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Perfectionism and Performance Following Failure in a Competitive Golf-Putting Task

by

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Running head: Perfectionism and Performance

Abstract

Objectives: Perfectionism is linked to an array of cognitive, affective, and behavioral correlates in sport. However, research examining links between perfectionism and performance in competition, especially following failure, is scarce. The purpose of this study was to examine the interaction between two higher-order dimensions of perfectionism—perfectionistic strivings and perfectionistic concerns—in predicting golf-putting performance following failure in competition.

Design: A correlational design was employed.

Method: Ninety-nine (52 female) intercollegiate athletes (*M* age = 20.51 years, *SD* = 1.79) completed a domain-specific measure of perfectionistic strivings and perfectionistic concerns in sport. Athletes competed in two trials of a golf-putting task against a research confederate. After the first trial of ten putts (and before the second trial of ten putts) athletes were provided false-failure feedback indicating that they were losing the competition to their opponent. Performance was measured by the total distance each putt finished from the intended target.

Results: Moderated hierarchical regression analysis with Johnson-Neyman technique to probe interactions revealed that, following failure, perfectionistic strivings is associated with better performance when perfectionistic concerns is lower, but associated with worse performance when perfectionistic concerns is higher.

Conclusions: Dimensions of perfectionism predict performance following competitive failure and the presence of higher (versus lower) perfectionistic concerns appears to be a key determining factor in how athletes perform.

Keywords: perfectionistic strivings; perfectionistic concerns; performance; sport; athletes

Perfectionism and Performance Following Failure in a Competitive Golf-Putting Task

Perfectionism is among the most studied personality characteristics in sport and has been consistently linked to a wide variety of cognitive, affective, and behavioral responses in athletes (for a recent review see Hill, Mallinson-Howard, & Jowett, 2018). Despite the extensive body of research that has examined perfectionism in sport, very few studies have investigated links between perfectionism and athletic performance. The dearth of research in this area seems surprising given that: (a) a key objective of sport/performance psychology research is to understand psychological factors that impact human performance (see Raab, Lobinger, Hoffman, Pizzera, & Laborde, 2016), and (b) competitive performance is arguably one of the most important aspects of an athlete's life (Hill, Appleton, & Mallinson, 2016). Thus, the general purpose of this study was to examine relationships between perfectionism and athlete performance in a competitive setting. We were particularly interested in this relationship in the context of competitive failure.

Multidimensional Perfectionism

Perfectionism is viewed by many contemporary perfectionism theorists as a multidimensional personality characteristic comprised of two higher-order dimensions that are often labelled perfectionistic strivings and perfectionistic concerns (Dunn et al., 2016; Stoeber & Otto, 2006). In the context of sport, *perfectionistic strivings* (PS) reflect "aspects of perfectionism associated with [athletes'] self-oriented striving for perfection and the setting of very high personal performance standards" (Gotwals, Stoeber, Dunn, & Stoll, 2012, p. 264). By contrast, *perfectionistic concerns* (PC) reflect "those aspects of perfectionism associated with [athletes'] concerns over making mistakes, fear of negative social evaluation, feelings of discrepancy between one's expectations and performance, and negative reactions to imperfection" (Gotwals et al., 2012, p. 264).

Evidence suggests that PS in sport is often ambivalent or ambiguous. This is evident in that it is associated with a mix of adaptive and maladaptive processes/outcomes among athletes. For example, PS is positively correlated to both ego and task orientation, intrinsic and extrinsic motivation, and self-confidence and anxiety (Gotwals et al., 2012; Hill et al., 2018; Jowett, Mallinson, & Hill, 2016). However, when the overlap with PC is controlled (viz., residual PS is examined) typically only the associations with adaptive processes/outcomes in athletes remain (e.g., task orientation, intrinsic motivation, self-confidence). This pattern of findings reflects a complex set of beliefs and underpinning motives that imbue personal achievement with an extreme sense of importance. This importance can energize personal effort and task focus but may also contribute to more worry and negative self-evaluation concerning possible failure. When more problematic self-evaluative tendencies are removed (leaving residual PS) or PS are accompanied by lower PC, what remains are the highly energizing qualities or a more challenge-appraisal mindset (Dunn, Gotwals, Causgrove Dunn, & Lizmore, 2019).

On the other hand, PC is comparatively less complex than PS in sport and is typically associated with maladaptive, unhealthy, or dysfunctional processes/outcomes. For example, regardless of whether the overlap with PS is controlled, PC is positively correlated with burnout, rumination, anxiety, fear of failure, amotivation, and performance avoidance goals in athletes (see Hill et al., 2018). This pattern of findings reflects a more insidious set of beliefs and motives that include deeply entrenched fears and concerns over negative social evaluation and failure. These concerns heighten the sense of threat associated with social and competitive settings and encourages a failure-avoidance mindset (Dunn et al., 2019). Moreover, removing the more personally oriented features of PS, and examining residual PC, or examining PC when accompanied by lower PS, appears to do little to quell these strong social fears.

Perfectionism and Athletic Performance

We are aware of only six published studies that have examined links between perfectionism and performance in athletic/sport contexts (Anshel & Mansouri, 2005; Hill, Hall, Duda, & Appleton, 2011; Madigan, Stoeber, Culley, Passfield, & Hill, 2018; Stoeber, Uphill, & Hotham, 2009; Stoll, Lau, & Stoeber, 2008; Thompson, Kaufman, De Petrillo, Glass, & Arnkoff, 2011).[1] These studies have employed a range of performance tasks including balancing tasks (Anshel & Mansouri, 2005), sport-specific technical tasks (Madigan, Stoeber, Culley, et al., 2018), and actual competitive performance (Stoeber et al., 2009). The results of these studies have provided mixed findings with respect to relationships between perfectionism and performance. Three studies found that perfectionistic strivings was associated with enhanced performance (Madigan, Stoeber, Culley, et al., 2018; Stoeber et al., 2009; Stoll et al., 2008), one study found that strivings was associated with reduced performance (Anshel & Mansouri, 2005), and two studies found no relationship between strivings and performance (Hill et al., 2011; Thompson et al., 2011). With respect to perfectionistic concerns, two studies reported that concerns was associated with reduced performance (Anshel & Mansouri, 2005; Thompson et al., 2011) and four studies found no relationship between concerns and performance (Hill et al., 2011; Madigan, Stoeber, Culley, et al., 2018; Stoeber et al., 2009; Stoll et al., 2008).

Against the backdrop of these inconsistent findings, we were interested in three issues: (1) the relationship between perfectionism and athletic performance in a distinctly competitive setting, (2) examination of this relationship under conditions of competitive failure, and (3) the interaction between perfectionistic strivings and perfectionistic concerns in predicting performance.

