Activation of Self-Focus and Self-Presentation Traits Under Private, Mixed, and Public Pressure

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Trait activation theorists suggest that situational demands activate traits in (pressure) situations. In a comparison of situational demands of private (monetary incentive, cover story), mixed (monetary incentive, small audience), and public (large audience, video taping) high-pressure situations, we hypothesized that situational demands of private and mixed high-pressure conditions would activate self-focus traits and those of a public high-pressure condition would activate self-presentation traits. Female handball players (N = 120) completed personality questionnaires and then performed a throwing task in a low-pressure condition and one of three high-pressure conditions (n = 40). Increased anxiety levels from low to high pressure indicated successful pressure manipulations. A self-focus trait negatively predicted performance in private and mixed high-pressure conditions, and self-presentation traits positively predicted performance in the public high-pressure condition. Thus, pressure situations differed in their trait-activating situational demands. Experimental research investigating the trait–performance relationship should therefore use simulations of real competitions over laboratory-based scenarios.

Keywords: choking under pressure, person-situation interaction, self-consciousness, narcissism, performance

For almost three decades, sport psychology research has investigated performance under pressure, largely focusing on athletes’ experiences of choking under pressure (i.e., choking, Baumeister, 1984). Although some athletes have broken world records or have achieved personal bests under the high pressure of Olympic finals, researchers (e.g., Hill, Hanton, Matthews, & Fleming, 2010; Mesagno & Marchant, 2012; Otten, 2009) have only recently started to focus on positive performance outcomes under pressure where the labels “clutch performance” or “excelling under pressure” apply. Hence, we refer to performance under pressure as a broad (and presumably normally distributed) variable, reflecting a continuum that ranges from choking to excelling under pressure. According to Mesagno, Harvey, and Janelle (2012), choking involves the demonstration of skilled performance, an increase in anxiety, and substandard performance under pressure. In contrast, clutch performance would involve a demonstration of skilled performance, an increase in anxiety, and (beyond) standard performance (Otten, 2009). Athletes’ abilities to perform under pressure are usually tested in sport competitions, where high-pressure situations take place in public and, especially within elite sport, involve considerably large, direct, and sometimes indirect television, audiences. Experimental research on choking (and excelling) under pressure, however, has mainly taken place under comparatively private laboratory-based pressure conditions (e.g., Beilock & Carr, 2001; Gucciardi & Dimmock, 2008; Kinrade, Jackson, & Ashford, 2010; Masters, Polman, & Hammond, 1993). Mesagno, Harvey, and Janelle (2011) recently categorized of pressure-inducing situational factors as motivational (e.g., monetary incentives) and self-presentational factors (e.g., audiences). On this basis we classify laboratory-based high-pressure conditions that primarily rely on the manipulation of motivational cues as private high-pressure conditions (e.g., Geukes, Mesagno, Hanrahan, & Kellmann, 2012a; Gucciardi & Dimmock, 2008; Masters et al., 1993, Study 2; Wallace & Baumeister, 2002) and to those that combine the manipulation of motivational and self-presentational cues as mixed high-pressure conditions (e.g., Kinrade et al., 2010; Mesagno et al., 2012; Otten, 2009; Wang, March-
ant, Morris, & Gibbs, 2004). Pressure conditions that take place outside the laboratory (in an applied setting) and that primarily involve self-presentational pressure-inducing factors (e.g., large audiences; Geukes, Mesagno, Hanrahan, & Kellmann, 2012b) are labeled public high-pressure conditions. The common approach within experimental research on choking is the use of mixed high-pressure conditions. The common approach within experimental research on choking is the use of mixed high-pressure conditions. The common approach within experimental research on choking is the use of mixed high-pressure conditions. The common approach within experimental research on choking is the use of mixed high-pressure conditions. The common approach within experimental research on choking is the use of mixed high-pressure conditions. The common approach within experimental research on choking is the use of mixed high-pressure conditions. The common approach within experimental research on choking is the use of mixed high-pressure conditions. The common approach within experimental research on choking is the use of mixed high-pressure conditions.

