Perfectionism and Reactions to Failure in Sport

by

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Abstract

The purposes of this dissertation were to (a) examine relationships between multidimensional perfectionism and athletes' cognitive responses to failure in competition, (b) examine relationships between multidimensional perfectionism and athletes' performance levels in competition, and (c) determine if athletes' perfectionism levels in sport could be changed through exposure to a mental-training program. Three studies were conducted. The specific purpose of the first study was to investigate the degree to which different dimensions of perfectionism (i.e., perfectionistic strivings and perfectionistic concerns) were associated with athletes' tendencies to respond with self-compassion, optimism, pessimism, and rumination following poor personal performance in sport. A sample of 239 intercollegiate team-sport athletes (*M* age = 20.50, *SD* = 1.99) completed self-report measures of perfectionism and cognitive responses to poor performance. Results of hierarchical regression analyses indicated that perfectionistic concerns were negatively associated with self-compassion and optimism, and positively associated with pessimism and rumination. Perfectionistic strivings were positively associated with self-compassion and optimism, and negatively associated with pessimism.

The purpose of the second study was to examine the degree to which perfectionistic strivings and perfectionistic concerns were associated with performance in a competitive golf putting task. A sample of 99 intercollegiate athletes (*M* age = 20.51, *SD* = 1.79) completed a self-report measure of perfectionism and state measures of perceived threat, optimism, and cognitive anxiety prior to competing in two putting trials. The objective of the two trials (each comprising of 10 putts) was to achieve a lower cumulative straight-line distance from the target "hole" than an opponent. Participants received false-failure feedback after the first trial informing them that they were losing the competition to heighten stress. Hierarchical regression results indicated that perfectionistic strivings were positively related to superior putting performance in both trials,

whereas perfectionistic concerns were not related to performance in either trial. The results from the first two studies indicate that perfectionistic strivings are generally adaptive in sport (particularly when the overlap with perfectionistic concerns is controlled) whereas perfectionistic concerns are generally maladaptive in sport.

The third study investigated the extent to which a mental-training program could reduce athletes' perfectionistic concerns and foster a more positive mindset towards failure in competition. A quasi-experimental mixed-methods research design was employed. A purposive sample of 16 competitive youth curling athletes (*M* age = 15.94, *SD* = .90) was given a 3-week mental-training program that was delivered in a wait-listed manner to participants during the study. Athletes completed a self-report measure of perfectionism four times throughout the study and participated in semi-structured interviews at the end of the study. Results of a repeated-measures MANOVA revealed that the athletes had significantly lower perfectionistic concerns in the post-intervention period (relative to the pre-intervention period) whereas no significant change in athletes' perfectionistic strivings were observed. Interview data indicated that athletes attributed their involvement in the mental-training program with enhanced attentional focus, functional (re)appraisals of failure, and functional (i.e., less self-critical) self-attitudes following failure.

Overall, the body of research contained within the dissertation provides insight into the potential roles that perfectionistic strivings and perfectionistic concerns might play in regards to athletes' experiences and reactions to failure and/or poor performance in sport. The results of the final study indicate that athletes' perfectionistic tendencies (i.e., perfectionistic concerns) and appraisals of failure can change over time, and may be impacted by exposure to a mental-training intervention. Implications for applied practice are discussed.

Preface

This thesis is an original work by Michael Lizmore. The three studies that form the dissertation all received research ethics approval from the University of Alberta Research Ethics Board. Study 1, project name "Motivational Orientations and Reactions to Failure in Intercollegiate Sport" (Pro00049147) was approved on August 8th, 2014. Study 2, project name "Personality and Golf Putting Performance" (Pro00056990) was approved on July 31st, 2015. Study 3, project name "A Positive-Mindset-Towards-Failure Intervention with Athletes in a High-Performance Developmental Youth Sport Program" (Pro00066275) was approved on July 27th, 2016.

At the time of submitting this dissertation, Chapter 2 was published as: Lizmore, M. R., Dunn, J. G. H., & Causgrove Dunn, J. (2017). Perfectionistic strivings, perfectionistic concerns, and reactions to poor personal performances among intercollegiate athletes, *Psychology of Sport and Exercise, 33*, 75-84. I, Michael R. Lizmore, developed and designed the study, collected, analyzed, and interpreted the data, and wrote the first draft of the manuscript. As supervisory committee members, J. G. H. Dunn and J. Causgrove Dunn provided feedback on study development and design, assisted by providing feedback regarding data collection, analysis, and interpretation, and provided additional feedback and contributions to manuscript preparation and revisions.

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CHAPTER 1

Introduction

The tendency to set and pursue very high standards of personal performance is frequently credited as a reason why some athletes attain success in high-level competitive sport (Hays, 2012). As performance standards increase, however, it often becomes harder for athletes to achieve their lofty performance goals. Therefore, as standards become harder to achieve and setbacks becomes more frequent, the ability of athletes to successfully rebound or cope with performance difficulties becomes increasingly important (see Bull, Shambrook, James, & Brooks, 2005; Fletcher & Sarkar, 2012). A personality characteristic that may play a role in determining how athletes respond to failure and adversity in sport is perfectionism (see Flett & Hewitt, 2016; Jowett, Mallinson, & Hill, 2016; Lizmore, Dunn, & Causgrove Dunn, 2016; Vallance, Dunn, & Causgrove Dunn, 2006).

Perfectionism is a multidimensional achievement-motivation disposition that is comprised of two higher-order dimensions labelled *perfectionistic strivings* and *perfectionistic concerns* (Hill, 2016; Stoeber & Otto, 2006). Perfectionistic strivings in sport represent the degree to which athletes set extremely high standards of personal performance and the degree to which they strive for perfection in sport (Gotwals, Stoeber, Dunn, & Stoll, 2012). In contrast, perfectionistic concerns represent athletes' tendencies to be concerned about failing to meet their performance standards, to perceive a discrepancy between their expectations and performance, to fear negative evaluation from others when performance standards are not met, and to react negatively to imperfection in sport (Gotwals et al., 2012; Stoeber, 2011).

There is ongoing debate among researchers and theorists in the field of sport psychology as to what sub-dimensions (or subscales) constitute the core facets of the two higher-order dimensions of perfectionism (see Dunn et al., 2016; Hill, 2016; Hill, Appleton, & Hall, 2014). Regardless of the specific subscales that researchers employ to measure perfectionistic strivings and perfectionistic concerns in sport (see Stoeber & Madigan, 2016, for a related discussion)

research evidence indicates that perfectionistic strivings are frequently associated with a variety of affective, cognitive, and behavioural correlates that are indicative of adaptive or healthy forms of adjustment in sport (for recent reviews see Gotwals et al., 2012; Jowett et al., 2016). However, it should be noted that these relationships are most apparent when the overlap between athletes' perfectionistic strivings and perfectionistic concerns is controlled. In contrast, research evidence indicates that athletes' perfectionistic concerns are typically associated with affective, cognitive, and behavioural correlates that are indicative of maladaptive or unhealthy adjustment in sport, regardless of whether the overlap with perfectionistic strivings is controlled or not (see Gotwals et al., 2012; Jowett et al., 2016).

Despite the extensive body of research that has focussed on the construct of perfectionism in sport over the last two decades (see Hill et al., 2014), many issues and unanswered questions remain. For example, there is disagreement among researchers and theorists as to whether or not it is appropriate to refer to perfectionism as both an adaptive and maladaptive construct (see Hall, 2016). Regarding this issue, Flett and Hewitt (2016) proposed that "the most critical factor in [determining] whether perfectionism is maladaptive or adaptive is not perfectionistic striving or the perfectionist's degree of evaluative concerns; rather, it is how the perfectionistic individual responds to unfavourable outcomes" (p. 299). To this end, Flett and Hewitt introduced the concept of *perfectionistic reactivity*—defined as a "characteristic style of responding to adversity that includes both psychological and physiological reactivity" (p. 301)—and noted that a particularly useful way to study the role of perfectionism in sport is to examine how individuals react when they experience "situations and contexts that are clearly discrepant to [their] goals or ambitions" (p. 299); failure in competition would generally constitute such a context for athletes. Consequently, the first study of this dissertation explores how athletes' perfectionistic strivings and perfectionistic concerns were associated with cognitive responses in

the context of poor personal performance in competition—where poor performance reflects situational conditions that are discrepant to the personal performance goals and ambitions of the athletes.

A second line of inquiry that has received a surprisingly limited amount of attention in the sport perfectionism literature relates to the link between perfectionism and *performance* in sport (Stoeber, 2014). Despite the existence of more than 150 papers that have examined perfectionism in sport over the last 25 years (see Hill, Appleton, & Mallinson, 2016), only six published studies have examined links between perfectionism and performance (i.e., Anshel & Mansouri, 2005; Hill, Hall, Duda, & Appleton, 2011; Roberts, Rotherham, Maynard, Thomas, & Woodman, 2013; Stoeber, Uphill, & Hotham, 2009; Stoll, Lau, & Stoeber, 2008; Thompson, Kaufman, De Petrillo, Glass, & Arnkoff, 2011), and only one of these studies assessed relationships between perfectionism and performance in a setting where athletes actually competed against opponents (i.e., Stoeber et al., 2009). Studies that have examined links between perfectionism and performance have produced mixed findings. Some studies have found no relationship between strivings and performance (e.g., Hill et al., 2011) or no relationship between concerns and performance (e.g., Stoll et al., 2008). In contrast, other studies have reported positive relationships between strivings and performance (e.g., Stoeber et al., 2009) or negative relationships between concerns and performance (e.g., Anshel & Mansouri, 2005). The inconsistency of findings from this limited body of research lead Hall, Hill, and Appleton (2012) to conclude that there is insufficient evidence "to draw any firm conclusions about the effect [or relationships] of perfectionism on [or with] performance" in sport (p. 159). To address this issue, the purpose of the second study was to examine relationships between athletes' perfectionism levels (i.e., perfectionistic strivings and perfectionistic concerns) and performance in a competitive setting where athletes engaged in direct competition with an opponent.