In regards to the first issue, only Stoeber et al. (2009) have examined the perfectionism-

[1] Hill, Stoeber, Brown, and Appleton (2014) examined links between perfectionism at a team level and team performance. Given that Hill et al. measured team performance, it is not discussed in the current study.

performance relationship in an actual *competitive* setting—where competition is defined as:

> An activity involving multiple parties that are attempting to achieve an exclusive goal, one which cannot be held in common or shared among the parties, and in which there are some set of rules, guidelines, or constraints on the means for participating and achieving the goal. (The Sports Ethicist, 2013)

Examining the perfectionism-performance relationship in competitive settings (as opposed to settings that focus upon intrapersonal, self-referenced, or self-improvement evaluations of performance) is important because competition increases the likelihood for interpersonal judgements of competence to occur. These judgements may increase the potential for athletes' perfectionistic tendencies to impact performance, particularly when the possibility of threat, negative evaluation, or failure exists within the environment (Dunn et al., 2019; Lizmore, Dunn, & Causgrove Dunn, 2017). Finally, competition is a defining and inherent part of sport. Therefore, examination of the relationship between perfectionism and athletic performance in a competitive setting provides ecological validity for any conclusions drawn regarding this relationship.

We adopt the position that evaluative- or interpersonally-based competitive failure is important because it has the potential to send a salient message to perfectionistic athletes that they are flawed relative to other people in the social/competitive environment and that they are failing to achieve their lofty performance standards. Individuals with higher PS and PC are hypersensitive to failure and are driven to avoid public displays of personal imperfection or personal inadequacy (Flett & Hewitt, 2016). Thus, conditions involving interpersonally-based evaluative failure in competition should be particularly threatening to the sense of self and personal identity of these individuals (Hewitt, Flett, & Mikail, 2017). In turn, this threat may result in what Flett and Hewitt (2016) have described as perfectionistic reactivity. Responses

such as anger, dejection, mistake rumination (overthinking past or anticipated mistakes), social comparison rumination (excessive attention to the status or performance of competitors), avoidance behaviors, and poorer performance are examples of such reactivity (Flett & Hewitt, 2005, 2016).

In regards to the second issue, only two studies have examined the perfectionism-performance relationship in athletic/sport contexts under conditions of personal failure. Anshel and Mansouri (2005) provided self-referenced false-failure feedback ("You are failing to reach your previous best") to participants on a stabilometer balancing task and measured subsequent performance. Results indicated that higher perfectionistic strivings (personal standards) and higher perfectionistic concerns (concern over mistakes, doubts about actions, and parental expectations) corresponded with lower performance (i.e., less time) on the balancing task following failure. Hill et al. (2011) provided similar self-referenced false-failure feedback to student-athletes who were engaged in a series of maximal-effort 6-minute cycling ergometer time-trials. Unlike Anshel and Mansouri's findings, Hill et al. found no link between perfectionism (i.e., self-oriented perfectionism) and performance following failure and noted only changes in self-report measures (e.g., effort and perceived threat). Given that both studies employed intra-personal self-referenced or self-comparison performance tasks, the degree to which perfectionism is associated with athletic performance under conditions of competitive failure remains unexamined in sport.

In regards to the third issue, almost every study that has examined the perfectionism-performance relationship in athletic/sport settings—with the notable exception of Stoll et al. (2008)—has focused upon the independent relationships of strivings and concerns with performance. This leaves an important gap in the literature because perfectionistic strivings and perfectionistic concerns coexist in athletes and are theorized to work in conjunction with each

other to impact performance (Dunn et al., 2019). This proposition is supported in Stoll et al.'s investigation of perfectionism and performance in a series of basketball shooting tasks where strivings and concerns interacted to predict shooting performance. Specifically, high strivings combined with high concerns corresponded with the greatest performance increments/ improvements, and high strivings combined with low concerns corresponded with the smallest performance increments. Stoll et al. noted that their findings were unexpected and difficult to explain, especially when considered in the context of existing research indicating that heightened perfectionistic concerns is largely associated with maladaptive processes and outcomes in sport (see Hill et al., 2018). Clearly more research is needed to examine the potential interaction effect of perfectionistic strivings and perfectionistic concerns on athletic performance.

Present Study

In consideration of the aforementioned issues, the purpose of this study was to examine the interaction of athletes' perfectionistic strivings and perfectionistic concerns in predicting (golf putting) performance following competitive failure. Based on current research examining perfectionism and performance, we hypothesised that the relationship between perfectionistic strivings and performance following competitive failure would depend on levels of perfectionistic concerns. We specifically hypothesised that in the context of lower perfectionistic concerns, perfectionistic strivings would be associated with better performance, and in the context of higher perfectionistic concerns, perfectionistic strivings would be associated with poorer performance.

Method

Participants

Forty-seven male and 52 female intercollegiate varsity athletes (N = 99; M age = 20.51 years, SD = 1.79) from a large Canadian university participated in the study (M varsity sport

experience = 2.51 years, *SD* = 1.79). Thirty-seven athletes competed in individual sports and 62 competed in team sports at the intercollegiate level.

After receiving approval from the institutional research ethics board, participation was solicited by the principal investigator at team meetings scheduled throughout the academic year and through the support of the university athletic board—a student-athlete body that had representation across varsity sports at the university. During recruitment, participants were informed that the study would examine psychological factors associated with performance in competition and that participation would require athletes to compete against a matched-ability opponent. Participants were also informed that the winner of each individual competition would receive a $5 gift certificate to a local food outlet and the overall winner of each 'matched-ability bracket' (described below) would further receive a $25 gift certificate to the same food outlet when all data collection for the entire study was completed.

Athletes signed up for the study using an online application that required them to (a) select a date and time when they could participate, and (b) indicate their golf ability level to ensure they would compete against a matched-ability opponent. Participants rated their ability in one of five performance categories; each category included a 'lay description' of a person's golf ability (ranging from "novice" to "very high proficiency") and a 'handicap' range (where a lower handicap is indicative of superior golf performance).[2] Fifty-three athletes identified their golf ability as 'novice' (i.e., golfed less than 10 times in their lives), 19 identified as 'low proficiency' (i.e., golf handicap range 31-40), 15 identified as 'moderate proficiency' (i.e., golf handicap range 21-30), 7 identified as 'high proficiency' (i.e., golf handicap range 11-20), and 5 identified as 'very high proficiency' (i.e., golf handicap ≤ 10). Given that the study was presented as a

[2] For readers who wish a more detailed overview of the World Handicap System (WHS) that is used in the game of golf, the following website is recommended: https://www.whs.com/

competition among varsity athletes at the university, the only inclusion criterion was that participants had to be on the current roster of a varsity sport team at the institution where the study was being conducted. All participants were treated in accordance with the ethical guidelines of the American Psychological Association (APA, 2010) and written informed consent was obtained from all participants prior to commencing the study protocols in the laboratory.