To test for the transferability of findings gained in the laboratory to more ecologically valid, crowded sport arenas, we advocate an interactionist perspective. Within interactionism, researchers (e.g., Epstein & O’Brien, 1985; Mischel, 1977) have identified that a person–situation interaction plays a part in determining different behavioral outcomes (e.g., performance). Within the principle of trait activation, Tett and Guterman (2000) argued that traits need trait-relevant situational cues to be activated in situations (e.g., Kenrick & Funder, 1988; Shoda, Mischel, & Wright, 1993). Consequently, when predicting behavioral outcomes by personality traits, a trait may contribute to their prediction only if the situation provides trait-relevant situational cues. Therefore, we use the activation of traits (i.e., reflected by significant associations) in different high-pressure conditions as a statistical indicator about (non-) existing differences in situational demands between high-pressure conditions. If identical traits become activated across different high-pressure conditions, equal or at least similar trait-relevant situational demands have activated them. If, however, distinct personality traits predict performance in the high-pressure conditions, differences in trait-relevant situational demands across high-pressure conditions have activated the performance-predicting traits so that differences in situational demands can be inferred (e.g., Geukes et al., 2012b; Tett & Guterman, 2000). Regarding personality traits that are relevant to performance under pressure, researchers have primarily found self-focus and self-presentation traits to be associated with high-stakes performances (e.g., Baumeister, 1984; Geukes et al., 2012a; Masters et al., 1993; Mesagno et al., 2011, 2012b; Wallace & Baumeister, 2002; Wang et al., 2004).

**Self-Focus Traits**

We consider traits that are concerned with individuals’ habitual tendencies to direct attention inward as self-focus traits. Private self-consciousness (PRI-SC), among others, can be categorized as a self-focus trait because it is “concerned with attending to one’s inner thoughts and feelings” (Fenigstein, Scheier, & Buss, 1975, p. 523). On the basis of the self-focus explanation of choking, researchers (e.g., Beilock & Carr, 2001; Masters, 1992) have argued that the habitual tendency to direct attention inward may be associated with choking. Because pressure leads athletes to become self-aware in high-pressure situations, they may attend to skill execution. At an expert level, however, motor skills are usually executed outside working memory (i.e., automatically; Beilock & Carr, 2001; Fitts & Posner, 1967) so that attention to proceduralized skills may lead to their deautomatization (e.g., Baumeister, 1984; Beilock & Carr, 2001; Deikman, 1969; Kimble & Perlmuter, 1970; Masters, 1992). Two oppositional hypotheses about the role of self-consciousness have been proposed and empirically supported. Baumeister (1984) found a positive association between self-consciousness and performance in private and mixed high-pressure conditions, whereby individuals low on self-consciousness experienced choking. Baumeister argued that high, compared with low, self-conscious individuals are more accustomed to performing in a self-conscious state, so their performances were not negatively affected. More recently, however, researchers (Geukes et al., 2012a; Wang et al., 2004) found a negative relationship between PRI-SC and performance in private and mixed high-pressure conditions, with individuals scoring high on PRI-SC found to be prone to choking. In line with the self-focus explanation it was argued that when performing a complex task the habitual tendency to develop a self-focus might inhibit proceduralized task execution (Beilock & Carr, 2001; Fitts & Posner, 1967). These equivocal findings regarding the directionality of the association between (private) self-consciousness and performance under pressure may have several explanations. First, Baumeister used a combined score of PRI-SC and public self-consciousness (PUB-SC), whereas Geukes et al. and Wang et al. separated the subscales of self-consciousness finding only PRI-SC, but not PUB-SC, to contribute to the prediction of performance under pressure. Second, the studies differed in the investigated tasks, with Baumeister using a roll-up game (Experiments 1–5) and a video game (Experiment 6) as tasks whose executions presumably involve working memory, while Geukes et al. and Wang et al. used a familiar and unconsciously processed complex motor tasks (i.e., handball 7-m throw, basketball free throw). Hence, in laboratory-based high-pressure conditions, a habitual self-focus appears to be beneficial when performing tasks that involve working memory as part of their execution, but disadvantageous when executing highly proceduralized skills. In a public high-pressure condition that involved the presence of a large audience, however, PRI-SC may be irrelevant to performance of a complex motor task (i.e., ball throwing; Geukes et al., 2012b).

**Self-Presentation Traits**

We consider traits that are concerned with the awareness of being evaluated and the need for admiration as...
self-presentation traits. Advocates of the self-presentation explanation of choking (e.g., Mesagno et al., 2012) suggest that athletes’ susceptibility to choking is a result of heightened competitive and social anxiety under pressure (Leary, 1992; Leary & Kowalski, 1990). When high-pressure situations provide a socially evaluative scenario, athletes may experience choking because of increased self-presentational concerns (e.g., Baumeister, 1984; Mesagno et al., 2011). Self-presentation refers to behaviors aimed at putting forward an image of self to others (Schlenker, 1980) and is positively correlated with PUB-SC (Buss, 1980; Fenigstein et al., 1975). PUB-SC is defined as the “general awareness of the self as a social object that has an effect on others” (Fenigstein et al., 1975, p. 523). In a public, socially evaluative high-pressure situation PUB-SC has been found to be positively associated with performance under pressure (Geukes et al., 2012b). In line with Baumeister’s (1984) argument, Geukes et al. explained that being accustomed to the awareness of being evaluated by others appears to be advantageous when performing in front of a pressuring evaluative audience. Narcissism (NA), which is characterized as an addiction to self-esteem and an obsession with demonstrating personal superiority or greatness to others (Baumeister & Vohs, 2001), was hypothesized and found to be positively associated with performance under pressure in public high-pressure conditions (Geukes et al., 2012b; Wallace, Baumeister, & Vohs, 2005). Experiencing success in situations that are evaluative and challenging promises reality-based support of narcissists’ perceived grandiosity and makes contingent admiration likely. Narcissists, therefore, may more frequently put themselves into competitive, challenging, and evaluative situations, and thus be more accustomed to these situational demands than their low-scoring counterparts (e.g., Elliot & Thrash, 2001).

