e. three years of experience in competitions and better than poor rating of throwing ability), they were asked to complete the personality questionnaire. The participants then performed the throwing task independently (with only the first author present) in low-pressure and high-pressure conditions, which were counterbalanced across the participants. Before their first condition, the participants were offered and completed five throws to familiarize themselves with the task. After they had read the instructions for each condition, the participants completed the state anxiety questionnaire, which was used as a pressure manipulation check, and then performed the experimental task.

Low pressure

During the instructions for the low-pressure condition, the participants were informed that they would complete eight attempts and the objective was to throw a ball as accurately as possible through the target hole. The participants were also notified that they could take as much, or as little, time as needed.

High pressure

During the high-pressure condition, the participants were tested with a combination of “private” situational factors (i.e. a cover story and a monetary incentive) used to manipulate pressure. To reduce public pressure (as was the purpose of the study), the high-pressure situation did not include public evaluation and only the first author was present to record performance scores. Prior to commencing their attempts, the participants were informed by a “bogus” official of the university faculty that this task had been used for over seven years to predict academic success in sport and exercise science students. The association found (reportedly) between task performance and academic success had been strong, reliable, and replicated in every semester. Additionally, the participants were informed that a monetary incentive was being offered and that they would receive €5 if they scored at least four times (out of the eight attempts).

After completing the performance task, the participants were asked about their understanding of the purpose of the study. They were not aware that we were focusing our research efforts on the relationship between the personality scores and the performance measures and were therefore still naïve to the purpose. The participants were then thoroughly debriefed, especially regarding the untruth of the cover story. Finally, the participants were paid €5—regardless of their actual high-pressure performance—and thanked for their participation.

Results

Preliminary analyses

Type of sport

To test for differences in the throwing ability of participants, two groups were differentiated by whether their type of sport involved throwing accuracy. Therefore, throwing sport participants ($n = 22$; i.e. basketball and handball) were compared with other sport participants ($n = 37$, e.g. volleyball, hockey, tennis, track and field, and gymnastics) with independent samples t -tests for the low-pressure and high-pressure conditions. For the low-pressure condition, it was found that the group of basketball and handball players ($M = 35.23$; $SD = 3.80$) did not significantly differ from the other sport group ($M = 33.91$, $SD = 4.60$, $t(58) = -1.118$, $p = 0.268$, $d = -0.29$). Also for the high-pressure condition, no significant differences were found between basketball and handball players ($M = 34.14$, $SD = 2.88$) and the other participants of the sample ($M = 33.70$, $SD = 3.64$, $t(58) = -0.476$, $p = 0.636$, $d = -0.13$).

Correlations between personality traits and anxiety perceptions

To test whether the anxiety perceptions (somatic anxiety, cognitive anxiety and self-confidence) in the low-pressure and high-pressure conditions systematically varied with scores on the personality traits (Table 1), Pearson correlations were calculated (Table 2). No significant association was found between private self-consciousness and state anxiety perceptions in the low-pressure and high-pressure conditions (all $p > 0.50$, correlations ranged from -0.09 to 0.08). Also the state anxiety perceptions did not vary systematically with the public self-consciousness trait (all $p > 0.20$, correlations ranged from -0.17 to 0.10). Finally, narcissism was not significantly correlated with the state anxiety perceptions (all $p > 0.10$, correlations ranged from -0.20 to 0.22).

Table 1. Trait, state, and performance scores (in the low pressure and high pressure conditions).

	<i>M</i>	<i>SD</i>
Private self consciousness	38.58	5.15
Public self consciousness	42.36	6.05
Narcissism	21.86	4.38
LP somatic anxiety	4.49	0.72
HP somatic anxiety	4.97	1.38
LP cognitive anxiety	4.90	0.90
HP cognitive anxiety	5.56	1.32
LP self confidence	13.58	1.05
HP self confidence	12.58	2.28
LP performance	31.98	3.22
HP performance	31.68	2.52

Note: LP, low pressure; HP, high pressure.

Table 2. Correlations between personality traits and state anxiety.