Task Procedures and Laboratory Description

The putting task required two athletes to simultaneously compete against one another over two ten-putt trials in a laboratory that had two green synthetic-carpet putting surfaces on the floor. The two putting surfaces (2.6 m wide x 9.2 m long; stimpmeter reading = 11.90) were separated by a curtain (see Figure 1) that allowed competitors to see each other's putting strokes but not the final outcome of each putt. On each surface, five starting points were marked at distances of 3.2, 3.8, 4.4, 5.0, and 5.6 m from the centre of a flat target ('hole') that was clearly marked by a small circular piece of tape at the opposite end of the surface. A space of 2.8 m of putting surface remained beyond the hole. The objective of the task was to putt each ball such that it stopped as close as possible to the centre of the target when it came to rest. Given that the ball could pass directly over the target on the putting surface, the task was to stop the ball as close to the target as possible rather than making the ball 'drop into a hole' as is typically the objective in golf. In golf parlance, this is often referred to as 'dead weight putting.' Participants were informed that the winner would be determined by which athlete achieved the smallest cumulative straight-line distance from the centre of the target across the two trials.

The two competitors arrived at the laboratory at the designated time and were greeted by two researchers. Unbeknown to the participant, the matched-ability opponent was a research confederate. After everyone had been introduced and a brief overview of the competitive task

had been provided (including a reminder that the opponent was of similar ability and that a gift certificate was to be awarded to the winner) the two competitors were directed towards tables and chairs at the far end of their respective sides of the curtain (see Figure 1) and instructed to complete a brief demographic questionnaire and a self-report measure of perfectionism (see Measures section). Each competitor was then given the option to select an identical left- or right-handed (90 cm Lynx Black Cat) putter and was asked to take two practice putts from the furthest and closest distance. After taking the practice putts, the two competitors returned to their respective tables and completed a self-report measure of cognitive state anxiety, state optimism, and perceived threat (see Measures section). Both competitors simultaneously commenced with Trial 1 (T1) by putting ten balls from the same series of starting points that had been specified by the researchers. The distance that each putt finished from the center of the target was recorded, after which the ball was removed from the putting surface before the next putt was taken.

After completing T1, participants saw the two researchers conferring about the scores of the two competitors. The participant and confederate were then invited to the front of the laboratory where the participant was provided with false-failure feedback indicating that his/her total distance score (reported in centimeters) was 17% worse (i.e., higher) than the confederate's score. The 'true' cumulative distance for the first ten putts of the participant and the 'fake' cumulative distance for the confederate were written on a whiteboard located at the front of the laboratory where both competitors could see the two scores during the second trial. The participant and confederate returned to the back of the laboratory where they again completed the measure of cognitive state anxiety, state optimism, and perceived threat before commencing with the next ten putts for T2.

Although there was no specific theoretical basis for choosing the value of 17% as the performance deficit, we felt this value would convey the message to participants that they were

losing the competition (thereby increasing the degree of threat/stress) but there was still a reasonable opportunity to overcome the deficit in the second round of putting. We did not want to create a sense of hopelessness by using a very large deficit nor did we want to use a very small deficit where participants would not feel much threat to their goal of winning the competition. We also wanted to create a performance deficit that 'felt real' to participants. A very small deficit for athletes who felt they were performing poorly may jeopardize internal validity, and a very large deficit for people who felt they were performing well could also threaten internal validity. Finally, we chose the value of 17% because it is not an 'intuitively obvious/simple' value. We considered this important because we were wary of the potential for participants to talk about their experiences with other teammates who might participate in the study and therefore avoided 'intuitively simple' values such as 10% or 20% or 50%.

Upon completion of T2, the participant and confederate were invited to the front of the laboratory where they were given their respective cumulative scores for the two trials and a winner was identified. In anticipation that participants might talk to their fellow varsity athletes (i.e., future participants) about their experiences in the study, an attempt was made to further protect the illusion of competition by randomly selecting approximately half of the participants as winners and the other half as losers. Each winner was handed a $5 gift card and both competitors were thanked for their participation. At the end of the school year when all data had been collected, every participant was informed by email of the deception that had occurred. Participants who had initially been informed that they lost their competition were invited to collect a $5 gift card and the actual winners of the five matched-ability brackets (i.e., lowest cumulative putting distance across the two trials) were awarded their $25 gift certificates.

Measures

Perfectionism. A domain-specific measure of perfectionism that combined items from

the Sport-Multidimensional Perfectionism Scale-2 (Sport-MPS-2; Gotwals & Dunn, 2009) and the Multidimensional Inventory of Perfectionism in Sport (MIPS; Stoeber, Otto, & Stoll, 2006) was used to assess participants' perfectionistic strivings and perfectionistic concerns in sport. Stoeber and Madigan (2016) argue that because "perfectionistic strivings and perfectionistic concerns are broad, higher-order dimensions that cannot be fully captured with single indicators [i.e., subscales]" (p. 48), a greater coverage of the breadth of the two dimensions is most likely to be achieved when multiple subscales/indicators are used to measure each dimension (also see Dunn et al., 2016). To this end, we measured (a) perfectionistic strivings with the seven items from the Personal Standards subscale of the Sport-MPS-2 and five items from the Striving for Perfection subscale of the MIPS, and (b) perfectionistic concerns with the eight items from the Concern Over Mistakes subscale of the Sport-MPS-2 and five items from the Negative Reactions to Imperfection subscale of the MIPS. This follows the same procedures that have been used in previous investigations of athletes' perfectionist tendencies in sport (e.g., Lizmore et al., 2017; Madigan, Stoeber, Culley, et al., 2018; Madigan, Stoeber, Forsdyke, Dayson, & Passfield, 2018; Rasquinha, Dunn, & Causgrove Dunn, 2014).

In previous studies that have used the aforementioned combination of items/subscales to measure perfectionistic strivings and perfectionistic concerns in athletes, the sets of items within the respective composite subscales have demonstrated excellent internal/factorial validity (see Lizmore et al., 2017; Rasquinha et al., 2014) and acceptable levels of internal consistency (i.e., all $\alpha s \geq .70$: see Lizmore et al., 2017; Madigan, Stoeber, Culley, et al., 2018; Madigan, Stoeber, Forsdyke, et al., 2018; Rasquinha et al., 2014). Respondents rated items on a 5-point scale (1 = *strongly disagree*; 5 = *strongly agree*). Composite subscale scores were averaged (i.e., returned to the 5-point scale) with higher composite subscale scores reflecting higher levels of perfectionistic strivings and perfectionistic concerns in sport.