Purpose and Hypotheses

The purpose of this study was to investigate whether situational demands differ across private, mixed, and public high-pressure conditions by testing for the distinct activation of self-focus and self-presentation traits at three points on the private to public high-pressure continuum. The private high-pressure condition was purposely designed not to provide self-presentational demands, the mixed high-pressure condition replicated high-pressure situations that have commonly been used in experimental choking research, and the public high-pressure conditions resembled the demands applied competitions. We used PRI-SC as an example of a self-focus trait and PUB-SC and NA as examples of self-presentation traits. Participants performed a throwing task in a low-pressure situation and in one of three high-pressure conditions: private, mixed, or public. Specifically, PRI-SC was hypothesized to negatively contribute to the prediction of high-pressure performance in the private and mixed high-pressure conditions. Conversely, in the public high-pressure condition only self-presentation traits, rather than self-focus traits, were hypothesized to be positively associated with performance under pressure. Finally, none of the predictors was hypothesized to contribute to any predictions of low-pressure performance.

Method

Participants

Participants were 120 female handball players competing at an intermediate level in German clubs (i.e., comparable to state level in other countries). The athletes were aged 19–36 years ($M = 24.20$; $SD = 4.36$) and had at least 3 years of experience in senior competitive handball ($M = 7.32$; $SD = 4.15$; ranging between 3 and 18 years). Their throwing ability can be considered as proceduralized and participants therefore as throwing experts.

Equipment, Task, and Performance

A standard handball goal ($2 \times 3$ m) was used for the throwing task. A tarpaulin with a circular target hole (with a diameter of 40 cm; size defined in pilot testing) in the center was attached to the goal’s posts and bar. The task was to throw a handball (size 2) eight times at the target, with a dichotomous measurement of scores and misses, and performance scores ranging from 0 to 8 points (see Geukes et al., 2012b, for a detailed description and a diagram).

Measures

Demographics Questionnaire. The demographics questionnaire assessed information about participants’ age, gender, and experience in senior handball competitions.

Private and Public Self-Consciousness. The 27-item Questionnaire Measuring Dispositional Self-Consciousness ([Fragebogen zur Erfassung dispositioneller Selbstaufmerksamkeit] SAM; Filipp & Freudenberg, 1989) was used to measure PRI-SC (13 items) and PUB-SC (14 items). Filipp and Freudenberg (1989) reported satisfactory internal consistencies for this modified German version of the Self-Consciousness Scale (Fenigstein et al., 1975) with Cronbach’s alpha values of .87 for PRI-SC and .88 for PUB-SC. Example items are as follows: I realize that I am observing myself (PRI-SC), I feel uncomfortable when observed by others (PUB-SC). Because each item was answered on a 5-point Likert scale, ranging from 1 (very rarely) to 5 (very often), scores ranged from 13 to 65 (PRI-SC) and from 14 to 70 (PUB-SC).

Narcissism. The 10-item subscale labeled “ambitious style and narcissistic personality disorder” is 1 of 14 subscales of the German Personality Style and Disorder Inventory ([Persönlichkeits-Stil-und-Störungs-Inventar] PSSI; Kuhl & Kazén, 2009) and was used to measure NA. This subscale assesses narcissistic tendencies in mentally
healthy individuals with an internal consistency value of .76 (Kuhl & Kazén, 2009). An example item is as follows: The thought of being a famous person appeals to me. A 4-point Likert scale, ranging from 1 (I do not agree) to 4 (I strongly agree), was used as the response format resulting in total scores ranging between 10 and 40.

**Competitive State Anxiety.** The 12-item subscale of the Competition Anxiety Inventory ([Wettkampfungsinventar] WAI; Brand, Ehrlnspiel, & Graf, 2009) was used to measure competitive state anxiety. Based on the Competitive State Anxiety Inventory-2 (CSAI-2; Martens, Burton, Vealey, Bump, & Smith, 1990) the WAI-state questionnaire consists of three subscales each consisting of four items. Brand et al. (2009) indicated that the subscales have satisfactory Cronbach’s alpha values of .81 (somatic anxiety), .74 (cognitive anxiety), and .82 (self-confidence). Example statements of subscale items include the following: I feel queasy (somatic anxiety), I am concerned that others might be disappointed by my performance (cognitive anxiety scale), I am confident to master this challenge (self-confidence; all translations by authors). With a 4-point Likert scale from 1 (not at all) to 4 (very much so) as the response format, total scores ranged from 4 to 16 points for each subscale. In the results section we only report findings on the anxiety subscales (i.e., somatic and cognitive anxiety).