	Private self consciousness	Public self consciousness	Narcissism
LP somatic anxiety	0.02	-0.10	-0.08
HP somatic anxiety	0.08	0.02	0.15
LP cognitive anxiety	-0.02	-0.09	0.04
HP cognitive anxiety	-0.06	-0.15	0.22
LP self confidence	0.01	0.07	-0.20
HP self confidence	-0.01	0.17	-0.09

Note: LP, low pressure; HP, high pressure; all $N = 59$; all $p > 0.10$.

Manipulation check

To test whether the pressure manipulation was successful (i.e. whether participants experienced higher anxiety in the high-pressure condition than in the low-pressure condition), three separate one-tailed paired samples t -tests were conducted for three subscales: somatic anxiety, cognitive anxiety and self-confidence.

The participants' state anxiety and self-confidence scores significantly differed across the two pressure conditions. Somatic anxiety ($t(58) = -2.43$, $p = 0.01$, $d = -0.43$) and cognitive anxiety ($t(58) = -3.08$, $p = 0.002$, $d = -0.59$) were significantly higher, and self-confidence was significantly lower ($t(58) = 2.75$, $p = 0.004$, $d = 0.58$) in the high-pressure condition than in the low-pressure condition. The t -tests for cognitive anxiety and self-confidence indicated medium effect sizes, whereas only a small effect size was found for somatic anxiety (Cohen, 1988).

Performance differences

To test whether mean performance differed between the low-pressure and high-pressure conditions, a two-tailed paired samples t -test was conducted on performance (Table 1). Overall, scores indicated that mean performance was not significantly different across conditions ($t(58) = 0.67$, $p = 0.507$, $d = 0.18$). On an individual level, six participants (10%) showed stable performance across conditions, 26 (44%) performed better, and 27 (46%) performed worse in the high-pressure condition than in the low-pressure condition.

Predicting performance

The personality variables private self-consciousness, public self-consciousness, and narcissism served as predictors in simple linear regression analyses predicting performance scores in the low-pressure and high-pressure conditions.

The linear regression analyses predicting performance in the low-pressure condition were all non-significant with private self-consciousness ($\beta = -0.04$, $t(58) = -0.27$, $p = 0.785$), public self-consciousness ($\beta = -0.05$, $t(58) = -0.35$, $p = 0.729$), and narcissism ($\beta = -0.01$, $t(58) = -0.11$, $p = 0.915$) not contributing to the prediction of low-pressure performance.

In a linear regression analysis using data from the high-pressure condition, private self-consciousness ($\beta = -0.32$, $t(58) = -2.54$, $p = 0.014$) negatively and significantly contributed to the prediction of performance. Private self-consciousness explained 10% of the performance variance ($R^2 = 0.10$). Regression analyses predicting high-pressure performance with public self-consciousness ($\beta = -0.10$, $t(58) = -0.75$, $p = 0.455$) and narcissism ($\beta = -0.08$, $t(58) = -0.59$, $p = 0.556$) as predictors, however, were not significant (Figure 2).

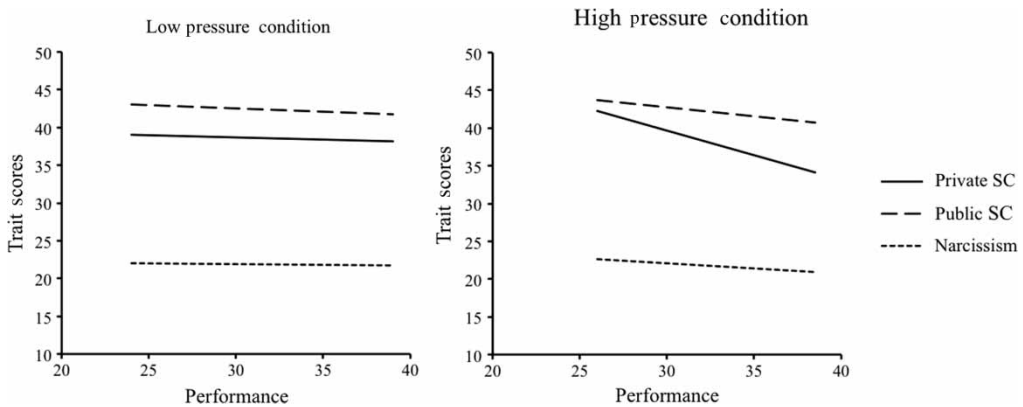


Figure 2. Regression lines for personality traits predicting low pressure and high pressure performances.