Pre-performance cognitions/perceptions. To determine the success/validity of the failure manipulation—with success being evident if participants experienced elevated stress levels following the false-failure feedback—self-report measures of cognitive state anxiety, state optimism, and perceived threat were taken. These variables were selected because they have all been linked with stress-related responses of athletes in competitive sport (see Raab et al., 2016). The three constructs were measured by single-item indicators using the same item-response format contained within Krane's (1994) Mental Readiness Form (MRF).

Participants were instructed to consider how they "currently feel about this competition" and to use three separate 11-point semantic differential scales to rate their immediate levels of cognitive anxiety ("Right now my thoughts are…" [1 = *not at all worried*; 11 = *very worried*]), optimism ("Right now I am feeling…" [1 = *not at all optimistic*; 11 = *very optimistic*]), and perceived threat ("Right now I find this situation…" [1 = *not at all threatening*; 11 = *very threatening*]). The MRF and corresponding 11-point response format have been used successfully in studies (e.g., Cox, Russell, & Robb, 1999; Duncan et al., 2016) to measure cognitive anxiety, somatic anxiety, and state confidence in athletes immediately prior to competition. Concurrent validity evidence supporting the use of the cognitive anxiety item of the MRF was provided by Krane (1994) using a sample of 116 intercollegiate (cross country) athletes.

Krane (1994) reported that the cognitive anxiety item of the MRF (using the 11-point response format) had a strong positive correlation ($r = .76$, $p < .01$) with the cognitive anxiety subscale of the Competitive State Anxiety Inventory-2 (CSAI-2; Martens, Burton, Vealey, Bump, & Smith, 1990), a strong negative correlation ($r = -.52$, $p < .01$) with the state confidence subscale of the CSAI-2, and a moderate positive correlation ($r = .35$, $p < .05$) with the concentration disruption subscale of the Sport Anxiety Scale (SAS; Smith, Smoll, & Schutz,

1990). The single-item Likert-type response format of the MRF is recommended for use when "expediency is an important concern" for researchers and participants (Krane, 1994, p. 189).[3]

Performance. Putting performance was assessed by the cumulative straight-line distance that the putts in each trial deviated from the centre of the target. Measurements for each putt were taken to the nearest millimetre using a laser measuring device (Bosch GLM 15). Lower distances were indicative of better (i.e., more accurate) putting performance.

Analytic strategy. The relationship between perfectionism and putting performance following failure was examined using moderated hierarchical regression. Trial 2 (T2) putting performance was the dependent variable. Trial 1 (T1) putting performance was entered in the first predictor block, and the two dimensions of perfectionism were added in the second predictor block. In order to examine the moderation effect of perfectionistic strivings and perfectionistic concerns on putting performance under conditions of failure, a third (and final) predictor block was assessed that included all variables and an interaction term (PS*PC). PS and PC were mean-centred prior to the analyses. The Johnson-Neyman (J-N) technique was used to probe significant interactions (see Bauer & Curran, 2005). This technique identifies regions in which the effect of X (perfectionistic strivings) on Y (putting performance following failure) is statistically significant ($p < .05$) based on scores on Z (perfectionistic concerns). All analyses were conducted using SPSS (version 24) and PROCESS macro (version 2.6).

Results

[3] The single-item measures of threat and optimism are not contained in the original MRF. As such, there is no previously established validity evidence supporting their use. We therefore examined the size and direction of the correlations between the three items using the current data. Cognitive anxiety was positively correlated with threat ($r = .68$, $p < .001$) and negatively correlated with optimism ($r = -.34$, $p < .001$) at the pre-manipulation period, and positively correlated with threat ($r = .61$, $p < .001$) and negatively correlated with optimism ($r = -.14$, $p = .20$) at the post-manipulation period. Threat was negatively correlated with optimism at the pre- ($r = -.34$, $p < .001$) and post manipulation periods ($r = -.16$, $p = .12$). Although two of the correlations were not statistically significant, all six correlations were in the expected directions, thereby providing initial validity evidence supporting the use of the three items to assess the success of the failure manipulation.

Preliminary Data Analysis

Only two missing data points were obtained from a total of 3,069 items (i.e., missing data response rate = 0.07%) on the self-report measures. The two missing data points (on separate perfectionism items) were replaced with intra-individual mean-item scores calculated from each respondent's scores on the other items from the corresponding perfectionism subscale (see Graham, Cumsille, & Elek-Fisk, 2003). The perfectionistic strivings ($\alpha = .84$) and perfectionistic concerns ($\alpha = .86$) subscales both had acceptable levels of internal consistency.

Of the five participants who self-identified as 'very high proficiency' golfers (i.e., golf handicaps ≤ 10) three indicated that they were also members of the varsity golf team. Moreover, the five high-proficiency athletes reported playing an average of 57 rounds of golf each year ($SD = 28.20$) in comparison to the participants from the other four ability levels who reported an average of 4.14 rounds per year ($SD = 9.10$). Given the small number of athletes comprising the 'very high proficiency' group, their competitive experience, and the degree to which their annual rates of play differed from the rest of the sample, the data from these five athletes were excluded from the analyses. The final sample contained 42 male and 52 female participants. Data were combined across gender into a single data set given that the covariance matrices for males and females (for T1 performance, T2 performance, strivings, and concerns) were deemed homogeneous: Box's M = 6.758, F (10, 36489.72), $p = .777$. Table 1 contains the descriptive statistics (i.e., means, standard deviations, and bivariate correlations [r]) for perfectionistic strivings, perfectionistic concerns, T1 putting performance, and T2 putting performance.

Manipulation check. To determine if the provision of the false-failure feedback after T1 was successful in creating conditions of perceived competitive failure—as would be evident if participants reported elevated levels of stress—a repeated-measures MANOVA was conducted to examine differences in pre-task cognitive anxiety, state optimism, and perceived threat

between T1 (i.e., prior to the first ten putts) and T2 (i.e., after the false-failure feedback). A statistically significant multivariate within-subjects test statistic was obtained: Wilks' $\Lambda = .802$, $F\ (3, 91) = 7.482$, $p < .001$, partial $\eta^2 = .198$. Follow-up univariate *F*-tests revealed statistically significant differences for cognitive anxiety ($F\ [1, 93] = 6.373$, $p < .05$), state optimism ($F\ [1, 93] = 14.719$, $p < .001$), and perceived threat ($F\ [1, 93] = 12.295$, $p < .001$). More specifically, following the false-failure feedback, participants reported higher cognitive state anxiety ($M_{T2} = 5.18$, $SD_{T2} = 2.33$; $M_{T1} = 4.56$, $SD_{T1} = 2.39$), lower state optimism ($M_{T2} = 5.85$, $SD_{T2} = 2.24$; $M_{T1} = 6.52$, $SD_{T1} = 2.19$), and higher perceived threat ($M_{T2} = 3.84$, $SD_{T2} = 2.41$; $M_{T1} = 3.19$, $SD_{T1} = 2.24$) in comparison to T1. Although the corresponding effect sizes (Cohen's [1977] *d* for dependent means) were relatively small—cognitive anxiety ($d = .26$), state optimism ($d = .40$), and perceived threat ($d = .32$)—the direction and magnitude of the changes in scores on each variable do suggest that participants, on average, experienced the putting task as a competitive event in which failure had occurred.