**Pressure Manipulations**

The low-pressure condition involved the absence of any pressure-inducing situational factors. Based on the categorization by Mesagno et al. (2011), the high-pressure situations involved the combination of two pressure-inducing factors each to create a private (i.e., two motivational factors), mixed (i.e., a motivational and a self-presentation factor), and public high-pressure group (two self-presentation factors).

**Private High-Pressure Group.** A performance-contingent monetary incentive and a bogus statement were combined in the private high-pressure group. Participants were told that they would receive 10 € if they scored at least 4 times out of 8 attempts, which was achievable for these participants. The bogus statement informed participants that this study would be a part of a long-term research collaboration between the university and the German Handball Federation (Deutscher Handball Bund). To increase the importance (i.e., ego relevance; Baumeister & Showers, 1986), participants were told that in previous studies and in applied sport psychology work with handball players, successful penalty throwers were found to perform this task outstandingly well with a success rate of above 95%. It was also stressed that the individual performance results would only be used for scientific purposes and not disclosed to anyone or any organization (including the German Handball Federation) outside the University.

**Mixed High-Pressure Group.** The mixed high-pressure group involved a combination of a performance-contingent monetary incentive (i.e., identical to the private high-pressure group) as a motivational factor and a small audience as self-presentation factor. Seven confederate spectators observed the participants while performing. The small audience was introduced as handball experts (i.e., coaches, players, officials) who were interested and involved in successful penalty-throwing and experimental research on handball. The audience was located slightly to the right and behind the performing participants facing in the direction of the performer and the target. Spectators were instructed to only clap when participants scored but not to verbally comment on participants’ performances.

**Public High-Pressure Group.** In the public high-pressure group, two self-presentation factors were combined to manipulate pressure: a large audience and videotaping participants while performing. The public high-pressure group took place in an arena hosting professional handball games. The audience attracted by these games served as part of the pressure manipulations. During the half-time breaks of the games, participants performed the throwing task in front of 1,000–1,500 audience members in the center of the court. Participants were not the players who played in the actual games in the arena on that day. With a standardized statement the hall announcer informed the audience about the “event” in the half-time break before the match commencing and again in the beginning of the half-time break before the first participant performed. The half-time breaks were characterized by crowd noise and movement, with attentive spectators clapping when participants scored. To increase self-presentation concerns, participants were told a bogus purpose of the videotape; the videotape would be given to their coaches with commentary about their individual performance and behavior from researchers who specialized in peak performance in sport.

**Procedure**

After contacting potential participants via e-mail or phone, a research assistant visited participants at their usual training facility before a team training session. After providing a brief description of the study, potential participants were asked to sign an informed consent form (explaining that the university ethics committee approved the study) and to complete the demographic and personality questionnaires. Participants were randomly assigned to one of the three high-pressure groups, with the low- and high-pressure conditions being completed in a counterbalanced order. For all participants the low- and high-pressure conditions took place on different days with a one-day break between sessions. The low-pressure, private, and mixed high-pressure conditions took place at participants’ usual training facility (i.e., in a gymnasium) before a regular training session. Participants had time to warm up physically before testing started but due to time restrictions for the public high-pressure group, no warm-up or familiarization throws at the target were allowed after completing the state anxiety questionnaires in any of the groups or conditions.
Low-Pressure Condition. Using standardized statements, a research assistant first presented the group-specific or condition-specific instructions. Participants then completed the state-anxiety questionnaire and performed the throwing task, whereby they were simply instructed to throw as accurately as possible. Only a research assistant was present to ensure identical procedures for every participant and to record performance scores.

High-Pressure Condition. The high-pressure condition was identical to the low-pressure condition with the exception of the group-specific instructions and pressure manipulation. A research assistant first presented the group-specific high-pressure instructions and its respective pressure inducing factors (i.e., monetary incentive, bogus cover story, small or large audience, bogus video-taping purpose). Participants then completed the state anxiety questionnaire, and performed the throwing task.

After the completion of the study, all participants were paid 10 €, irrespective of their actual performance or group. All participants were then thoroughly debriefed (especially concerning the bogus cover story and videotaping purpose) and thanked for their participation.

Results

Descriptive statistics of the personality trait scores (PRI-SC, PUB-SC, NA), state anxiety scores (somatic, cognitive state anxiety), and performance scores per pressure condition for the whole sample and for each high-pressure group are provided in Table 1.