A third line of inquiry that has received almost no attention in the sport perfectionism literature relates to *applied interventions* that target the dysfunctional (or maladaptive/unhealthy) components of perfectionism in sport (i.e., perfectionistic concerns). Although research has been conducted in the clinical-, school-, and general-psychology literature to examine the impact of interventions on individuals' perfectionistic tendencies (for a review see Lloyd, Schmidt, Khondaker, & Tcanturia, 2015), the need to develop (and assess) interventions that are designed to reduce athletes' perfectionistic concerns in sport has been advocated by sport psychology researchers (see Gotwals et al., 2012). To this end, the third study of the dissertation explored the degree to which athletes' perfectionistic concerns in sport could be reduced through the delivery of a mental-training program that focussed upon the integration of adopting a positive mindset towards failure in sport.

The three studies build upon previous research conducted by the author (see Lizmore, Dunn, & Causgrove, 2016) that examined links between athletes' perfectionistic tendencies and reactions to personal failure in sport. It is hoped that the results obtained from this dissertation can be used to help athletes, coaches, and sport psychologists better understand how, why, and when the personality trait of perfectionism may impact athletes' responses to failure in sport. This knowledge may help athletes to develop and implement adaptive or functional responses to the inevitable failures they face in competition, and ultimately facilitate performance (and recovery) in competition.

Overview of Studies

Study 1. The first study examines adaptive and maladaptive cognitions that are often experienced by athletes following poor personal performances in competition. The specific purpose of Study 1 was to determine if perfectionistic strivings and perfectionistic concerns in sport differentially predict athletes' self-compassion, optimism, pessimism, and rumination

following poor personal performances in sport. Intercollegiate team-sport athletes completed a measure of perfectionistic strivings and perfectionistic concerns in sport, along with a self-report measure that asked them to indicate the extent to which they typically engaged in self-compassion, optimism, pessimism, and rumination in response to poor personal performances in competition. Hierarchical regression analysis was used to examine the degree to which perfectionistic strivings and perfectionistic concerns predicted self-compassion, optimism, pessimism, and rumination. This study has already been published (see Lizmore, Dunn, & Causgrove Dunn, 2017).

Study 2. The second study examines relationships between perfectionistic strivings, perfectionistic concerns, and golf-putting performance in two competitive conditions that varied in the amount of stress that was perceived by athletes. The higher stress condition was experimentally manipulated by providing athletes with false-failure feedback indicating that they were losing the competition against their opponent. State measures of perceived threat, cognitive anxiety, and optimism were used to check that athletes did indeed experience different levels of stress in the two conditions (where each trial/condition required athletes to compete against an opponent by simultaneously putting ten golf balls at a target/hole from varying distances). The dependent variable of interest in each condition/trial was performance, which was assessed by taking the cumulative straight-line distance that the ten putts finished from the intended target. Hierarchical regression analyses were used to determine the extent to which perfectionistic strivings and perfectionistic concerns predicted golf putting performance in the two conditions.

Study 3. The final study of the dissertation assessed the degree to which a newly constructed mental-training program reduced athletes' perfectionistic concerns in sport. The study also explored how athletes felt that their exposure to the mental-training program impacted the way they perceived and responded to failure in sport. A parallel convergent mixed-methods

research design was employed (see Creswell & Plano Clark, 2011). Athletes completed a self-report measure of perfectionism four times throughout the study. Changes in athletes' perfectionism levels from pre- to post-intervention periods were examined using a repeated-measures MANOVA. Qualitative data obtained from social validation questionnaires and semi-structured interviews were explored using inductive thematic analysis to assess how athletes had experienced the intervention.

Dissertation Overview

There are five chapters in the dissertation. The dissertation begins with this Introduction section (Chapter 1). The three studies are presented in paper format. Study 1 (Chapter 2) examines perfectionism and reactions to poor performance in intercollegiate athletes, and as noted previously is published in *Psychology of Sport and Exercise*. Study 2 (Chapter 3) examines links between perfectionism and golf-putting performance in conditions that vary in competitive stress. Study 3 (Chapter 4) examines changes in athletes' perfectionism levels as a result of undergoing a mental-training intervention and explores if/how athletes change the way they view and react to failure in sport. The final chapter (Chapter 5) contains a General Discussion section and summarizes the overall findings and research implications from the three of studies. Suggestions for future research and applied practice are also presented in the closing chapter. Each chapter has its own self-contained References section. Footnotes (when used) are also self-self-contained and sequentially ordered within each chapter.

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CHAPTER 2

Study 1

Perfectionistic Strivings, Perfectionistic Concerns, and Reactions to Poor Personal Performances Among Intercollegiate Athletes

A version of this chapter has been published: Lizmore, M. R., Dunn, J. G. H., & Causgrove Dunn, J. (2017). Perfectionistic strivings, perfectionistic concerns, and reactions to poor personal performances among intercollegiate athletes. *Psychology of Sport and Exercise, 33*, 75-84. doi:10.1016/j.psychsport.2017.07.010. Printed with permission from the publisher.

In a well-publicized sporting-goods commercial that aired on North American TV in the late 1990s, Michael Jordan—the five-time winner of the National Basketball Association's (NBA) Most Valuable Player (MVP) award—was heard saying, "I've missed more than 9,000 shots in my career. I've lost almost 300 games. Twenty six times I've been trusted to take the game-winning shot, and missed. I've failed over and over and over again in my life. And that is why I succeed." Implicit within Jordan's words are two important lessons for athletes pursuing sporting excellence. First, personal failure, substandard performance, and/or personal mistakes are inherent parts of the sporting experience even for the most elite performers. Second, the successful journey undertaken by many elite performers in sport is founded upon their ability to respond in a constructive manner when faced with adversity (Fletcher & Sarkar, 2012).

Although the criteria for what constitutes a poor performance or failure in sport will almost certainly vary across individuals, it is important for researchers and sport practitioners to identify potential reasons why some athletes react to failure with responses that reflect typically adaptive or healthy forms of psychological, affective, and behavioural adjustment (e.g., confidence, hope, and task engagement) while others react to failure with seemingly maladaptive or unhealthy forms of maladjustment (e.g., pessimism, dejection, and task avoidance). Research indicates that insight into how and why athletes react differently to failure in sport can be obtained by assessing athletes' perfectionistic dispositions (see Flett & Hewitt, 2016; Lizmore, Dunn, & Causgrove Dunn, 2016).

At a general level, perfectionism can be conceptualized as a multidimensional personality characteristic that is comprised of two higher-order dimensions: *perfectionistic strivings* and *perfectionistic concerns* (see Hill, 2016; Stoeber & Otto, 2006). In the context of sport, Stoeber (2011) defined perfectionistic strivings as "those aspects of perfectionism associated with striving for perfection and setting exceedingly high standards of performance" and

perfectionistic concerns as "those aspects [of perfectionism] associated with concerns over making mistakes, fear of negative evaluation by others, feelings of discrepancy between one's expectations and performance, and negative reactions to imperfection" (p. 129). Differentiating between the two dimensions is important because perfectionistic concerns are typically linked to maladaptive cognitive, affective, and behavioural responses/outcomes in sport, whereas perfectionistic strivings are more likely to be associated with adaptive responses/outcomes in sport, particularly when the overlap with perfectionistic concerns is controlled (see Gotwals, Stoeber, Dunn, & Stoll, 2012; Jowett, Mallinson, & Hill, 2016).

Flett and Hewitt (2016) recently suggested that a greater understanding of perfectionism, and the degree to which its constituent dimensions are linked to adaptive or maladaptive responses/outcomes in sport, is likely to be achieved when researchers give consideration to the situational context in which athletes' behaviours occur. More specifically, Flett and Hewitt argued that whether perfectionism is adaptive or maladaptive should not only be determined by a person's level of perfectionistic strivings or perfectionistic concerns, but also by the manner in which a person reacts to unfavourable or distressing situational circumstances. Building upon this idea, Flett and Hewitt introduced the concept of *perfectionistic reactivity*—defined as a person's "characteristic style of responding to adversity that includes both psychological and physiological reactivity" (p. 301)—and proposed that a better understanding of perfectionism could be attained if an individual's perfectionistic tendencies are considered with respect to how a person "reacts and responds to those situations and contexts that are clearly discrepant to his or her goals and ambitions" (p. 299).

Although Flett and Hewitt (2016) primarily presented the concept of perfectionistic reactivity within a person-oriented framework of perfectionism that focusses upon the reactions of *perfectionists*, the concept of perfectionistic reactivity can also be applied within a variable-

oriented framework (see Flett & Hewitt, 2016, p. 308) where relationships between the higher-order dimensions of perfectionism (i.e., perfectionistic strivings and perfectionistic concerns) and cognitive, affective, and behavioural responses may be examined in situations that threaten athletes' goals. In other words, if achieving high performance standards is a central feature of perfectionistic strivings and the desire to avoid mistakes and negative social evaluation are central features of perfectionistic concerns, situations where athletes experience personal failure or commit mistakes in competition would likely provide conditions that are antithetical to the goals and ambitions of performers who have high—as opposed to low—perfectionistic strivings and/or perfectionistic concerns. The general objective of the current study was to explore the concept of perfectionistic reactivity within a variable-oriented framework of perfectionism and examine relationships between perfectionistic strivings, perfectionistic concerns, and athletes' cognitive reactions to poor personal performance in competition.