Predicting Putting Performance

Prior to conducting the regression analysis, data were screened for the presence of univariate and multivariate outliers. Standardized *z*-scores were computed for all variables contained in the analysis. Only two scores were identified as possible univariate outliers ($z_1 = 3.63$ and $z_2 = 3.85$) using the criterion of $z > |3.29|$ as a potential lower boundary (see Tabachnick & Fidell, 1996). However, these two scores did not qualify as univariate outliers when Stevens' (1992) criterion of $z > |4|$ was applied (also see Hair, Anderson, Tatham, & Black, 1998). Given that all subsequent Cook's distances were small (i.e., $\leq .061$)—indicating that the removal of any individual case would not have a major influence on the regression results—and the two cases may or may not qualify as potential univariate outliers (depending upon the criterion applied for this purpose), scores from all 94 participants were included in the regression analysis. No

multivariate outliers were present in the data (i.e., all individuals had a Mahalanobis distance less than χ^2 [4] $_{critical}$ = 18.467, $p < .001$). No concerns regarding multicollinearity were identified (see Tabachnick & Fidell, 1996) given that all bivariate correlations among predictor variables in each analysis were ≤ |.59| and all Variance Inflation Factors (VIFs) were ≤ 2.001.

Multiple regression analysis revealed that T1 putting performance significantly predicted T2 putting performance: $R^2 = .35$, F (1, 92) = 48.57, $p < .001$, $B = 0.44$, $p < .001$. Adding PS and PC in the second block of the analysis did not significantly improve the predictive ability of the model, $R^2 = .36$, F (3, 90) = 16.92, $p < .001$, R^2 change =.02, F change (1, 90) = 1.06, $p = .351$. Neither PS nor PC was a significant predictor of T2 performance after controlling for T1 performance: PS (B = -50.22, $p = .189$), PC (B = -1.07, $p = .973$). Adding the interaction term (PS*PC) revealed that there was a significant interaction when predicting T2 putting performance (after controlling for T1 performance): $R^2 = .42$, F (4, 89) = 15.87, $p < .001$, R^2 change due to interaction =.06 and $f^2 = .10$, F change (1, 89) = 8.54, $p = .004$, B = 135.57, p =.004. The interaction term indicates that as PC increases by one unit, the effect of PS on performance after failure increases by 135.57 cm (i.e., putts get further away from the target). The results of these analyses are shown in Table 2.

The J-N technique provided additional information regarding the interaction and indicated that the conditional effect of PS on putting performance was statistically significant ($p < .05$) when PC was ≤ 2.80, and statistically significant when PC was ≥ 4.53 (i.e., the conditional effect was not statistically significant in between these values). In addition, the conditional effect of PS when PC was ≤ 2.80 (n = 40) corresponded to better following failure and the conditional effect of PS when PC was ≥ 4.53 (n = 1) corresponded to worse performance following failure. This latter finding requires a note of caution, however, as only one case in the sample exceeded this value (1.06% coverage). The results of this analysis are depicted in Figure 2.

Discussion

The purpose of this study was to examine the interaction of athletes' perfectionistic strivings and perfectionistic concerns in predicting (golf putting) performance following competitive failure. We hypothesised that in the context of lower perfectionistic concerns, perfectionistic strivings would be associated with better performance (i.e., less deviation from the target) and in the context of higher perfectionistic concerns, perfectionistic strivings would be associated with poorer performance (i.e., greater deviation from the target). Our analyses provided support for this hypothesis.

Perfectionism and Competitive Performance

In comparing our findings to the only other study that has examined the relationship between perfectionism and performance in a competitive sport setting (i.e., Stoeber et al., 2009), we note some similarities and differences in findings. Similar to Stoeber et al. (2009), at the bivariate level, higher perfectionistic strivings was related to better performance (at T1 and T2) and perfectionistic concerns was unrelated to performance (here golf-putting as opposed to triathlon-race performance). However, unlike Stoeber et al. we did not find that perfectionistic strivings uniquely predicted subsequent performance when controlling for previous performances. That is, Stoeber et al. found that perfectionistic strivings predicted race performance after controlling for season-best and/or personal-best performances (and perfectionistic concerns), whereas we did not find that strivings predicted putting performance after controlling for previous performance (and perfectionistic concerns). In explaining this difference, it is possible that the association between perfectionistic strivings and performance in competition is evident for performance generally, but is absent following competitive failure. In other words, in terms of unique effects, perfectionistic strivings may initially provide a motivational or energizing force for athletes pursuing lofty performance standards in competitive

447 settings, but these benefits may be lost when athletes realise that their performance goals—which
448 include victory over opponents—are in jeopardy.

449 As to why this might be the case, Hall (2016) proposed that when athletes who have
450 higher perfectionistic strivings experience failure or performance difficulties in competition, they
451 may be more likely to call their competence into question. In Hill et al.'s (2011) study of
452 athletes' cycling-ergometer performance following false-failure feedback, athletes high in self-
453 oriented perfectionism (i.e., a facet of perfectionistic strivings) experienced higher levels of
454 threat and reportedly withdrew effort to a greater degree in the trials following failure than
455 athletes who had low self-oriented perfectionism. Hill et al. speculated that more threat is
456 experienced and more effort withdrawn by those higher in self-oriented perfectionism because
457 these individuals may have adopted an irrationally important view of the need to achieve their
458 high personal performance standards. Under conditions of failure, such individuals may become
459 vulnerable to exaggerating the negative consequences of their perceived failure, question their
460 level of competence, and subsequently reduce effort accordingly.