Preliminary Analyses

Reliability. Internal consistency analyses were conducted for all personality scales for the sample used. For the subscales of the SAM, Cronbach’s alpha values were .83 for the PRI-SC subscale and .75 for the PUB-SC subscale. A Cronbach’s alpha value of .71 was found for the NA subscale of the PSSI indicated. These internal consistency values are acceptable (α > .70) or good (α > .80; George & Mallery, 2003).

Personality Traits. To test for differences in scores on personality traits among the three high-pressure groups, a MANOVA was conducted with PRI-SC, PUB-SC, and NA as dependent variables and high-pressure group as fixed between-subjects factor. The MANOVA indicated no significant differences among the high-pressure groups, F(6, 230) = 1.74, p = .112, η² = .043.

Performance. To ensure that the groups were equal in ability level under low pressure, a check for differences in participants’ initial throwing ability was necessary. A univariate ANOVA indicated no significant differences in their initial ability among the high-pressure groups, F(2, 117) = 1.40, p = .250, η² = .01.

To test for differences in performance, a 3 (Group) × 2 (Condition) ANOVA with repeated measures on the Condition factor was conducted. This ANOVA did not indicate a significant Condition main effect, F(1, 117) = 1.69, p = .196, η² = .01, a significant (high-pressure) Group main effect, F(2, 117) = 2.17, p = .119, η² = .04, or a significant interaction, F(2, 117) = .42, p = .656, η² = .01.

State Anxiety. To test for differences in scores on state anxiety among the high-pressure groups, two separate 3 (Group) × 2 (Condition) ANOVAs with repeated measures on the Condition factor were conducted for somatic and cognitive anxiety, respectively. For somatic anxiety, a significant Condition main effect for pressure intensity, F(1, 117) = 81.14, p < .001, η² = .41, a significant (high-pressure) Group main effect, F(2, 117) = 10.61, p < .001, η² = .15, and a significant interaction effect, F(2, 117) = 8.91, p < .001, η² = .13, were evident. Further Bonferroni post hoc tests indicated significant differences between

Table 1 Trait Measures, State Anxiety, and Performance Scores

<table>
<thead>
<tr>
<th></th>
<th>Sample (N = 120)</th>
<th>Private HP (n = 40)</th>
<th>Mixed HP (n = 40)</th>
<th>Public HP (n = 40)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>PRI-SC</td>
<td>44.78</td>
<td>6.24</td>
<td>44.52</td>
<td>4.74</td>
</tr>
<tr>
<td>PUB-SC</td>
<td>47.40</td>
<td>6.12</td>
<td>48.23</td>
<td>5.76</td>
</tr>
<tr>
<td>NA</td>
<td>22.03</td>
<td>4.18</td>
<td>21.28</td>
<td>3.97</td>
</tr>
<tr>
<td>LP Somatic Anxiety</td>
<td>4.67</td>
<td>1.07</td>
<td>4.40</td>
<td>0.55</td>
</tr>
<tr>
<td>HP Somatic Anxiety</td>
<td>6.07</td>
<td>1.25</td>
<td>5.28</td>
<td>1.43</td>
</tr>
<tr>
<td>LP Cognitive Anxiety</td>
<td>5.19</td>
<td>1.78</td>
<td>4.90</td>
<td>1.43</td>
</tr>
<tr>
<td>HP Cognitive Anxiety</td>
<td>6.43</td>
<td>2.14</td>
<td>5.55</td>
<td>1.43</td>
</tr>
<tr>
<td>LP Performance</td>
<td>3.07</td>
<td>1.49</td>
<td>2.83</td>
<td>1.77</td>
</tr>
<tr>
<td>HP Performance</td>
<td>2.83</td>
<td>1.68</td>
<td>2.48</td>
<td>1.40</td>
</tr>
</tbody>
</table>

Note. LP = low-pressure condition; HP = high-pressure condition.
the private and the public pressure groups ($p < .001$) and the mixed and public pressure groups ($p = .035$).

For cognitive anxiety, a significant Condition main effect, $F(1, 117) = 38.90, p < .001, \eta^2_p = .25$, a significant Group main effect, $F(2, 117) = 8.97, p < .02, \eta^2_g = .13$, and a significant interaction, $F(2, 117) = 4.01, p < .001, \eta^2_p = .07$, were found. Post hoc analyses indicated that significant differences occurred between the private and public high-pressure groups ($p < .001$), while the difference between the mixed and public high-pressure groups ($p = .071$) approached significance. These results indicated that the pressure manipulations were generally successful.