A number of variable-oriented studies have investigated relationships between facets (i.e., sub-dimensions) of perfectionistic strivings/concerns and athletes' reactions to personal failure/mistakes in competition. This body of research has typically shown that higher scores on scales/subscales representing perfectionistic concerns are associated with indicators of maladjustment including heightened anger reactivity (Dunn, Gotwals, Causgrove Dunn, & Syrotuik, 2006), an inability to forget about mistakes and heightened disappointment (Frost & Henderson, 1991), heightened fear of failure (Sagar & Stoeber, 2009), and a heightened tendency to perceive threat and experience negative affect (Crocker, Gaudreau, Mosewich, & Kljajic, 2014). Person-oriented studies—where groups or clusters of unhealthy/maladaptive perfectionists have been identified on the basis of scores reflecting high perfectionistic strivings and high perfectionistic concerns—reveal that unhealthy/maladaptive perfectionists have a tendency to employ avoidance coping strategies (see Dunn, Causgrove Dunn, Gamache, & Holt,

2014) and to experience heightened anger/dejection and lower confidence/optimism following personal failure in competition (Lizmore et al., 2016).

In contrast to the relatively clear and consistent pattern of relationships that exist between heightened perfectionistic concerns and indicators of cognitive, affective, and behavioural maladjustment following personal failure in sport, relationships between athletes' perfectionistic strivings and responses to failure in competition are less clear. For example, scales/subscales that reflect aspects of perfectionistic strivings in sport have been positively correlated with indicators of psycho-emotional maladjustment—including heightened anger reactivity (Dunn et al., 2006), heightened fear of failure (Sagar & Stoeber, 2009), and heightened anger/dejection (Lizmore et al., 2016)—and positively correlated with indictors of psycho-emotional adjustment—including heightened confidence/optimism (Lizmore et al., 2016), heightened positive affect, and stronger perceptions of goal progress (Crocker et al., 2014). Given the mixed findings regarding the relationships between perfectionistic strivings and athletes' reactions to personal failure/mistakes in competition, there is a clear need to examine perfectionistic strivings in the context of athletes' perfectionistic reactivity. Addressing this issue would enable researchers to better understand if, how, and when perfectionistic strivings might play a role in the perfectionistic reactivity of athletes following personal failure or mistakes in competition.

The specific purpose of this study was to determine if perfectionistic strivings and perfectionistic concerns differentially predicted the dispositional tendency of athletes to respond to poor personal performances in competition with self-compassion, optimism, pessimism, and rumination. The decision to focus on cognitive reactions to failure follows the position of Flett and Hewitt (2014) who have previously noted that "perfectionism has a very salient cognitive element" (p. 401). Self-compassion, optimism, pessimism, and rumination were selected because all four variables can be unambiguously classified as indicators of either psychological

adjustment (i.e., self-compassion and optimism) or psychological maladjustment (i.e., pessimism and rumination) in sport (see Gotwals et al, 2012, for a related discussion) and because all four variables appear to be relevant cognitive indicators of perfectionistic reactivity (see Flett & Hewitt, 2016, p. 309). Including indicators of both cognitive adjustment and maladjustment was considered to be an essential part of this study because while perfectionistic reactivity can be discussed in terms of negative responses, Flett and Hewitt (2016) noted that it is also important to discuss or assess "perfectionistic reactivity in terms of a lack of positive responses" (p. 308). Thus, a lack of self-compassionate thoughts or optimistic thinking following personal failure in sport may provide insight into perfectionistic reactivity in the same way that heightened pessimism or rumination might achieve.

Cognitive reactions to failure

Self-compassion is defined as a non-evaluative multidimensional "positive self-attitude" that involves "being kind and understanding towards oneself in instances of pain or failure rather than being harshly self-critical," "perceiving one's experiences as part of the larger human experience rather than seeing them as separating and isolating," and "holding painful thoughts and feelings in balanced awareness rather than over-identifying with them" (Neff, 2003a, p. 85). Self-compassion is viewed as a highly adaptive, beneficial, or functional response to dealing with personal failure or distressing events in sport (e.g., Mosewich, Crocker, Kowalski, & DeLongis, 2013) and non-sport settings (e.g., Leary, Tate, Adams, Batts Allen, & Hancock, 2007). Research evidence indicates that perfectionistic concerns in sport are expected to be negatively correlated with athletes' levels of self-compassion (see Mosewich et al., 2013). Links between self-compassion and perfectionistic strivings in athletes remain unexplored. However, it should be noted that Neff (2011, p. 6) specifically stated that she found no association between self-compassion and performance standards—a central component of perfectionistic strivings—

in her own research outside of sport.

Optimism is a future-oriented cognitive disposition that involves positive expectancies about the future (Scheier, Carver, & Bridges, 1994). Individuals who possess heightened levels of optimism tend to respond in an adaptive manner when confronted with failure or adversity (Carver, Scheier, & Segerstrom, 2010). Heightened optimism in sport is considered to be "indispensable for success" (Zinsser, Bunker, & Williams, 2006, p. 351), particularly when athletes are faced with difficulty and adversity in their competitive environments. A previous study by Brannan, Petrie, Greenleaf, Reel, and Carter (2009) with female intercollegiate athletes reported significant negative bivariate correlations between various sub-dimensions of perfectionistic concerns and dispositional optimism. Research by Chang (2006, 2009) with college students found significant positive correlations between 'positive self-oriented performance perfectionism'—a sub-dimension of perfectionistic strivings—and optimism**.**

Pessimism is a future-oriented cognitive tendency that involves negative general expectancies about the future (Scheier et al., 1994) and can be considered as the opposite disposition to optimism with respect to expectations about future events (Carver et al., 2010). Pessimism has been negatively correlated with mental toughness, commitment, emotional control, and confidence of athletes and is generally considered to be a maladaptive response to failure or adversity in sport (see Nicholls, Polman, Levy, & Backhouse, 2008). Although links between perfectionism and pessimism have not been assessed in sport, Chang's (2006, 2009) research with college students found a significant negative correlation between positive self-oriented performance perfectionism and pessimism (see Chang, 2009) and a significant positive correlation between 'negative socially prescribed performance perfectionism'—a sub-dimension of perfectionistic concerns—and pessimism (see Chang, 2006).

Rumination involves the presence of reoccurring or persistent thoughts that are often

initiated by a discrepancy or deficit between an important goal that is held by an individual and the actual progress the individual has made towards that goal (Martin & Tesser, 1996). When these thoughts occur in conjunction with a state of negative affect—as is often the case when athletes perform poorly (see Lizmore et al., 2016)—rumination reflects a relatively uncontrollable set of maladaptive or intrusive thoughts (see Nolen-Hoeksema, 1996) that hinder individuals' efforts to find a solution to dealing with the outcome-performance discrepancy (see Wade, Vogel, Liao, & Goldman, 2008). Research in sport has shown that ruminative thoughts are linked to perfectionism. For example, Frost and Henderson (1991) reported that a number of sub-dimensions reflecting perfectionistic concerns were positively correlated with female intercollegiate athletes' self-reported inability to forget about personal mistakes committed during competition, and in a more recent study, Hill (2014) found significant positive bivariate correlations between perfectionistic strivings, perfectionistic concerns, and general rumination in a sample of adult athletes—although the relationship between strivings and rumination was non-significant when the overlap with concerns was controlled.

As a collection of responses, low levels of self-compassion and optimism and high levels of pessimism and rumination appear to reflect "cognitive tendencies that contribute to a less than optimal response orientation" (Flett & Hewitt, 2016, p. 297) for athletes in situations involving personal failure in competition. On the basis that perfectionistic concerns are (a) characterized by high concern over mistakes and negative reactions to imperfection, and (b) typically associated with maladaptive responses/outcomes in sport (see Gotwals et al., 2012; Jowett et al., 2016), we hypothesized that athletes' perfectionistic concerns would negatively predict self-compassion and optimism, and positively predict pessimism and rumination in response to personal failure in competition. In contrast, because previous research has revealed positive relationships between perfectionistic strivings and psychological/emotional adjustment (e.g., Crocker et al., 2014;

Lizmore et al., 2016) and maladjustment (e.g, Dunn et al., 2006; Lizmore et al., 2016; Sagar & Stoeber, 2009) in response to personal failure/mistakes in sport, our hypotheses regarding anticipated relationships between perfectionistic strivings and the four cognitive reactions-to-failure variables were more tentative. In consideration of the fact that perfectionistic strivings are frequently associated with adaptive responses/outcomes in sport—particularly when the overlap with perfectionistic concerns is controlled (see Gotwals et al., 2012; Jowett et al., 2016; Stoeber, 2012)—we speculated that perfectionistic strivings would positively predict self-compassion and optimism and negatively predict pessimism and rumination following personal failure in competition.

Method

Participants

A total of 239 intercollegiate team-sport varsity athletes (140 men, 99 women) from a large Canadian university participated in the study. The current sample formed a sub-sample of athletes (N = 1605) in a paper by Dunn et al. (2016) that previously examined the higher-order latent dimensionality of the Sport-Multidimensional Perfectionism Scale-2 (Sport-MPS-2).[1] Athletes (M age = 20.50 years, SD = 1.99) had an average of 2.56 years of intercollegiate sport experience (SD = 1.48) in the sports of basketball (14 men, 12 women), Canadian football (66 men), ice hockey (22 men, 18 women), rugby (32 women), soccer (21 men, 22 women), and volleyball (17 men, 15 women).

Measures

Perfectionism. The assessment of perfectionistic strivings and perfectionistic concerns in sport is enhanced when multiple indicators of each construct are employed (Stoeber & Madigan,

[1] The perfectionism data in this study were used by Dunn et al. (2016) for the sole purpose of examining the latent dimensionality of the Sport-MPS-2. None of the responses to poor performance data in this study have been previously used or reported in any other publication.

2016). In accordance with previous research (e.g., Rasquinha, Dunn & Causgrove Dunn, 2014; Stoeber, Stoll, Salmi, & Tiikkaja, 2009), perfectionistic strivings were measured by the seven items contained within the *Personal Standards* (PS) subscale of the Sport-Multidimensional Perfectionism Scale-2 (Sport-MPS-2: Gotwals & Dunn, 2009) and five items contained within the *Striving for Perfection* (SP) subscale of the Multidimensional Inventory of Perfectionism in Sport (MIPS: Stoeber, Otto, & Stoll, 2006). Perfectionistic concerns were measured by the eight items contained within the *Concern over Mistakes* (COM) subscale of the Sport-MPS-2 and five items from the *Negative Reactions to Imperfection* (NRI) subscale of the MIPS.