461 An alternative explanation as to why heightened perfectionistic strivings may not have
462 performance benefits following failure surrounds the fact that the valued goal of attaining high
463 personal performance standards has been blocked. This thwarting of a personally meaningful
464 goal may lead to a form of cognitive interference. In this instance, cognitive interference could
465 occur when performers turn their attention away from the task at hand and redirect their attention
466 inwardly towards judgements of personal inadequacy and the possible harm that their
467 underachievement (i.e., failure) may inflict upon their performance-contingent self-worth (Blatt,
468 1995). Turning attention away from the task at hand is, of course, likely to do little to aid athlete
469 performance in competitive sport settings (Gotwals, Dunn, Causgrove Dunn, & Gamache, 2010)
470 and may detract from any previous behaviors that the athlete had been employing to aid

performance.

Drawing on research in sport, we are mindful of the potential roles that performance-approach goals (i.e., a motivational orientation that is generally conducive to better performance in sport: Lochbaum & Gottardy, 2015) and performance-avoidance goals (i.e., a motivational orientation that is generally more detrimental to performance in sport: Lochbaum & Gottardy, 2015) might play in initiating various types of perfectionistic reactivity (e.g., reduced effort and reduced concentration) and impacting performance. Specifically, changes in perceived competence (Morris & Kavussanu, 2008) and associated outcome expectancies (Schnelle, Brandstätter, & Knöpfel, 2010) may shift athletes' endorsement from one achievement goal to the other, which in turn can lead to different performance outcomes in competitive sport (see Halvari & Kjørmo, 1999). In addition, Stoeber et al. (2009) found that the degree to which athletes endorsed performance-approach goals relative to performance-avoidance goals explained the relationships between perfectionistic strivings and race performance in triathlon. More research is needed in order to test these proposed mechanisms and to examine how the mindset of perfectionistic athletes may be altered once they experience failure. Regardless of the underlying reasons why strivings and concerns may be linked to performance, the current findings strengthen Flett and Hewitt's (2016) position that "advances in understanding the role of perfectionism in sport…[requires greater] consideration of the contexts that participants find themselves in" (p. 302), particularly when athletes experience failure in competition.

Interaction of Perfectionism and Performance Following Competitive Failure

The unique effects of strivings and concerns on performance were superseded by an interaction effect. The interaction indicated that perfectionistic strivings was associated with comparatively better performance following failure when perfectionistic concerns was lower, but associated with worse performance when perfectionistic concerns was higher. This finding

appears consistent with other research in sport that has examined combinations of perfectionistic strivings and perfectionistic concerns in various ways. Much of the work conducted by Dunn and colleagues with athletes has illustrated that a combination of higher perfectionistic strivings with lower perfectionistic concern is associated with an array of comparatively adaptive characteristics/responses including an optimistic challenge-mindset going into competition (Dunn et al., 2019), enhanced concentration (Gotwals et al., 2010), and the use of problem-focussed coping strategies to deal with stressful situations (Dunn, Causgrove Dunn, Gamache, & Holt, 2014). Similarly, Gaudreau and colleagues have found that when comparing subtypes of perfectionism in samples of athletes that include higher perfectionistic strivings and lower or higher perfectionistic concerns, the combination of higher strivings with lower concerns typically corresponds with more adaptive characteristics/responses in sport (e.g., Gaudreau & Verner-Filion, 2012). The interaction effect we found in the current study extends previous research by illustrating how this pattern is also evident for athletic performance following failure in competition.

Also in keeping with previous research, the interaction effect provides evidence that as the presence of perfectionistic concerns increased, the positive influence of perfectionistic strivings on performance decreased until it was not statistically significant. Again, there is evidence from other research that shows this is the case for outcomes other than sport performance such as athlete burnout, emotion regulation, and general sporting experiences (Hill, 2013; Hill & Davis, 2014; Mallinson, Hill, Hall, & Gotwals, 2014). This finding is in line with the theoretical views of Hall (2016) who proposed that under conditions of perceived failure, "any form of perfectionism which encompasses tendencies for self-critical appraisal [i.e., heightened perfectionistic concerns] may negatively affect" athletic performance (p. 280: also see Flett & Hewitt, 2016). Importantly, in the current study we identify "a tipping point" for

when this is the case and when perfectionistic concerns appear to neutralise the performance benefits of perfectionistic strivings following failure. This tipping point was actually lower than the score that corresponds to the mid-point of the response scale (i.e., 3.0) for perfectionistic concerns and therefore indicates that even lower levels of perfectionistic concerns can be problematic in this regard.

Perhaps the most novel aspect of our findings is that we also found tentative evidence that the relationship between perfectionistic strivings and better performance is eventually reversed at higher levels of perfectionistic concerns. The importance of the presence (and relative absence) of perfectionistic concerns, then, is evident not only in terms of cancelling out any performance benefits of perfectionistic strivings, but may also be apparent in terms of triggering psychological processes through which higher perfectionistic strivings becomes problematic for athletes' performance. We speculate that following competitive failure, higher levels of both dimensions of perfectionism may lead to behaviors that would otherwise not be evident at other levels of either dimension. For example, higher levels of concentration disruption, a desire for escape, and heightened competitive anxiety may represent a distinct pattern of perfectionistic reactivity (Flett & Hewitt, 2016) that occurs when performance difficulties are encountered by athletes who exhibit a strong personal commitment to the pursuit of very high personal performance standards that is underpinned by fear, doubt, and concern regarding their performances.

Practical Implications

The current results have potential implications for practitioners (e.g., coaches, sport psychologists, and even parents) who work with athletes in an effort to optimize athletic performance. It seems reasonable to suggest that athletes should be educated about the high likelihood of encountering personal failure, adversity, and performance setbacks in competition,

and that such encounters have the potential to increase cognitive anxiety, increase perceived threat, and reduce optimism. Enhancing athlete self-awareness in this regard, and helping athletes to accept that failure and adversity are natural/inevitable (though unwanted) parts of the performance process may mitigate the degree to which athletes—especially those with high perfectionistic concerns—might engage in harsh self-criticism (Hall, 2016) or lose the desire to give maximal effort in pursuit of achieving optimal performance levels (Hill et al., 2011). Enhanced self-awareness and acceptance of personal failure/adversity in athletes has been previously linked to positive growth experiences and the attainment of very high performance standards in competitive sport (see Howells & Fletcher, 2015).