To check whether each pressure manipulation was successful independently, separate one-tailed paired samples $t$ tests were conducted for somatic and cognitive state anxiety. Results indicated that participants’ somatic anxiety significantly increased from low-pressure condition to the private high-pressure, $t(39) = 3.60, p < .001, d = -1.15$, the mixed high-pressure, $t(39) = 3.49, p = .001, d = 1.12$, and the public high-pressure, $t(39) = -8.43, p < .001, d = -2.70$, conditions. Cognitive anxiety also showed statistically significant increases from low-pressure condition to private high-pressure, $t(39) = 2.35, p = .012, d = -0.75$, mixed high-pressure, $t(39) = -3.01, p = .003, d = .96$, and public high-pressure, $t(39) = -5.10, p < .001, d = 1.63$, conditions.

To additionally determine whether state anxiety scores differed systematically with scores on personality traits (PRI-SC, PUB-SC, NA), bivariate correlations were calculated. None of these correlations indicated an association between any of these variables ($p > .10$ for all correlations, correlations ranged from $r = -1.3$ to $r = .14$).

Testing Hypotheses—Prediction of Performance

Personality scores on PRI-SC, PUB-SC, and NA were used as predictors of low- and high-pressure performance. Standardized $z$-scores were used in all linear regression analyses.

**Private High-Pressure.** In the private high-pressure group, the regression analyses indicated no contribution of any predictor to the explanation of low-pressure performance, with PRI-SC, $\beta = -.14, t(39) = -.90, p = .376$, PUB-SC, $\beta = .07, t(39) = -.42, p = .675$, and NA, $\beta = -.12, t(39) = -.76, p = .451$, respectively. PRI-SC, however, significantly predicted high-pressure performance, $\beta = -3.3, t(39) = -2.16, p = .037$ explaining $9\%$ of high-pressure performance variance ($R^2 = .09$). PUB-SC, $\beta = -.21, t(39) = -1.29, p = .205$, and NA, $\beta = -.12, t(39) = -.72, p = .474$, did not significantly contribute to the prediction of high-pressure performance in this group.

**Mixed High-Pressure.** For the mixed high-pressure group, the regression analyses indicated that no personality traits predicted low-pressure performance: PRI-SC: $\beta = -.05, t(39) = -.32, p = .754$; PUB-SC: $\beta = -.22, t(39) = -1.42, p = .166$; NA: $\beta = .03, t(39) = -.18, p = .860$. PRI-SC significantly contributed to the prediction of performance, $\beta = -3.1, t(39) = -2.03, p < .05$, explaining $7\%$ of the variance in high-pressure performance ($R^2 = .07$). PUB-SC, $\beta = -.12, t(39) = -.74, p = .463$, and NA, $\beta = -.12, t(39) = -.76, p = .450$, did not significantly contribute to the prediction of high-pressure performance.

**Public High-Pressure.** For the public high-pressure group, none of the predictors contributed to the explanation of participants’ low-pressure performance: PRI-SC, $\beta = .00, t(39) = -.02, p = .982$, PUB-SC, $\beta = .04, t(39) = .22, t = .825$, NA, $\beta = -.06, t(39) = -.38, p = .706$, respectively. PRI-SC did not serve as a significant predictor, $\beta = .10, t(39) = .63, p = .521$, PUB-SC, $\beta = .33, t(39) = 2.21, p = .033$, and NA, $\beta = .34, t(39) = 2.19, p = .035$, however, significantly contributed to the prediction of performance in the public high-pressure group. PUB-SC explained $9\%$ ($R^2 = .09$), and NA also explained $9\%$ ($R^2 = .09$) of high-pressure performance within the public group.

Additional Analyses—Prediction of the Whole Sample’s Performance

Not distinguishing between private, mixed, and public high-pressure groups and on the basis of the whole sample’s scores, all personality scores were only insignificant predictors of performance. PRI-SC, $\beta = -.03, t(119) = -3.6, p = .723$, PUB-SC, $\beta = -.06, t(119) = -0.7, p = .503$, and NA, $\beta = -.02, t(119) = -2.1, p = .835$, did not significantly predict overall low-pressure performance; PRI-SC, $\beta = -.16, t(119) = -1.17, p = .086$, PUB-SC, $\beta = -.01, t(119) = .11, p = .915$, and NA, $\beta = .16, t(119) = 1.76, p = .081$ did not significantly predict overall high-pressure performance.

Discussion

The purpose of this study was to investigate whether situational demands differ across private, mixed, and public high-pressure conditions. Based on the interactionist background (e.g., Tett & Guertner, 2000; Geukes et al., 2012a, 2012b), we hypothesized the distinct activation of self-focus and self-presentation traits in laboratory-based and public high-pressure conditions and inactivated traits under low pressure. While the low-pressure condition activated none of the personality traits, the high-pressure conditions differed in situational demands distinctly activating self-focus and self-presentation traits. Only PRI-SC was negatively associated with performance under private and mixed pressure, and only PUB-SC and NA were positively associated with performance under public high pressure.