Predicting performance differences

To test whether the private self-consciousness trait additionally predicted the difference between low-pressure and high-pressure performances, a new variable was calculated by subtracting the low-pressure performance from the high-pressure performance. This differential variable ($M = -0.31$; $SD = 3.51$) served as a criterion and private self-consciousness as a predictor variable. The regression analyses indicated a non-significant prediction of the performance difference by private self-consciousness ($\beta = -0.14$, $t(58) = -1.51$, $p = 0.138$).

Discussion

The purpose of the current study was to investigate the predictions of the trait activation principle for the relevance of self-focus and self-presentation personality traits to performance in a private high-pressure setting. The findings of this study supported the statistical relevance of private self-consciousness as an example of a self-focus trait and the irrelevance of self-presentation traits (i.e. public self-consciousness and narcissism) to performance on a gross motor task in a private high-pressure situation. Thus, the interactionist principle of trait activation enables the successful prediction of interindividual differences in performance in a specific high-pressure situation.

Self-focus explanation

In the current study, private self-consciousness was found to negatively predict performance in a private high-pressure condition. Researchers found mixed results regarding the direction between private self-consciousness and performance under pressure. This result is in line with previous studies on self-consciousness and reinvestment (e.g. Masters et al., 1993; Wang, Marchant, Morris, & Gibbs, 2004) that used a gross motor task and found that private self-consciousness was relevant to performance under pressure (e.g. Wang, Marchant, Morris, & Gibbs, 2004), but it contradicts Baumeister's (1984) finding of a positive relationship. Thus, task properties and particularly the involvement of working memory in successful task execution may be important variables that influence this relationship (e.g. Beilock & Carr, 2001; Beilock & DeCaro, 2007). As indicated above, Baumeister used tasks that involved working-memory capacity as a decisive variable for success, so we identified this difference as a potential explanation for direction differences in the correlation between self-consciousness and performance under pressure.

Our study investigated personality traits that relate to choking experiences, but did not explicitly consider underlying mechanisms. Thus, we provide several potential explanations for our findings in the private high-pressure situation. First, trait activation may have led to a trait–state inter-correlation. That is, individuals who scored high on private self-consciousness, compared with those scoring low, may have been more likely to develop a self-focus perspective when facing the private high-pressure situation. When performing a well-learned skill, self-focusing leads to conscious processing of an automated skill using step-by-step control, which is commonly assumed to cause poor performance (e.g. Baumeister, 1984; Beilock & Carr, 2001; Beilock, Carr, MacMahon, & Starkes, 2002; Jackson et al., 2006; Masters, 1992). When considering this private high-pressure setting, which is comparatively low in visual (e.g. moving spectators, co-actors, or competitors) or auditory (e.g. clapping, booing, exclamation of the audience, or music) distractions, self-focusing while performing appears to be a likely explanation of poor performance or choking. Second, the distraction model may nevertheless provide a potential explanation for poor performance under private high-pressure situations. Athletes might have been distracted by situational cues (e.g. the “bogus” cover story), so their performance might have suffered because of diverted attention (Carver & Scheier, 1981). A third explanation of the relationship between private self-consciousness and choking would involve variables that mediated or moderated this relationship but have not been measured in this study. Further research is required to address potential variables within the task (e.g. involvement of working memory and difficulty), the person (e.g. self-confidence and self-efficacy beliefs), or the situation (e.g. self-confidence, self-efficacy beliefs, previous success and failure, and anticipated consequences of the performance outcome) that could serve as mediators or moderators of trait–performance relationships.

Self-presentation explanation

In the current study, narcissism and public self-consciousness were found to be irrelevant to performance in a private high-pressure setting. Therefore, the self-presentation explanation of choking appears to be comparatively irrelevant to private high-pressure situations. Because traits related to self-presentation were not contributors to the explanation of performance, the self-presentation model of choking may only apply to high-pressure situations that involve self-presentation as situational demands. Pressure situations that involve audiences, anticipated evaluation, or competitions should provide these demands (Mesagno et al., 2011; Schlenker & Leary, 1982), which is common in competitive sport. Therefore, the importance and applicability of the self-presentation model for the successful predictions of performance under pressure in applied sports remain unchallenged by findings on private pressure situations.