Respondents rated the items (which were randomly ordered within the instrument) on a 5-point scale (1 = *strongly disagree*; 5 = *strongly agree*), with higher composite subscale scores reflecting higher levels of perfectionism. Validity and reliability evidence supporting the use of these items/subscales as measures of perfectionistic strivings and perfectionistic concerns in sport has been provided in the literature (see Rasquinha et al., 2014; Stoeber et al., 2009).

Self-compassion. A sport-modified version of the Short Form of the Self-Compassion Scale (SCS-SF: Raes, Pommier, Neff, & Van Gucht, 2011) was used to measure the degree to which athletes were self-compassionate following poor performances in sport. The SCS-SF is an abbreviated 12-item version of Neff's (2003b) original 26-item Self Compassion Scale (SCS). Raes et al. (2011) reported excellent goodness-of-fit (following confirmatory factor analyses) supporting the unidimensional structure of the SCS-SF with different samples, a near perfect correlation with Neff's original 26-item SCS (r = .97), and high internal consistency (αs ≥ .86).

To enhance the relevance of the SCS-SF to the context of sport, initial instructions asked respondents to "identify how you typically think and act towards yourself after you play poorly." Every item was preceded with the phrase, "*After I play poorly in my sport*…" and modifications were made to items to further enhance their relevance to the domain of sport. For example, an

original SCS-SF item was modified from "*When something painful happens, I try to take a balanced view of the situation*" to "*After I play poorly in my sport, I take a balanced view of the situation*." Another original SCS-SF item was modified from "*When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people*" to "*After I play poorly in my sport, I remind myself that feelings of inadequacy are shared by most people*." Participants were asked to respond to the 12 items using a 5-point scale (1 = *almost never*; 5 = *almost always*) such that a higher composite score on the instrument reflected higher levels of self-compassion following poor personal performances in sport.

Optimism and pessimism. A sport-modified version of the Life Orientation Test (LOT: Scheier & Carver, 1985) was used to measure athletes' typical levels of optimism and pessimism following poor performances in sport. The LOT contains four positively worded items, four negatively worded items, and four filler items (that are not scored). In accordance with previous research conducted with athletes (see Gordon, 2008; Nicholls et al., 2008), the four positively worded items were used to measure optimism and the four negatively worded items were used to measure pessimism. Initial instructions asked participants to "identify how you typically think and feel following poor performances in your sport." Items were preceded with the phrase "*After I play poorly in my sport*…" and were modified to enhance their relevance to sport. For example, a LOT-optimism item was modified from "*I'm always optimistic about my future*" to "*After I play poorly in my sport, I'm always optimistic about my future as an athlete*." A LOT-pessimism item was modified from "*I hardly ever expect things to go my way*" to "*After I play poorly in my sport, I hardly ever expect things to go my way for the next competition*."

Participants responded to items on a 5-point scale (1 = *almost never*; 5 = *almost always*) such that higher subscale scores indicated higher levels of optimism and/or pessimism following poor performances in sport. Validity and reliability evidence supporting the LOT as a measure of

optimism and pessimism among athletes is contained within the sport-psychology literature (e.g., Gordon, 2008; Nicholls et al., 2008).

Rumination. A sport-modified version of the Rumination about an Interpersonal Offense Scale (RIO: Wade et al., 2008) was used to measure the extent to which athletes engage in rumination following poor performances in sport. The RIO is a six-item unidimensional instrument that measures the extent to which people ruminate about a situation in which they were grieved by an interpersonal offense (e.g., "*I can't stop thinking about how I was wronged by this person*"). Higher scores have been associated with higher levels of revenge, depression, and hostility in various samples (see Wade et al., 2008) reinforcing the maladaptive nature of rumination as measured by the RIO. We modified the instrument to focus on the extent to which athletes ruminate about poor performances in sport. Instructions asked respondents to "identify the degree to which your thoughts remain focussed on poor performances after competition is complete." Each item was preceded by the phrase, "*After I play poorly in my sport*…" and the wording of items was changed to reflect the situational context of sport. For example, an original RIO item was modified from "*Memories about this person's painful actions have limited my enjoyment of life*" to "*After I play poorly in my sport, memories of my performance detract from my enjoyment of life*." Another original RIO item was modified from "*I have a hard time getting thoughts of how I was mistreated out of my head*" to "*After I play poorly in my sport, I have a hard time getting thoughts of my performance out of my head.*"

Participants responded to items using a 5-point scale (1 = *almost never*; 5 = *almost always*) such that a higher composite score was indicative of higher levels of rumination following poor performances in sport. Validity and reliability evidence supporting the use of the RIO as a measure of rumination (about an interpersonal offense) has been reported in the general psychology literature (see Nepon, Flett, Hewitt, & Molnar, 2011; Wade et al., 2008).

Procedure

Approval to conduct the study was obtained from the institutional Human Research Ethics Board and the head coaches of each team. All data were collected through the use of paper-and-pencil self-report instruments that were administered by the first author in classroom settings at team meetings during or shortly after each team's competitive season, and never within a 48-hour period before or after competition. A demographic questionnaire (to measure age, gender, and sport experience) was presented first to participants and then all other instruments were presented in random orders to minimize any potential presentation order effects. Coaches were not present during any test period. All respondents voluntarily participated in the study and were treated in accordance with the ethical guidelines of the American Psychological Association.

Results

Preliminary data analyses

Fifty-six missing data points were provided by the 239 participants across all measures (i.e., missing-data response rate of 0.46%). Missing data were replaced by calculating an intra-individual mean item score from the scores provided by the respondent on the remaining items of the relevant subscale (see Graham, Cumsille, & Elek-Fisk, 2003).

Given the extent to which the instruments were modified to measure constructs in the domain of sport, psychometric evaluations were conducted on all instruments to ensure that they functioned in accordance with theoretical expectations. To this end, the latent structure of each instrument was assessed by submitting the inter-item covariance matrix of each instrument's data set to a Maximum Likelihood (ML) Confirmatory Factor Analysis (CFA) using LISREL 8.72 (Jöreskog & Sörbom, 1996). Following the recommendations of Hu and Bentler (1999), the adequacy of each model fit was assessed with a combination of the standardized root mean

squared residual (SRMR), the root mean square error of approximation (RMSEA), and the comparative fit index (CFI). Hu and Bentler propose that an adequate fitting model is obtained when SRMR is close to (or less than) .08, RMSEA is close to (or less than) .06, and CFI is close to (or greater than) .95. However, it should be noted that Hu and Bentler indicate that the RMSEA has a tendency to over-reject models when sample size is ≤ 250 (as is the case [N = 239] in the current study). The internal consistency of each instrument was also assessed using Cronbach's alpha.

Perfectionism. Confirmatory factor analyses that tested two- and four-factor models failed to produce an adequate-fit for the perfectionism data (cf. Rasquinha et al., 2014). However, when the correlation matrix for the 25 perfectionism items was examined with an exploratory Principal Axis factor analysis (with direct oblimin rotation), a two-factor solution with excellent simple structure across all items was obtained (i.e., each item had a pattern coefficient ≥ .32 on only one factor). The first factor contained all eight items intended to measure concern over mistakes and all five items intended to measure negative reactions to imperfection. Factor 1 was therefore labelled *perfectionistic concerns* (see Rasquinha et al., 2014). The second factor contained all seven items intended to measure personal standards and all five items intended to measure striving for perfection. In accordance with theory, Factor 2 was labelled *perfectionistic strivings* (see Rasquinha et al., 2014). The 13-item perfectionistic concerns subscale and the 12-item perfectionistic strivings subscale had acceptable levels of internal consistency (both αs = .86).

Self-compassion. Following the removal of one item (i.e., Item 5: "*I see my failings as part of the overall human condition*"), CFA goodness-of-fit indices supported the unidimensional conceptualization of the sport-modified version of the abbreviated self-compassion scale (SRMR = .06; RMSEA = .09 [90% C.I. = .08 - .11]; CFI = .94). All standardized factor loadings were ≥

.37 (all *p*s < .001) on the single factor. The internal consistency for the 11-item scale was acceptable (α = .85).

Optimism and pessimism. Following the removal of one item that was intended to measure optimism (Item 1: "*After I play poorly I usually expect the best for my next competition*") CFA goodness-of-fit indices supported the retention of a two-factor model to capture the latent dimensionality of the sport-modified LOT (SRMR = .06; RMSEA = .11 [90% C.I. = .08 - .15]; CFI = .95). The standardized factor loadings for the three optimism items on the optimism factor were ≥ .68 (*p*s < .001) and the standardized factor loadings for the four pessimism items on the pessimism factor were ≥ .62 (*p*s < .001). The internal consistency values for the optimism (α = .77) and pessimism (α = .79) subscales were acceptable.

Rumination. Goodness-of-fit indices provided strong support for a unidimensional rumination scale (SRMR = .02; RMSEA = .03 [90% C.I. = .00 - .08]; CFI = 1.0). All items had standardized factor loadings ≥.65 (*p*s < .001) on the single factor, and the internal consistency for the 6-item scale was acceptable (α = .89).

In light of the factor analytic and internal consistency results, it was deemed that all instruments possessed adequate psychometric characteristics and functioned (at a structural level) in accordance with theoretical expectations. Table 2.1 contains the mean-item scores, standard deviations, and bivariate correlations for all scales/subscales.

Predicting Reactions to Poor Personal Performances

Four hierarchical regression analyses were conducted to examine the extent to which perfectionistic strivings and perfectionistic concerns predicted athletes' self-compassion, optimism, pessimism, and rumination responses to poor personal performances. One cognitive-response variable was entered as the dependent variable in each regression analysis.