The current results also support the need to develop and implement mental-training programs that are geared towards reducing athletes' perfectionistic concerns in sport (Dunn et al., 2019; Gotwals et al., 2012). What is less clear, however, is whether perfectionistic strivings should also be the target of mental-training programs for athletes. Few, if any, coaches or athletes would likely endorse the setting of lower personal performance standards to achieve competitive success in high-performance sport. On this issue, it is worth considering the difference between exceptionally high (but attainable) performance goals and unrealistically high perfectionistic goals, and how differences between the two may be best identified by *what* athletes are trying to achieve, the meaning athletes give to success and failure, and how athletes think and feel about themselves following failure. As noted by Gustafsson and Lundqvist (2016), when sport psychologists work to address potentially destructive perfectionistic tendencies in athletes, it may be best "to emphasize that it is not about lowering standards but...[is more about helping] the client [athlete] broaden his/her understanding of performance and to develop their self-evaluation so it is not totally dependent on [performance-based] achievements" (p. 213). As such, interventions do not necessitate reducing standards, per se. Rather, effective interventions

may need to ensure that athletes do not hold onto unrealistic perfectionistic goals that undermine how they deal with setbacks and compromise motivation, wellbeing, and performance over time.

Limitations and Future Directions

Although the current research sheds important light upon relationships between perfectionistic strivings, perfectionistic concerns, and competitive performance under conditions of perceived failure, the study does contain a number of limitations. For example, our study lacks 'ecological validity' in the sense that participants were engaged in a laboratory-based competitive scenario (albeit against an opponent). This potentially limits the degree to which our results can be generalized to 'real-world' competitive sport contexts where athletes compete in their primary sports and where it seems likely that achieving success (or avoiding failure) would be more highly valued than winning or losing a laboratory-based golf-putting task for a small monetary reward. That being said, we speculate that the interaction effect of strivings and concerns on performance may actually be stronger in a real-word competitive setting where athletes are likely to be more emotionally invested in the potential consequences of failure and the outcome of the competitive event. Given that (a) our sample likely included a mix of participants who placed varying degrees of value/importance on the task, and (b) perceived task-value has been linked to domain-specific perfectionism in sport and academe (see Dunn, Causgrove Dunn, & McDonald, 2012), future research may benefit from assessing the degree to which variations in task value mediate relationships between athletes' perfectionistic strivings, perfectionistic concerns, and performance in competition.

We also acknowledge that it is currently not possible to determine whether our findings would have changed had we used a different value for the proportional performance deficit that was provided to participants (i.e., 17%) through the false-failure feedback. For example, we do not know if the provision of a performance deficit greater than 17% (indicating a larger degree of

personal failure) would have created more stress/threat, and in turn potentially magnified the role that heightened perfectionistic concerns had upon performance. We also do not know if a performance deficit less than 17% would have reduced the degree of threat/stress, and in turn, potentially minimised the role that heightened perfectionistic concerns had upon performance. More research is needed to examine the degree to which the magnitude of performance failure during competition may interact with athletes' perfectionistic tendencies to impact performance.

Another potential limitation of this study revolves around the fact that we do not know if any form of self-selection bias existed within the sample. More specifically, we do not know if athletes with lower levels of perfectionistic concerns (on average) tended to volunteer for the study while those with higher perfectionistic concerns avoided the study in order to protect their self-concept in the possible event that they performed poorly in the head-to-head competition. If such a self-selection bias did take place, the range of scores on athletes' perfectionistic concerns might be restricted which could attenuate or obfuscate the potential impact of perfectionistic concerns on performance. That being said, the means and standard deviations for strivings and concerns (see Table 1) are similar to those reported in a study with intercollegiate athletes who completed the same measure of perfectionism used in this study (see Rasquinha et al., 2014).

Finally, it must be acknowledged that we do not know the extent to which our results can be generalized to different competitive tasks/sports, or to athletes who compete at different levels of competition. For example, it is possible that individual performance may be easier to 'hide' in team-sport settings where social-loafing strategies can be employed by individuals to protect themselves against negative social evaluation and corresponding threats to their self-concept should failure occur (see Vaartstra, Dunn, & Causgrove Dunn, 2018). These opportunities to avoid blame for any potential failure are less available in individual-sport settings. Similarly, previous research has shown that athletes who compete in lower levels of competition may have

lower perfectionistic strivings and concerns than athletes who compete in higher levels of competition (see Rasquina et al., 2014). More research is required to determine if the aforementioned factors potentially moderate the relationships between strivings, concerns, and performance in sport.

Conclusion

Despite these limitations, the current study is the first to demonstrate that the presence of higher (versus lower) perfectionistic concerns appears to be a key determining factor in how athletes respond to failure in competition. We thus reiterate our suggestion that practitioners and researchers who are interested in designing and/or implementing mental-training programs to help athletes respond most effectively to failure in competition will be best served if the central focus of such interventions is targeted at reducing athletes' perfectionistic concerns in sport. This is especially emphasized in cases where athletes are already displaying heightened perfectionistic strivings and are engaging with competitive sport environments where performance failures are almost inevitable.

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Table 1

Means, Standard Deviations, and Bivariate Correlations for Perfectionistic Strivings, Perfectionistic Concerns, Trial-1 Putting Performance, and Trial-2 Putting Performance

	Perfectionistic strivings [a]		Perfectionistic concerns [a]		Trial-1 putting performance [b]		Trial-2 putting performance [b]	
	M	(*SD*)	*M*	(*SD*)	*M*	(*SD*)	*M*	(*SD*)
Variables	3.61	(0.52)	2.93	(0.59)	73.23	(33.90)	59.00	(25.48)
Perfectionistic concerns	.41***		-					
Trial-1 putting performance	-.30**		-.11		-			
Trial-2 putting performance	-.29**		-.12		.59***		-	

Note. Correlations (*r*) are contained in the lower triangular matrix.

[a] Items measured on a 5-point scale.

[b] Mean distance from target per putt (cm). Lower scores represent better performance.

** $p < .01$. *** $p < .001$. ($n = 94$).

Table 2

Regression Analysis Predicting Trial-2 Putting Performance Following Failure

Predictor variable		R^2	ΔR^2	ΔF	*B*	β	*t*
Block 1		.35		48.57**			
	Trial-1 performance				0.44	.59	6.97***
Block 2		.36	.02	1.06			
	Trial-1 performance				0.41	.55	6.22***
	PS				-50.22	-.13	-1.32
	PC				-1.07	-.01	-0.03
Block 3		.42	.06	8.54**			
	Trial-1 performance				0.42	.57	6.64**
	PS				-48.86	-.12	-1.34
	PC				-10.69	-.03	-0.35
	PS*PC				135.57	.24	2.92***

Note. PS = Perfectionistic strivings; PC = Perfectionistic concerns.