Pressure manipulation

In this study, a private high-pressure condition was compared to a low-pressure condition. The label of “private” high pressure only refers to a comparative, rather than absolute, distinction between private and public high-pressure situations on the basis of objective situational attributes and along the private–public high-pressure continuum. Arguably, this is not an absolutely private high-pressure situation due to the experimenter being present in both situations, but is somewhat dichotomous to the public pressure experienced in crowded sport arenas, and is therefore categorized as private *per se*. Other comparatively private pressure manipulations have been used in research studies (e.g. Beilock & Carr, 2001; Gucciardi & Dimmock, 2008); however, public cues were still included through social evaluation or performance comparisons. The aim of the current study was to manipulate pressure with only minimal factors that are directly or indirectly

related to self-presentation, social evaluation, or performance comparisons with others; therefore, we did not include an audience (with the exception of the first author), evaluation apprehension through videotaping, or competition (Baumeister, 1984; Buss, 1980; Carver & Scheier, 1981; Leary, 1992; Schlenker, 1980; Schlenker & Leary, 1982). The private pressure manipulation was new because it exclusively referred to the private self and only involved identity-related evaluation by the participants themselves.

Limitations and future research

This study was conducted with the purpose of testing the applicability of trait activation, rather than providing an ecologically valid approach to the relationship of personality traits and performance under pressure in sport. Although the lack of ecological validity was intentionally accepted when designing the study, it was a limitation. In the sport context, private high-pressure situations are rare, so a generalization—especially when considering the situational activation of relevant personality traits—of these findings seems inappropriate. In academic contexts, however, written examinations might be similar to the private pressure situation used in this study. Academic tasks usually demand working memory, with working-memory capacity being one key variable that determines success and failure (e.g. Beilock & DeCaro, 2007). In sport, however, motor tasks that are performed by experts are well learned and processed outside working memory (e.g. Beilock & Carr, 2001; Fitts & Posner, 1967). Thus, underlying mechanisms of choking and excelling under pressure in academics and sport might be different due to different task properties. According to trait activation, however, situational demands of the high-pressure condition (and not task properties) determine the activation of personality traits. Thus, a transfer of this interactionist knowledge to an academic context and to academic tasks seems appropriate but needs empirical validation.

Within motor tasks, however, a greater focus on the person–situation interaction could lead to a better understanding of when, how, and why individuals experience choking (and excelling) under pressure. When investigating personality traits, researchers could additionally focus on the source of significant associations within the scale or questionnaire. Regarding the private self-consciousness traits, for example, researchers (e.g. Anderson, Bohon, & Berrigan, 1996) analyzed the factor structure of the private self-consciousness scale and found two subcomponents: internal state awareness (i.e. to be aware of one's inner emotions and physiological states) and self-reflection (i.e. to think about the self; Anderson et al., 1996). Thus, future research in which an English-speaking sample and the self-consciousness scale are used (Fenigstein et al., 1975) may address these two components of private self-consciousness and provide further insights into the association between private self-consciousness and performance under pressure. Identifying which subscale is (more) responsible for the correlational association will increase predictive validity and will be helpful for applied work with athletes.

The combined evidence of our, and of previous, studies (Geukes et al., 2012; Wallace & Baumeister, 2002, Experiment 3; Wallace et al., 2005) suggests that self-focus traits are only relevant in private high-pressure situations and self-presentation traits are relevant in public high-pressure situations. These differences indicate that a transfer of relevant personality traits from one high-pressure scenario to another may be unjustified. These different high-pressure scenarios may vary in trait-relevant situational cues that activate (un-)successful performance under pressure; thus, systematic investigations of pressure manipulations in general and of situational factors creating these demands in particular (e.g. DeCaro et al., 2011; Mesagno et al., 2011) are still required. These analyses may subsequently lead to valid justifications for the transfer of knowledge, for example, from one setting to another, from training to competition, or to the knowledge that these transfers are inappropriate.