Within Private, Mixed, and Public High-Pressure Groups

As found in previous studies on choking (e.g., Geukes et al., 2012a, 2012b; Gucciardi & Dimmock, 2008; Wang et al., 2012a, 2012b; Geukes et al., 2012a, 2012b), we hypothesized the distinct activation of self-focus and self-presentation traits in laboratory-based and public high-pressure conditions and inactivated traits under low pressure. While the low-pressure condition activated none of the personality traits, the high-pressure conditions differed in situational demands distinctly activating self-focus and self-presentation traits. Only PRI-SC was negatively associated with performance under private and mixed pressure, and only PUB-SC and NA were positively associated with performance under public high pressure.
the manipulation of motivational and self-presentational situational factors successfully induced statistically significant increases in competitive state anxiety from the low-pressure situation to the private, mixed, and public high-pressure groups.

**Private High-Pressure Group.** Findings of the private high-pressure group empirically supported a negative association between PRI-SC and performance under private pressure (e.g., Geukes et al., 2012a; Wang et al., 2004) and the irrelevance of self-presentation traits. In line with the self-focus explanation of choking (e.g., Beilock & Carr, 2001; Masters, 1992; Wang et al., 2004), participants appeared to be (based on the PRI-SC score) more privately self-aware with increasing scores on PRI-SC. This self-awareness may have inhibited the automatic skill execution and caused choking on the complex motor task within private high-pressure groups (Beilock & Carr, 2001; Deikman, 1969). Nevertheless, on the basis of personality traits, in contrast to personality states, a direct test of a current and detrimental self-focus that directly supported the self-focus explanation was not obtained. Thus, self-focus is a likely cause for choking, but on the basis of these data not the only possible explanation. Therefore, alternative explanations of choking cannot be excluded. Situational cues (e.g., present researcher, bogus cover story, monetary incentive; Carver & Scheier, 1981), for example, may have caused participants to divert attention and to choke in this laboratory-based high-pressure situation.

**Mixed High-Pressure Group.** To replicate common experimental, laboratory-based research on choking, the mixed high-pressure group involved motivational and self-presentational cues. Despite the presence of self-presentational cues, however, only the self-focus trait (i.e., PRI-SC) became activated and was negatively associated with performance under mixed pressure. Hence, the explanation that PRI-SC may have led to choking (presented for the private high-pressure condition) is equally applicable to choking in the mixed high-pressure condition. Generally and as hypothesized, this finding indicates that the common experimental approach of using “mixed” high-pressure conditions is comparable to the use of private high-pressure conditions, which provides too few, or too weak, self-presentation cues to activate self-presentation traits (e.g., Tett & Guterman, 2000). In a related study that also used a mixed high-pressure group (Mesagno et al., 2012), a self-presentation trait (i.e., fear of negative evaluation) was found to predict performance. Study-specific differences in the setup of the mixed situations may explain these equivocal findings. Mesagno et al. situated the audience two meters in front of the participants, but the audience in our study was positioned slightly behind (4 m) and to the right (3–5 m) of the performers outside their visual fields. Thus, not only the mere presence of self-presentation cues but also their salience (Baumeister & Showers, 1986) may influence participants’ perceptions of high-pressure situations and the activation of self-presentation traits.

**Public High-Pressure Group.** In the public high-pressure situation, positive associations of PUB-SC and NA with performance were found, replicating the findings of Geukes et al. (2012b) and indirectly supporting the self-presentation explanation of choking. These results only indirectly support the self-presentation explanation for two reasons. First, the correlational, trait-based design of this study did not allow a direct test of this explanation. As mentioned above, on the basis of traits it is impossible to draw clear conclusions about the relationship of participants’ self-presentational concerns to choking. Second, despite empirical evidence for self-presentation generally playing an important part in explaining performance under pressure, the directionality of the association of PUB-SC to performance challenges the predictions of the self-presentation explanation of choking. The self-presentation model (Mesagno et al., 2011, 2012) predicts that high scores on PUB-SC are likely to be associated with high scores on anxiety. In the current study, however, no such association existed. In line with Baumeister’s findings (1984), individuals who are habitually publicly self-aware appeared to have an advantage over individuals who were comparatively unfamiliar with the state of being publicly self-aware. Similar to PUB-SC, the advantage of individuals scoring high on NA might have derived from their experience with performing in public high-pressure situations. Because narcissists frequently put themselves in competitive and challenging situations, their greater experience might explain their advantage over less experienced, low-scoring individuals (Beilock & Carr, 2001; Elliot & Thrash, 2002; Geukes et al., 2012b; Oudejans, 2008; Oudejans & Pijpers, 2010). In a previous study, NA was found to be positively associated with dart-throwing performance in a private high-pressure situation (Wallace & Baumeister, 2002, experiment 3). Our study, however, did not replicate the relevance of NA under private high-pressure. Wallace and Baumeister (2002) assessed NA with the 40-item forced-choice Narcissistic Personality Inventory (i.e., NPI; Raskin & Terry, 1988) covering both the confidence/superiority striving facet and the fragility/vulnerability facet of NA (Elliot & Thrash, 2001). We measured NA with the 10-item subscale of the PSSI (Kuhl & Kazén, 2009) that only assesses the confidence/superiority striving facet. Thus, this difference may explain the irrelevance of NA in the private high-pressure group in our study.