Although gender was not a primary variable of interest in this study, previous research

has occasionally identified the existence of gender differences on the constructs that were under investigation: perfectionism (Dunn, Causgrove Dunn, & McDonald, 2012), self-compassion (Neff, 2003b), optimism/pessimism (Extremera, Durán, & Rey, 2007), and rumination (Nolen-Hoeksema & Harrell, 2002). Moreover, as seen in Table 2.1, gender showed small (but significant) bivariate correlations with perfectionistic strivings, self-compassion, and optimism in the current data set. Consequently, to control for any possible influence that gender might have upon the regression results, gender (coded as 1 = male, 2 = female) was entered in the first step of each analysis (cf. Cheng & Hardy, 2016; Rasquinha et al., 2014; Stoeber, Uphill, & Hotham, 2009). Perfectionistic strivings and perfectionistic concerns were simultaneously entered in the second step of each analysis thereby ensuring that the overlap between the two higher-order dimensions (r = .34) was controlled and the resulting regression coefficients provided information about the unique contribution each perfectionism variable made to the prediction of self-compassion, optimism, pessimism, and rumination (see Jowett et al., 2016; Stoeber & Gaudreau, 2017).

Prior to conducting the regression analyses, data were screened for the presence of univariate and multivariate outliers. To screen for univariate outliers we computed standardized z-scores for all six variables of interest (i.e., strivings, concerns, self-compassion, optimism, pessimism, and rumination). Using Tabachnick and Fidell's (1996) criterion of $z > |3.29|$ as a potential lower boundary for univariate outliers, we found two cases where a composite subscale score on a variable might qualify as a univariate outlier ($z_1 = 3.37$ and $z_2 = 3.73$). Using Stevens' (1992) criterion of $z > |4|$, no cases were classified as univariate outliers (also see Hair, Anderson, Tatham & Black, 1998). Given that all subsequent Cooks' distances were small (i.e., ≤ .090) for each regression analysis, and the two cases may or may not qualify as potential outliers (depending upon whose criteria we apply for this purpose), we did not remove either of

the cases on the basis of their standardized z-scores. However, three multivariate outliers were identified (Mahalonobis distances > 22.46; $\chi^2[6\ ]_{critical} = 22.46$, $p < .001$) and removed from the data set. Following removal of the multivariate outliers there were no issues with multicollinearity among the variables (all bivariate correlations ≤ |.64|; all Variance Inflation Factors ≤ 1.20) and all Cook's distances ≤ .086, indicating that removal of any individual case would not have a major influence on the regression results.

The results of the four regression analyses are contained in Table 2.2. Gender was a small (but significant) predictor of self-compassion and optimism (i.e., males tended to have higher self-compassion and optimism following poor performances than females). Perfectionistic concerns was a significant negative predictor of self-compassion and optimism, and a significant positive predictor of pessimism and rumination. More specifically, after controlling for gender and the overlap with perfectionistic strivings, higher levels of perfectionistic concerns were associated with (a) lower self-compassion and lower optimism, and (b) higher pessimism and higher rumination following poor personal performances in sport.

The unique contribution that was made by perfectionistic strivings towards the prediction of the four dependent variables was quite different than the unique contribution made by perfectionistic concerns. As seen in Table 2.2, perfectionistic strivings was a significant positive predictor of self-compassion and optimism, and a significant negative predictor of pessimism. In other words, after controlling for gender and the overlap with perfectionistic concerns, higher levels of perfectionistic strivings were associated with higher self-compassion, higher optimism, and lower pessimism following poor personal performances in sport. After controlling for gender and perfectionistic concerns, perfectionistic strivings was not a significant predictor of

rumination.[2]

Discussion

In the current study, we sought to explore the concept of perfectionistic reactivity (Flett & Hewitt, 2016) within a variable-oriented framework of perfectionism and determine the extent to which self-compassion, optimism, pessimism, and rumination—four cognitively-based responses that can occur to varying degrees among athletes in response to failure in sport—could be predicted by athletes' perfectionistic concerns and perfectionistic strivings in sport. Results of the regression analyses (Table 2.2) indicate that perfectionistic concerns negatively predicted the two adaptive constructs (i.e., self-compassion and optimism) and positively predicted the two maladaptive constructs (i.e., pessimism and rumination). In other words, after controlling for gender and perfectionistic strivings, as perfectionistic concerns increased there was a reduced tendency for athletes to engage in self-compassion and optimistic thinking, and a greater tendency to engage in pessimistic thinking and rumination following poor personal performances. Results of the regression analyses also indicated that perfectionistic strivings positively predicted self-compassion and optimism, and negatively predicted pessimism. That is, after controlling for gender and perfectionistic concerns, as perfectionistic strivings increased there was a greater tendency for athletes to engage in self-compassion and optimistic thinking, and a reduced tendency to engage in pessimistic thinking following poor personal performances. Collectively, these results provide empirical support for the view that heightened perfectionistic concerns tend to be maladaptive in sport (Stoeber, 2012), whereas heightened perfectionistic strivings tend to be adaptive in sport particularly when "the negative influence [or overlap] with

[2] For the sake of brevity and ease of presentation, we continue to use the terms 'perfectionistic strivings' and 'perfectionistic concerns' when discussing the regression results throughout the paper. However, it is important to acknowledge that the regression results pertaining to each of the two higher-order dimensions of perfectionism control for the overlap with the other dimension. As such, any further reference to the two perfectionism dimensions in the context of the regression analyses refer to 'residualised' perfectionistic strivings/concerns (Hill, 2014, p. 4), 'residual' perfectionistic strivings/concerns (Stoeber & Gaudreau, 2017, p. 380) or 'pure' perfectionistic strivings/concerns (Jowett et al., 2016, p. 87)—labels that have been advocated by other perfectionism theorists.

perfectionistic concerns is controlled" (Gotwals et al., 2012, p. 263).

The aforementioned inferences about the adaptiveness/maladaptiveness of perfectionistic strivings and concerns are founded upon the premise that self-compassion and optimism are adaptive responses, and pessimism and rumination are maladaptive responses. Examination of the bivariate correlations among the subscales measuring these four constructs (see Table 2.1) appears to provide support for this position. Self-compassion and optimism were positively correlated, pessimism and rumination were positively correlated, and self-compassion and optimism were negatively correlated with pessimism and rumination. If conceptualizing these four constructs within a nomological framework of adaptive and maladaptive cognitions in sport, the direction and strength of the correlations among the four subscales provide an interpretable pattern of convergent and divergent validity coefficients that is highly consistent with the theorized adaptiveness of self-compassion and optimism, and the theorized maladaptiveness of pessimism and rumination. Thus, we are confident in our position that self-compassion and optimism represent adaptive responses, and pessimism and rumination represent maladaptive responses among athletes following poor personal performances in sport.

Almost all of the results obtained in the regression analyses supported our hypotheses and were theoretically interpretable. It was expected that perfectionistic concerns would be negatively associated with self-compassion (see Tables 2.1 and 2.2) because perfectionistic concerns involve the tendency to be overly self-critical following failure (Stoeber, 2012) whereas self-compassion involves people's efforts to "be kind to themselves and make themselves feel better…following negative events" (Leary et al., 2007, p. 891). In contrast, it was expected that perfectionistic strivings would be positively associated with self-compassion when the overlap with perfectionistic concerns was controlled because strivings involve high personal standards and because self-compassion—while entailing self-kindness in the context of failure—"does not

entail complacency or lax standards for the self" (Neff, Hsieh, & Dejitterat, 2005, p. 265). To the best of our knowledge, this is the first study to directly examine associations between perfectionistic strivings, perfectionistic concerns, and athletes' use of self-compassion in response to poor personal performances in sport.

The hypothesis that perfectionistic concerns would be negatively associated with optimism and positively associated with pessimism following failure was also supported (see Table 2.1 and 2.2). Perfectionistic concerns reflect an athlete's tendency to be concerned about personal mistakes and failure; optimism reflects an expectation that future outcomes will generally be positive and pessimism reflects an expectation that future outcomes will generally be negative (Carver & Scheier, 2014). If perfectionistic concerns increase, it is likely that individuals will feel less confident and experience more worry (see Flett & Hewitt, 2014) about their future when mistakes arise (i.e., reduced optimism) and be more inclined to focus on what might go wrong in the future (e.g., higher pessimism). In contrast, the associations of higher perfectionistic strivings with higher optimism and lower pessimism make sense because it would be counterintuitive for athletes to set increasingly higher standards of personal performance (i.e., higher perfectionistic strivings) if they did not feel confident that these standards were likely to be achieved (see Dunn et al., 2012).

According to previous research, people with high levels of perfectionistic concerns are inclined to worry, ruminate, and become "cognitively pre-occupied" with mistakes (Flett & Hewitt, 2014a, p. 401). Therefore, the positive relationship between perfectionistic concerns and rumination was expected (see Table 2.1 and 2.2). However, we did not find any evidence supporting our hypothesis that higher perfectionistic strivings would be associated with lower rumination following failure. In fact, at the bivariate level (see Table 2.1), perfectionistic strivings actually had a small but significant positive correlation with rumination. We speculate

that athletes' perfectionistic strivings did not predict rumination in the regression analysis because perfectionistic strivings, when the overlap with perfectionistic concerns is controlled, reflect a tendency to strive for perfection and set very high standards for performance (Stoeber, 2011) rather than a tendency to uncontrollably fixate on past failures. Such fixation on past failures would likely do little to help athletes attain future high performance standards.

Overall, the results of this study indicate that heightened perfectionistic concerns in sport are maladaptive with respect to how athletes' cognitively respond to personal failure (see Lizmore et al., 2016) whereas heightened perfectionistic strivings are predominantly adaptive, particularly when the overlap with perfectionistic concerns in controlled (Gotwals et al., 2012; Jowett et al., 2016). Higher perfectionistic concerns corresponded with lower self-compassion and optimism, and with higher pessimism and rumination. In contrast, higher perfectionistic strivings corresponded with higher self-compassion, higher optimism, and lower pessimism when the overlap with concerns was controlled. These findings provide important insight into the role that perfectionistic strivings and perfectionistic concerns appear to play within the context of athletes' perfectionistic reactivity (Flett & Hewitt, 2016) following poor personal performances in sport.