Conclusion

This study tested and empirically supported the applicability of the interactionist principle of trait activation to performance under pressure. In a private high-pressure situation, self-focus, rather than self-presentation, traits were activated. A negative correlational association between habitual private self-focus and performance was found under private pressure. Thus, the person–situation interaction plays an important role when investigating the relationship between personality traits and performance on a motor task under pressure. Systematically addressing situational demands of pressure situations will extend the understanding of the person–situation interaction concerning performance under pressure.

Acknowledgements

We would like to thank the Faculty of Sport Science, Ruhr University Bochum (Germany) especially Kristian Roszkopf and Heiner Langenkamp for their reliable support regarding the organization of data collection. We wish to express our appreciation to Katharina Schockenhoff for her outstanding assistance during data collection. Furthermore, we are grateful to the Konrad Adenauer Stiftung, Sankt Augustin (Germany), for its fundamental support of this project.

References

- Allport, G.W. (1966). Traits revisited. *American Psychologist*, *21*, 1–10.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (Rev. 4th ed.). Washington, DC: Author.
- Anderson, E.M., Bohon, L.M., & Berrigan, L.P. (1996). Factor structure of the private self-consciousness scale. *Journal of Personality Assessment*, *66*, 144–152.
- Baumeister, R.F. (1984). Choking under pressure: Self-consciousness and paradoxical effects of incentives on skillful performance. *Journal of Personality and Social Psychology*, *46*, 610–620.
- Baumeister, R.F., Hamilton, J.C., & Tice, D.M. (1985). Public versus private expectancy of success: Confidence booster or performance pressure? *Journal of Personality and Social Psychology*, *48*, 1447–1457.
- Beilock, S.L., & Carr, T.H. (2001). On the fragility of skilled performance: What governs choking under pressure? *Journal of Experimental Psychology: General*, *130*, 701–725.
- Beilock, S.L., Carr, T.H., MacMahon, C., & Starkes, J.L. (2002). When paying attention becomes counterproductive: Impact of divided versus skill focused attention on novice and experienced performance of sensorimotor skills. *Journal of Experimental Psychology: Applied*, *8*, 6–16.
- Beilock, S.L., & DeCaro, M.S. (2007). From poor performance to success under stress: Working memory, strategy selection, and mathematical problem solving under pressure. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *33*, 983–998.
- Brand, R., Ehrlenspiel, F., & Graf, K. (2009). *Wettkampf Angst Inventar (WAI). Manual zur komprehensiven Eingangsdagnostik von Wettkampfangst, Wettkampfstärke und Angstbewältigungsmodus im Sport* [Competition anxiety inventory. Manual for comprehensive diagnostics of competitive trait and state anxiety, and coping]. Köln: Sport und Buch Strauß.
- Buss, A.H. (1980). *Self-consciousness and social anxiety*. San Francisco, CA: Freeman.
- Carver, C.S., & Scheier, M.F. (1981). *Attention and self-regulation: A control theory approach to human behavior*. New York, NY: Springer Verlag.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: Lawrence Erlbaum.
- DeCaro, M.S., Thomas, R.D., Albert, N.B., & Beilock, S.L. (2011). Choking under pressure: Multiple routes to skill failure. *Journal of Experimental Psychology: General*, *140*, 390–406.
- Eysenck, M.W., & Calvo, M.G. (1992). Anxiety and performance: The processing efficiency theory. *Cognition and Emotion*, *6*, 409–434.
- Fenigstein, A., Scheier, M.F., & Buss, A.H. (1975). Public and private self-consciousness: Assessment and theory. *Journal of Consulting and Clinical Psychology*, *43*, 522–527.
- Filipp, S.H., & Freudenberg, E. (1989). *Der Fragebogen zur Erfassung dispositioneller Selbstaufmerksamkeit (SAM Fragebogen)* [Questionnaire measuring dispositional self-consciousness]. Göttingen: Hogrefe.