** $p < .01$. *** $p < .001$, all two-tailed ($n = 94$).

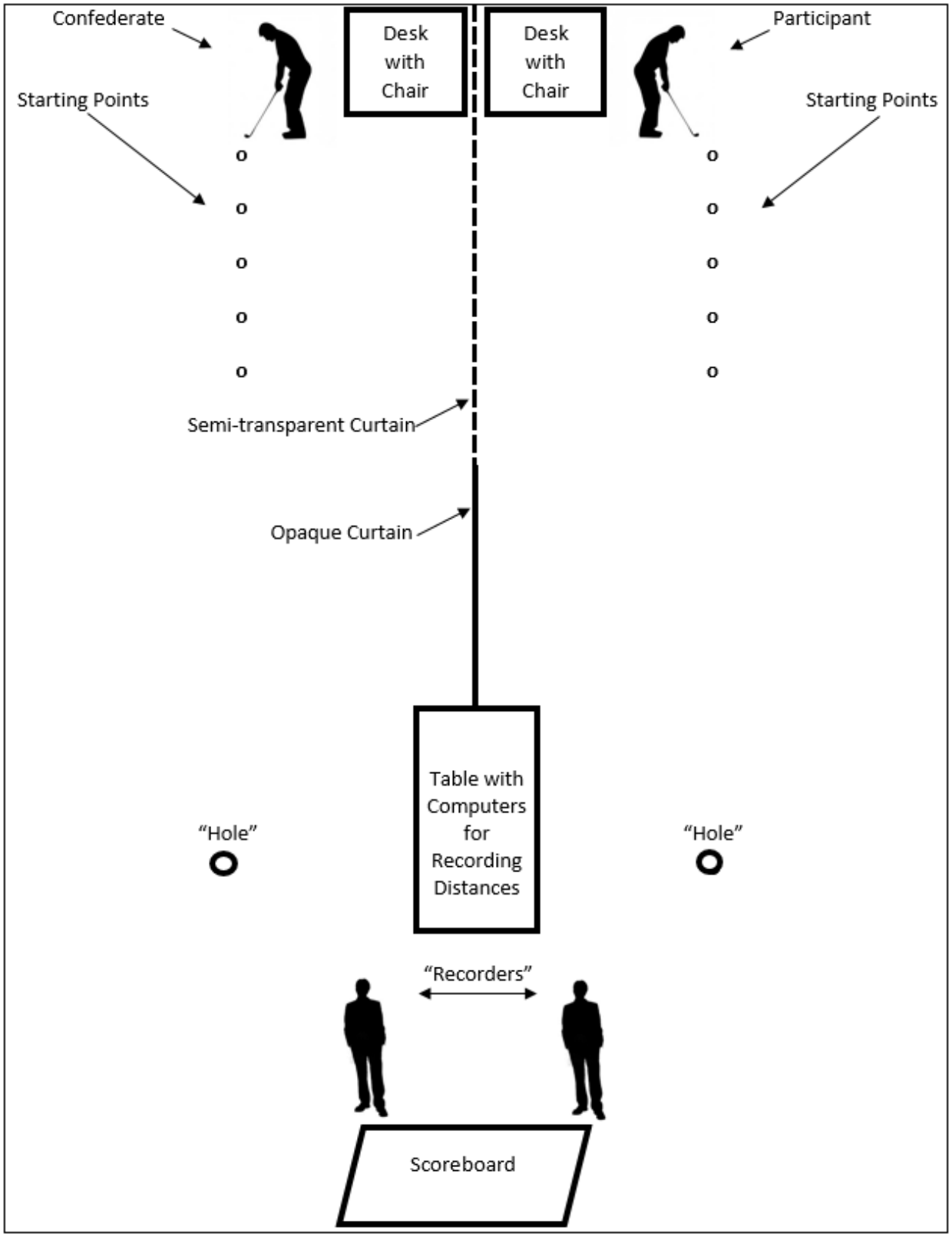

Figure 1. Graphical representation (not to scale) of laboratory set-up.

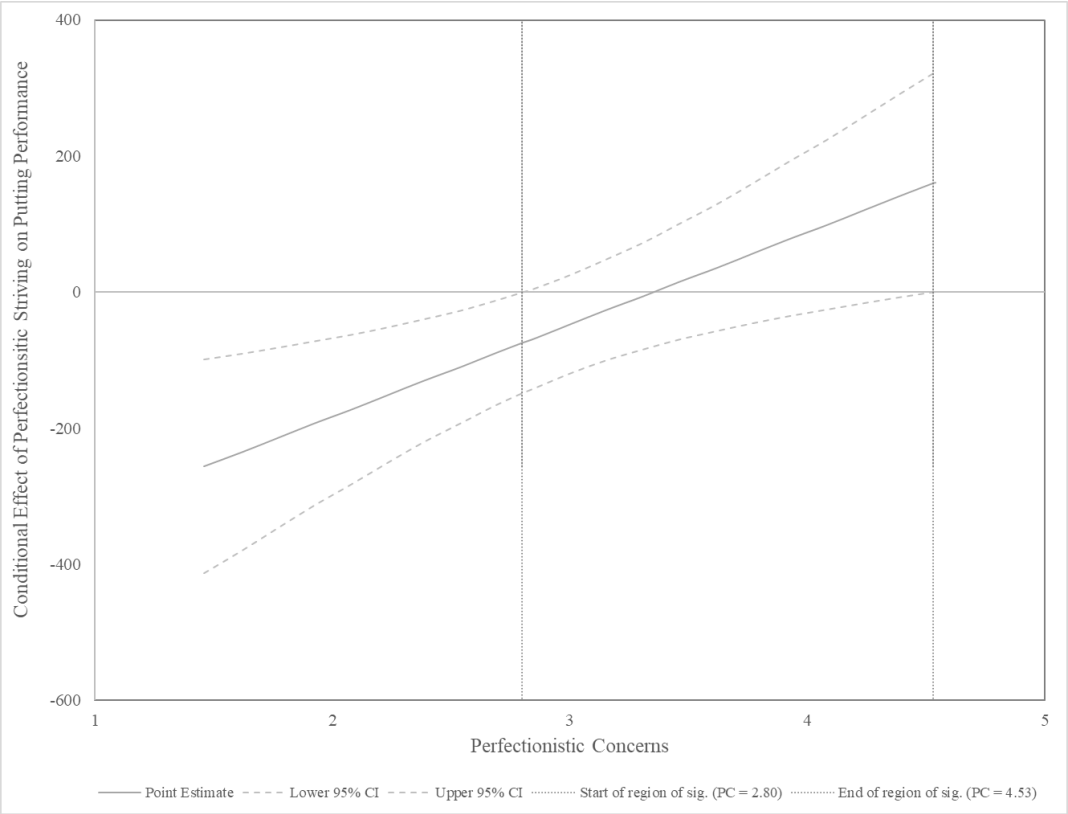

Figure 2. Conditional effect of perfectionistic strivings on putting performance following failure as a function of perfectionistic concerns (y-axis denotes improvement [-] or decrement [+] in performance following competitive failure)