We acknowledge that the results of this study are based upon a variable-oriented approach to assessing perfectionistic reactivity. Nevertheless, we speculate that a profile of psychological perfectionistic reactivity in athletes that includes any combination of heightened self-compassion, heightened optimism, reduced pessimism, and reduced rumination following poor personal performances in competition might reflect an important characteristic of psychological resilience. We adopt this position in light of Fletcher and Sarkar's (2012) work that examined psychological resilience in Olympic champions. Fletcher and Sarkar concluded that "an integral aspect of the stress-resilience-performance relationship [among the Olympians

was an]…ability to utilize and optimize a constellation of [psychological] characteristics to withstand the stressors" (p. 672). On the basis of our results, we propose that heightened self-compassion, heightened optimism, reduced pessimism, and reduced rumination may all reflect components of "constructive cognitive reactions" (Fletcher & Sarkar, 2012, p. 674) that pertain to psychological resilience in sport. We also posit that heightened perfectionistic strivings and low perfectionistic concerns may form part of the "positive personality" that Fletcher and Sarkar (p. 673) associated with psychological resilience in athletes. While recognizing that we assessed the independent effects of strivings and concerns on athletes' cognitive responses to failure, future person-oriented research could benefit by examining the extent to which adaptive perfectionistic tendencies (i.e., high perfectionistic strivings combined with low perfectionistic concerns) may form part of a psychologically resilient personality profile in sport for athletes (see Sarkar & Fletcher, 2014, p. 1425).

Limitations

Although this study provided important insights into the links between perfectionistic strivings, perfectionistic concerns, and the psychological perfectionistic reactivity of athletes' following failure in sport, the study is not without limitations. For example, the variable-oriented approach limits our ability to talk about perfectionistic *athletes* therefore discussion is focussed largely upon perfectionism *dimensions* (see Lizmore et al., 2016). The study also employed a cross-sectional correlational design therefore we must be cautious about inferring that variations in perfectionistic strivings and perfectionistic concerns caused athletes to respond with different levels of self-compassion, optimism, pessimism, and rumination following personal failure. For example, it is possible that variations in self-compassion may actually lead to changes in an athlete's levels of perfectionistic strivings or perfectionistic concerns (cf. Mosewich et al., 2013). Indeed, it is conceivable that athletes' perfectionistic strivings and/or perfectionistic concerns

could also be influenced by how athletes typically respond to poor performances in terms of optimism, pessimism, and rumination. More research is clearly required to address these issues.

Another potential limitation of this study relates to the domain-specific approach that was used to measure athletes' perfectionism levels and their cognitive responses to failure. This approach precludes the opportunity to generalize findings beyond the context of sport. In other words, the extent to which perfectionistic strivings and perfectionistic concerns may be associated with adaptive/maladaptive cognitions following poor personal performances in other achievement domains (e.g., school or work) remains unknown. Furthermore, the use of modified instruments to measure self-compassion, optimism, pessimism, and rumination as domain-specific constructs in this study also creates potential limitations because the instruments lack extensive validity and reliability evidence to support their use. Nevertheless, the decision was made to modify the measures because many "instruments frequently do not translate across contexts" (Hagger & Chatzisarantis, 2009, p. 514) and we believed that a domain-specific approach provided us with the best means to answer our research question (see de Beaudrap, Dunn, & Holt, 2017) and examine athletes' psychological perfectionistic reactivity following personal failure in sport. Obviously, further psychometric evaluation of the modified instruments would help determine their suitability for use in future research and shed more light on the validity of the inferences we have generated in the current study.

We made no attempt to determine if the cognitive patterns of perfectionistic reactivity to failure that were associated with heightened perfectionistic strivings and perfectionistic concerns had any bearing on the future performance levels of the athletes (in competition or training) or upon the speed with which the athletes typically overcame poor performances. Future research is needed to determine if variations in perfectionistic strivings, perfectionistic concerns, and cognitive responses to perceived personal failure in competition have any bearing on these

important performance indicators.

Finally, it is important to recognize that by asking athletes to indicate how they typically respond to poor personal performances in sport, we obtained generalized responses to a somewhat hypothetical or average situation where poor personal performance has occurred. Obtaining information about athletes' actual state responses immediately following competitive events where personal failure or poor personal performance has occurred may be of particular value to researchers who could potentially assess specific situational and/or motivational factors surrounding the event that impact athletes' perfectionistic reactivity in sport. Despite this limitation, the approach of asking athletes to indicate how they would likely or typically respond to a hypothetical/contrived competitive situation that involves poor personal performance or mistakes has been used successfully in previous research examining links between perfectionism and athletes' emotional/psychological responses in sport (e.g., Dunn et al., 2006; Lizmore et al., 2016; Vallance, Dunn, & Causgrove Dunn, 2006).

Conclusion

Despite these limitations, the results of this study provide support for a growing body of research evidence indicating that heightened perfectionistic concerns are predominantly maladaptive in sport, and heightened perfectionistic strivings are typically adaptive in sport when the overlap with perfectionistic concerns is controlled (see Gotwals et al., 2012; Jowett et al., 2016; Stoeber, 2012). To the best of our knowledge, this is the first study in the sport psychology literature to specifically examine athletes' psychological responses to personal failure in sport using Flett and Hewitt's (2016) concept of perfectionistic reactivity. Although Flett and Hewitt construe "perfectionistic reactivity as being largely negative" (p. 300), the current results provide evidence that certain psychological response patterns following personal failure in competition (e.g., higher self-compassion, higher optimism, lower pessimism) may actually reflect a more

positive or adaptive form of perfectionistic reactivity. We hope the results of this study will stimulate future research into individual-difference characteristics and situational conditions that enhance our understanding of factors associated with optimal and "less optimal form[s] of perfectionistic reactivity to failure" (Flett & Hewitt, 2016, p. 300) in sport.

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Table 2.1

Mean-Item Subscale Scores, Standard Deviations, Bivariate Correlations (r), and Internal Consistency Values (α) for all Variables

	Subscale					
	Perfectionistic strivings	Perfectionistic concerns	Self-compassion	Optimism	Pessimism	Rumination
	M = 3.76	*M* = 2.97	*M* = 3.03	*M* = 3.14	*M* = 2.38	*M* = 3.50
Variable	*SD* = 0.56	*SD* = 0.64	*SD* = 0.64	*SD* = 0.77	*SD* = 0.70	*SD* = 0.79
Gender	-.22***	.01	-.13*	-.14*	-.03	.07
Perfectionistic strivings	α = .86	.34***	-.08	.17**	-.09	.24***
Perfectionistic concerns		α = .86	-.63***	-.39***	.47***	.58***
Self-compassion			α = .85	.58***	-.48***	-.60***
Optimism				α = .77	-.50***	-.29***
Pessimism					α = .79	.37***
Rumination						α = .89

Note. *N* = 239. Gender coded as 1 = male, 2 = female.

*$p < .05$. **$p < .01$. ***$p < .001$.

Table 2.2

Summary of Contributions of Each Independent Variable Entered at Each Step in the Hierarchical Regression Analyses Predicting Self-Compassion, Optimism, Pessimism, and Rumination

Predictor		R^2	ΔR^2	ΔF	β	*t*
			Self-compassion			
Step 1		.02	.02	4.06*		
	Gender				-.13	-2.01*
Step 2		.44	.42	88.12***		
	Gender				-.09	-1.80
	Perf. concerns				-.69	-13.10***
	Perf. strivings				.14	2.65**
			Optimism			
Step 1		.02	.02	4.57*		
	Gender				-.14	-2.14*
Step 2		.27	.25	38.82***		
	Gender				-.06	-1.01
	Perf. concerns				-.50	-8.36***
	Perf. strivings				.34	5.55***
			Pessimism			
Step 1		.00	.00	.27		
	Gender				-.03	-0.52
Step 2		.34	.34	58.19***		
	Gender				-.12	-2.11*
	Perf. concerns				.60	10.54***
	Perf. strivings				-.34	-5.86***
			Rumination			
Step 1		.01	.01	1.18		
	Gender				.07	1.09
Step 2		.39	.38	73.26***		
	Gender				.08	1.46
	Perf. concerns				.60	10.88***
	Perf. strivings				.06	1.11

Note. $N = 236$. Gender coded as 1 = male, 2 = female. Scale abbreviations: Perf. concerns = perfectionistic concerns; Perf. strivings = Perfectionistic strivings.

*$p < .05$. **$p < .01$. ***$p < .001$.

CHAPTER 3

Study 2

Perfectionism and Performance in a Competitive Golf-Putting Task

"Perfectionism is perhaps the most studied personality trait in sport" (Hill & Madigan, 2017, p. 3) and has been consistently linked to a wide variety of cognitive, affective, and behavioural responses among performers (for reviews see Gotwals, Stoeber, Dunn, & Stoll, 2012; Jowett, Mallinson, & Hill, 2016). Despite the prevalence of research on perfectionism in sport over the last 20 years (see Hill, Appleton, & Hall, 2014), it is surprising that very few studies have examined links between perfectionism and performance in sport. Indeed, assessing the content of a recent book chapter written by Jowett et al. (2016) that summarized relationships between perfectionism dimensions and cognitive, affective, and behavioural correlates in sport-, dance-, and exercise-settings, 60 studies were conducted in the domain of sport and only two (i.e., Stoeber, Uphill, & Hotham, 2009; Stoll, Lau, & Stoeber, 2008) included performance as a variable. Given that 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 "performance is one of the defining features of the sport domain…[that] is perhaps the single most important aspect of an athlete's life" (Hill, Appleton, & Mallinson, 2016, pp. 654-655), the general purpose of this study was to examine relationships between perfectionism and athlete performance in a competitive setting.