- Fitts, P.M., & Posner, M.T. (1967). *Human performance*. Belmont, CA: Brooks/Cole.
- Geukes, K., Mesagno, C., Hanrahan, S.J., & Kellmann, M. (2012). Testing an interactionist perspective on the relationship between personality traits and performance under public pressure. *Psychology of Sport and Exercise, 13*, 243–250.
- Gucciardi, D.F., & Dimmock, J.A. (2008). Choking under pressure in sensorimotor skills: Conscious processing or depleted attentional resources? *Psychology of Sport and Exercise, 9*, 45–59.
- Jackson, R.C., Ashford, J.J., & Norsworthy, G. (2006). Attentional focus, dispositional reinvestment and skilled performance under pressure. *Journal of Sport and Exercise Psychology, 28*, 49–68.
- Kenrick, D.T., & Funder, D.C. (1988). Profiting from controversy: Lessons from the person-situation debate. *American Psychologist, 43*, 23–34.
- Kinrade, N., Jackson, R.C., & Ashford, K.J. (2010). Dispositional reinvestment and skill failure cognitive and motor tasks. *Psychology of Sport and Exercise, 11*, 312–319.
- Kuhl, J., & Kazén, M. (2009). *Persönlichkeits Stil und Störungs Inventar (PSSI). Manual (2., überarbeitete und neu normierte Auflage)* [Personality style and disorder inventory]. Göttingen: Hogrefe.
- Leary, M.R. (1992). Self-presentational processes in exercise and sport. *Journal of Sport & Exercise Psychology, 14*, 339–351.
- Masters, R.S.W. (1992). Knowledge, knerves and know how: The role of explicit versus implicit knowledge in the breakdown of a complex sporting motor skill under pressure. *British Journal of Psychology, 83*, 343–358.
- Masters, R.S.W., & Maxwell, J. (2008). The theory of reinvestment. *International Review of Sport and Exercise Psychology, 1*, 160–184.
- Masters, R.S.W., Polman, R.C.J., & Hammond, N.V. (1993). “Reinvestment”: A dimension of personality implicated in skill breakdown under pressure. *Personality and Individual Differences, 14*, 655–666.
- Mesagno, C., Harvey, J.T., & Janelle, C.M. (2011). Self-presentational origins of choking: Evidence from separate pressure manipulations. *Journal of Sport & Exercise Psychology, 33*, 441–559.
- Mesagno, C., Harvey, J.T., & Janelle, C.M. (2012). Choking under pressure: The role of fear of negative evaluation. *Psychology of Sport and Exercise, 13*, 60–68.
- Mesagno, C., & Mullane Grant, T. (2010). A comparison of different pre-performance routines as possible choking interventions. *Journal of Applied Sport Psychology, 22*, 343–360.
- Schlenker, B.R. (1980). *Impression management: The self-concept, social identity, and interpersonal relations*. Monterey, CA: Brooks/Cole.
- Schlenker, B.R., & Leary, M.R. (1982). Audiences’ reactions to self-enhancing, self-denigrating, and accurate self-presentations. *Journal of Experimental Social Psychology, 18*, 89–104.
- Seta, J.J., & Hassan, R.K. (1980). Awareness of prior success or failure: A critical factor in task performance. *Journal of Personality and Social Psychology, 39*, 70–76.
- Tett, R.P., & Gutermann, H.A. (2000). Situation-trait relevance, trait expression, and cross-situational consistency: Testing a principle of trait activation. *Journal of Research in Personality, 34*, 397–423.
- Wallace, H.M., & Baumeister, R.F. (2002). The performance of narcissists rises and falls with perceived opportunity for glory. *Journal of Personality and Social Psychology, 82*, 819–834.
- Wallace, H.M., Baumeister, R.F., & Vohs, K.D. (2005). Audience support and choking under pressure: A home disadvantage? *Journal of Sports Sciences, 23*, 429–438.
- Wang, J., Marchant, D.B., & Morris, T. (2004a). Coping style and susceptibility to choking. *Journal of Sport Behavior, 27*, 75–92.
- Wang, J., Marchant, D.B., Morris, T., & Gibbs, P. (2004b). Self-consciousness and trait anxiety as predictors of choking in sport. *Journal of Science and Medicine in Sport, 7*, 174–185.