**Comparing Private, Mixed, and Public High-Pressure Groups**

Comparing group-specific state anxiety perceptions, somatic and cognitive anxiety were (marginally) significantly higher in the public high-pressure than in the private and mixed high-pressure groups. Although comparable anxiety levels across high-pressure groups would have been desirable from a methodological and experimental design perspective, related findings on the anxiety/self-presentation relationship support that
self-presentation concerns are associated with trait (e.g., Hudson & Williams, 2001; Wilson & Eklund, 1998) and state anxiety (Braw, Martin, & Widmeyer, 2000). In line with previous choking research (Mesagno et al., 2011), these findings highlight that pressure manipulations based on self-presentation elevated participants’ somatic and cognitive state anxiety more than those based on motivation. Furthermore, these findings add to the existing literature that the public high-pressure situation differed from the private or mixed high-pressure situations, not only quantitatively (i.e., perceived pressure-intensity; see Fairclough, Tattersall, & Houston, 2006) but also qualitatively (i.e., regarding situational demands). Because different traits were activated in laboratory-based and public high-pressure situations, sources of these differences—according to trait activation (e.g., Kenrick & Funder, 1988; Tett & Guterman, 2000)—are due to differences in situational demands that characterize the high-pressure situations.

**Implications, Limitations, and Future Directions**

Our results that situational demands of private, mixed, and public high-pressure situations distinctly activate self-focus and self-presentation traits highlights the benefit of using ecologically valid scenarios within sport psychology research. At least when investigating the role of personality traits, the use of applied, public scenarios might be advantageous in terms of their ecological validity over the common laboratory-based approach. If athletes’ familiarization with high-pressure situations is important for their ability to perform under pressure, the situational demands of competitions will provide well-founded knowledge about the relevance of traits (Kenrick & Funder, 1988; Tett & Guterman, 2000). We understand, however, that in applied or public high-pressure situations, despite their ability to offer ecologically valid situational demands, it is difficult to control for potential confounding variables. The reactions of the spectators, the amount of movement, and the level of crowd noise are examples of variables that we could not influence as researchers. Thus, especially when aiming for strict experimental designs, public scenarios might involve more sources of error than do private and mixed situations. In addition, to experimentally test participants in front of large audiences and in public high-pressure situations, researchers have to accept accompanying organizational, logistical, and financial efforts that may provide additional difficulties. Nevertheless, only the comparison of activated traits in private, mixed, and public high-pressure situations indicated that these situations provide different situational demands. Hence, only the comparison of laboratory-based and field-based research indicated, for example, that private and public self-consciousness distinctly contribute to the prediction of performance under pressure and, therefore, the usefulness of separating self-consciousness into its subcomponents.

Limitations of this study, however, are the biased (female) gender of the sample and the gross motor task. Because only female handball players were tested, a transfer of findings to males is not possible. In addition, the throwing task used in this study restricts the generalizability of findings to tasks other than gross motor tasks (e.g., fine motor tasks, effort-based motor tasks, academic tasks). Further research is, therefore, required to investigate different samples and (sport) tasks to test the transferability of findings to contexts other than the one used in this study.

This study provided empirical evidence that laboratory-based (i.e., private, mixed) high-pressure situations differ from public high-pressure situations in trait-activating situational demands. As judged by significant associations between personality traits and high-pressure performance, laboratory-based high-pressure groups only activated a self-focus trait and the public high-pressure activated only self-presentation traits. Hence, on the basis of a situational-specific activation of traits it can be inferred that high-pressure situations may differ in (at least in trait-activating) situational demands. Experimental research on the personality trait/performance relationship should therefore best take place in applied and ecologically valid settings or at least in simulations of them.

**Acknowledgments**

We would like to thank the Konrad-Adenauer-Stiftung, Sankt Augustin (Germany), for its fundamental support of this work. We would also like to thank the ASV Hamm-Westfalen for offering the opportunity of using their audience as part of the public pressure condition.

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*Manuscript submitted: May 25, 2012
Revision accepted: October 25, 2012*