Perfectionism is a multidimensional achievement motivation disposition comprised of two higher-order dimensions commonly referred to as perfectionistic strivings and perfectionistic concerns (see Stoeber & Gaudreau, 2017; Stoeber & Otto, 2006). In the context of sport, *perfectionistic strivings* reflect "aspects of perfectionism associated with [athletes'] self-oriented striving for perfection and the setting of very high personal performance standards" (Gotwals et al., 2012, p. 264) whereas *perfectionistic concerns* 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). Although there is substantial evidence indicating that (a) heightened perfectionistic strivings in sport are associated with adaptive, healthy, or functional "characteristics, processes, and outcomes in athletes" (Sagar & Stoeber, 2009, p. 603)—especially when the overlap with perfectionistic concerns is controlled (see Gotwals et al., 2012)—and (b) heightened perfectionistic concerns in sport are associated with maladaptive, unhealthy, or dysfunctional characteristics, processes, and outcomes (Gotwals et al., 2012), very little is known about the relationships between athletes' perfectionistic strivings, perfectionistic concerns, and performance in sport.

To date, only six published studies have examined links between perfectionism and individual performance in sport/athletic contexts (i.e., Anshel & Mansouri, 2005; Hill, Hall, Duda, & Appleton, 2011; Roberts, Rotherham, Maynard, Thomas, & Woodman, 2013; Stoeber et al., 2009; Stoll et al., 2008; Thompson, Kaufman, De Petrillo, Glass & Arnkoff, 2011).[1] Of those six studies, only one (i.e., Stoeber et al., 2009) examined the perfectionism-performance relationship in a 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)

Stoeber et al. (2009) examined relationships between perfectionism and race performance in two separate samples of adult triathletes. In both studies, higher perfectionistic strivings

[1] Although largely beyond the scope of this paper, the existence of one study by Hill, Stoeber, Brown, and Appleton (2014) that examined links between perfectionism at a team level and team performance is acknowledged. Hill et al. reported that team-oriented perfectionism (as represented by teams' perfectionistic standards) in the sport of rowing was positively associated with team performance over the course of a 4-day competition.

predicted superior (i.e., faster) race performance when the overlap with perfectionistic concerns was controlled. In contrast, perfectionistic concerns did not predict race performance in either sample.

Thompson et al. (2011) examined links between changes in perfectionism and changes in the personal-best 1-mile running times of ten long-distance runners who had been involved in a mindfulness training intervention. Changes in perfectionistic strivings were unrelated to changes in performance, whereas increases (between 'pretest' and a 1-year follow-up) on two sub-dimensions of perfectionistic concerns were associated with slower running times. Thompson et al. did not specify if running times were obtained in training or competition.

Four studies have examined perfectionism-performance relationships in non-competitive athletic/sport settings where performance was typically measured against some sort of self-referenced standard as opposed to performance standards against a competitor. Anshel and Mansouri (2005) examined relationships between various sub-dimensions of perfectionistic strivings/concerns and performance on a balancing task in 30 male undergraduate students. Performance was assessed by the amount of time participants were able to maintain their balance on a stabilometer (stability) device. In a no-feedback condition, sub-dimensions of perfectionistic strivings and perfectionistic concerns were unrelated to balance performance. However, in a false-failure condition where participants were informed that they had performed worse than their previous attempts, heightened scores on subscales measuring perfectionistic strivings and perfectionistic concerns corresponded with reduced performance (i.e., shorter balance times).

Stoll et al. (2008) asked a sample of 122 undergraduate sport-science students to complete four sets of basketball shooting tasks as part of a practical course requirement. Domain/sport-specific perfectionistic strivings were positively correlated with (superior)

shooting performance in three of four trials, whereas perfectionistic concerns were negatively correlated with shooting performance in the only first trial (and only when the overlap with perfectionistic strivings was controlled). In another study, Hill et al. (2011) asked 68 student-athletes to complete three 6-minute muscular endurance cycling time-trials on stationary bikes. The first time-trial was used to establish baseline levels of maximal 'do your best' performance (as measured by distance travelled and average pedal revolutions per minute). The objective for participants in the second and third time-trials was to exceed initial performance levels. Self-referenced false-failure feedback was provided after the second and third trials whereby participants were informed that they had not reached their own previously established performance levels. Hill et al. reported that athletes with high vs. low self-oriented perfectionism—a sub-dimension of perfectionistic strivings—did not differ with respect to performance levels on the cycling trials. Athletes' perfectionistic concerns were not assessed in relation to performance.

Most recently, Roberts et al. (2013) examined the relationship between perfectionism and the yips in golf—where the yips reflect involuntary muscular movements in motor control tasks that seriously impede task execution and performance. A group of 60 yips-affected athletes from the sports of golf, cricket, and darts were matched with 60 non-yips-affected athletes from the same sports. Using logistic regression, Roberts et al. attempted to predict whether or not athletes experienced the yips based on their perfectionism scores. Findings indicated that there was an increased likelihood of being a yips-affected athlete if performers had higher levels of perfectionistic strivings and perfectionistic concerns. Although Roberts et al. did not directly measure performance, it can be inferred from their findings that substandard performance (resulting from the yips) may be more likely if athletes have heightened perfectionistic strivings

and/or heightened perfectionistic concerns.

The aforementioned studies by Thompson et al (2011), Anshel and Mansouri (2005), Stoll et al. (2008), Hill et al. (2008), and Roberts et al. (2013) provide insight into perfectionism-performance relationships in athletic/sport tasks. However, the degree to which the results of these studies can be generalized to situations where athletes actually compete against opponents is limited. Moreover, it is evident from the results of these studies (and from Stoeber et al.'s [2009] study with triathletes) that no clear or consistent pattern of results has emerged. For example, perfectionistic strivings have been positively associated with performance (e.g., Stoeber et al., 2009; Stoll et al., 2008), negatively associated with performance (Anshell & Mansouri, 2005; Roberts et al., 2013), and unrelated to performance (e.g., Hill et al., 2011; Thompson et al., 2011). While no evidence has been obtained to indicate that perfectionistic concerns are associated with enhanced performance in sport/athletic settings, studies have shown that perfectionistic concerns are either negatively associated with performance (e.g., Anshell & Mansouri, 2005; Roberts et al., 2013; Thompson et al., 2011) or unrelated to performance (e.g., Stoeber et al., 2009; Stoll et al., 2008).

The apparent inconsistency of findings across studies that have examined links between perfectionism and performance in sport/athletic settings is likely compounded by the fact that all studies in this area have varied greatly with respect to sample characteristics (e.g., students vs. student-athletes vs. non-student adult athletes), sample size (ranging from 10 to 321), competitive/motivational context (e.g., compete against opponents vs. attainment of self-referenced performance standards), and the type of performance that was evaluated (e.g., running times vs. race times vs. balancing ability vs. shooting performance vs. distance travelled and revolutions per minute). Moreover, efforts to better understand relationships between

perfectionism and performance in sport are likely hindered by the fact that no studies have conceptualized and measured perfectionism in the same way. For example, Stoeber et al. (2009) and Stoll et al. (2008) conceptualized and measured perfectionism as a domain/sport-specific construct, but used different measures of perfectionism for this purpose, whereas Anshel and Mansouri (2005), Hill et al. (2011), Roberts et al. (2013), and Thompson et al. (2011) conceptualized and measured perfectionism as a global/generic construct (and also used different measures of perfectionism).

Numerous researchers have advocated that perfectionism in sport is best conceptualized and measured as a domain-specific construct (see Dunn, Gotwals & Causgrove Dunn, 2005; Dunn et al., 2016; Hill et al., 2016; Stoeber & Madigan, 2016)—something that has not been common practice in research that has investigated the perfectionism-performance relationship in athletes (cf. Anshel & Mansouri, 2005; Hill et al., 2011; Roberts et al., 2013; Thompson et al., 2011). Moreover, Stoeber and Madigan (2016) have proposed that because "perfectionistic strivings and perfectionistic concerns are broad, higher-order dimensions that cannot be fully captured with single indicators" (p. 48), the breadth of the two dimensions is best represented when multiple subscales/indicators are used to measure each dimension (also see Dunn et al., 2016). Examination of existing studies that have investigated the perfectionism-performance relationship in athletes reveals that perfectionistic strivings and/or perfectionistic concerns have frequently been assessed with single subscales from instruments (e.g., Hill et al., 2011; Stoeber et al., 2009; Stoll et al., 2008) which limits the degree to which important aspects of the two higher-order dimensions of perfectionism have been captured. In consideration of these issues, the current study conceptualized and measured perfectionistic strivings and concerns as domain-specific constructs using multiple items/subscales from different instruments to capture the

breadth of each construct.

The specific purpose of this study was to determine if athletes' perfectionistic strivings and perfectionistic concerns were associated with performance in a competitive golf-putting task, where the task required athletes to directly compete against an opponent and where the possibility of failure (i.e., losing to an opponent) existed. A golf-putting task was chosen because a major component of performance (i.e., the distance the golf ball finishes from the target/hole) is easy to measure, and because the basic elements of the putting stroke (i.e., stance, grip, 'short swing', and contact of a stationary ball) are relatively easy skills to execute—albeit difficult to master—for almost any ability level of performer. As noted previously, no clear patterns of results have emerged from previous investigations of perfectionism-performance relationship in sport. Nevertheless, given that perfectionistic strivings have typically been associated with superior individual performance in achievement domains outside of sport (e.g., academe and music: for a review see Stoeber, 2012), and because the high personal performance standards inherent within perfectionistic strivings are thought to "energize action and goal directed [behaviour in athletes]" (Hall, 2016, p. 280), it was tentatively hypothesized that heightened perfectionistic strivings would be associated with better golf-putting performance. In contrast, given that perfectionistic concerns in sport have consistently been associated with a large number of cognitive/affective correlates that would be expected to undermine performance—including heightened fear of failure, heightened competitive anxiety, overly critical self-evaluations of performance, and avoidance goal orientations (see Stoeber, 2011)—it was tentatively hypothesized that heightened perfectionistic concerns would be associated with poorer golf-putting performance.

Method

Participants

A total of 99 (47 male, 52 female) intercollegiate varsity athletes (*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 athletes competed in team sports at the intercollegiate level.

Participation was solicited by the principal investigator at team meetings scheduled throughout the academic year and via the support of the university athletic board—a student-athlete body that had representation across varsity sports at the university. Prospective participants were informed that the study was examining psychological factors associated with performance in competition, and participation would require athletes to compete against a matched-ability opponent in a laboratory-based golf-putting task. Participants were also informed that the winner of each individual head-to-head competition would receive a $5 gift certificate to a local food outlet and that the overall winner of various 'matched-ability brackets' (described below) would further receive a $25 gift certificate to the same food outlet when all data collection episodes for all participants were completed.

Athletes were instructed to sign 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. Fifty three athletes self-identified their golf playing 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 $\leq$ 10). All participants were treated in accordance with the ethical guidelines of the American Psychological Association (APA, 2010).

Task Procedures and Laboratory Description

The putting task required two athletes to simultaneously compete against each other (over two trials each comprising ten putts) in a laboratory that had two green synthetic-carpet putting surfaces covering 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 3.1) that allowed competitors to see each other's putting strokes, but not the final outcome of each putt. On each putting surface, five starting points were marked at distances of 3.2, 3.8, 4.4, 5.0, and 5.6 metres 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 metres 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 'hole' when it came to rest. Participants were informed that the winner of the competition would be determined by which athlete achieved the smallest cumulative straight-line distance from the centre of the hole across the two trials.[2]

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 opponents were 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 3.1) 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 (see Plate 3.1) and asked to take two practice putts from

[2] 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 goal in golf.

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 their first trial, putting from the same series of starting points specified by the researchers (see Plate 3.2). The distance that each putt finished from the center of the target was measured (see Plate 3.3) and subsequently recorded in a computer by the researcher. Each ball was removed from the putting surface before the next putt was taken.

After completing the first trial, participants saw the 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 false-failure feedback was included in the study to strengthen the deception that participants were engaged in a 'real' competitive task, and to change the degree of perceived threat/stress that the participants experienced in the second trial (where the success of the manipulation would be evident if participants experienced elevated stress levels following the false-failure feedback). 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 that was placed at the front of the laboratory where both competitors could see the two scores during the second trial (see Figure 3.1). 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 second trial.

Upon completion of the second set of ten putts, 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. Following recommendations of Stoeber and Madigan (2016), perfectionistic strivings was measured with the seven items from the *Personal Standards* (PS) subscale of the Sport-MPS-2 and five items from the *Striving for Perfection* (SP) subscale of the MIPS. Perfectionistic concerns was measured by the eight items from the *Concern over Mistakes* (COM) subscale of the Sport-MPS-2 and five items from the *Negative Reactions to Imperfection* (NRI) subscale of the MIPS. Respondents rated items on a 5-point scale (1 = *strongly disagree*; 5 = *strongly agree*), with higher composite subscale scores reflecting higher levels of perfectionistic strivings and perfectionistic concerns in sport. These items/subscales have been used successfully to measure athletes' perfectionistic strivings and perfectionistic concerns in previous research (e.g.,

Rasquinha, Dunn, & Causgrove Dunn, 2014; Stoeber, Stoll, Salmi, & Tiikkaja, 2009).

Pre-performance cognitions/perceptions. To determine if the contrived golf-putting competition and false-failure feedback had induced competitive stress, 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 and all are recognized as having potential to impact athletic performance (see Raab et al., 2016). The three constructs were measured by single-item indicators using the same item 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*] to 11 [*very worried*]), optimism ("Right now I am feeling…" 1 [*not at all optimistic*] to 11 [*very optimistic*]), and perceived threat ("Right now I find this situation…" 1 [*not at all threatening*] to 11 [*very threatening*]). The MRF and corresponding item format have been successfully used in a number of studies examining state anxiety in athletes (e.g., Cox, Russell, & Robb, 1999; Duncan et al., 2016; Moore, Vine, Freeman, & Wilson, 2013) and are recommended for use when "expediency is an important concern" for both the researcher and participant (Krane, 1994, p. 189).

Performance. Putting performance was assessed by the cumulative straight-line distance that the putts in each trial deviated from the centre of the target ('hole'). Measurements for each putt were taken to the nearest millimetre using a laser measuring device (Bosch GLM 15; see Plate 3.4). Lower distances were indicative of better (i.e., more accurate) putting performance.

Results

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%). 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 very 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 all remaining analyses. Table 3.1 contains the descriptive statistics (i.e., means, standard deviations, and bivariate correlations [r]) for all variables in the final sample ($n = 94$).

Manipulation check. To determine if the provision of the false-failure feedback after the first trial created a more stressful competitive experience—evidence of which would support our contention that athletes experienced the laboratory task as an authentic competition—a repeated-measures MANOVA was conducted to examine differences in pre-task cognitive anxiety, state optimism, and perceived threat between Trial 1 (i.e., prior to the first ten putts) and Trial 2 (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, $p < .001$). As seen in Table 3.1, participants reported higher cognitive anxiety, lower state optimism, and higher perceived threat following the false-failure feedback. 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 experienced the putting task as a 'real' competitive event.

Predicting Putting Performance

A hierarchical regression analysis was conducted upon the data for each trial to determine if perfectionistic strivings and concerns predicted golf putting performance (where higher average putting distances were indicative of poorer performance). Gender and ability were significantly correlated with performance in both trials (see Table 3.1), therefore it was deemed necessary to control for the influence of these variables by entering them in the first step of each regression analysis (cf. Stoeber et al., 2009). Similarly, given the potential for cognitive anxiety, state optimism, and perceived threat to influence performance (see Skinner & Brewer, 2004), the three cognitive variables were entered in the second step of each analysis. Perfectionistic strivings and concerns were entered together in the final step of each analysis.

Prior to conducting the regression analyses, data were screened for the presence of univariate and multivariate outliers. Standardized z-scores were computed for all variables contained in the regression analyses. 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 Stephens' (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., ≤ .061) for each regression analysis, 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 analyses. No multivariate outliers were found (i.e., all individuals had a Mahalanobis distance < $\chi^2[12]_{\text{critical}} = 32.91$, $p < .001$). No concerns regarding multicollinearity were identified (see Tabachnick & Fidell, 1996) given that all bivariate correlations among predictor variables in each analysis were ≤ |.68| and all Variance Inflation Factors were ≤ 2.001. All Cook's distances in each analysis were ≤ 0.061, indicating that removal of any individual case would not have a major influence on the regression results.

The results of the two regression analyses are contained in Table 3.2. Gender was not a significant predictor of performance in either trial. However, golf ability was a significant predictor of performance in Trial 1 (β = -.24) and Trial 2 (β = -.47). These negative regression coefficients indicate that higher golf ability corresponded with better performance. None of the cognitive variables (i.e., cognitive anxiety, state optimism, and perceived threat) significantly predicted performance in either trial. Perfectionistic concerns did not significantly predict performance in either trial, whereas perfectionistic strivings significantly predicted performance in Trial 1 (β = -.24) and Trial 2 (β = -.22). These negative regression coefficients indicate that higher perfectionistic strivings (after controlling for the other variables) corresponded with better performance in both trials.

Discussion

The purpose of this study was to determine if athletes' perfectionistic strivings and perfectionistic concerns in sport were associated with performance in a competitive golf-putting task. Bivariate correlations (see Table 3.1) and standardized regression coefficients (see Table

3.2) revealed that heightened perfectionistic strivings were associated with better performance in both trials, whereas perfectionistic concerns were unrelated to performance. These results closely mirror the findings of Stoeber et al. (2009) in the only study from the extant literature that has previously examined relationships between perfectionistic strivings, perfectionistic concerns, and performance in a competitive sport setting. Stoeber et al. reported that higher personal standards (a sub-dimension of perfectionistic strivings) was significantly associated with better race performance (i.e., lower race times) in two independent samples of adult triathlon competitors. Consistent with the results of the current study, Stoeber et al. also found that concern over mistakes (a sub-dimension of perfectionistic concerns) was unrelated to performance.

Taken together, the results of the current study and Stoeber et al.'s (2009) study indicate that heightened perfectionistic strivings may be associated with superior performance in competitive sport settings in the same way that heightened perfectionistic strivings have been associated with superior performance in achievement settings beyond the domain of competitive sport (see Stoeber, 2012). Why might higher perfectionistic strivings in sport be associated with better performance in competition? As noted by Stoeber (2012), it is possible there is a strong motivational component underlying perfectionistic strivings "that give individuals an extra 'boost' to do their best, make an additional effort, and achieve the best possible results" (p. 301). It also seems reasonable to speculate that the desire to set and strive towards the accomplishment of high personal performance standards may create a mindset that enhances the ability or desire of performers to maintain concentration and direct necessary task-relevant focus towards the task at hand. Support for this contention may be seen in the results of a study conducted by Gotwals, Dunn, Causgrove Dunn, and Gamache (2010) with intercollegiate ice hockey players where a significant positive canonical correlation was found between a canonical variate resembling

healthy/adaptive perfectionism—i.e., high perfectionistic strivings combined with low perfectionistic concerns—and a canonical variate defined by a strong tendency to remain focussed during competition. As proposed by Gotwals et al. (p. 430):

> Given that the ability to concentrate (or not lose concentration) clearly serves an adaptive function in sport…it is possible that healthy perfectionistic athletes [i.e., those with high strivings and low concerns] are better able to stay focussed on the task-at-hand because they are not distracted by the self-doubts or evaluative concerns that so often plague unhealthy perfectionists [i.e., those with high strivings and high concerns].

This argument not only supports the position that heighted perfectionistic strivings may enhance the ability/motivation of athletes to focus on the task at hand—which in turn may enhance their ability to perform—but also supports the position of Stoeber (2012) who posited that "perfectionistic strivings may form part of a healthy pursuit of excellence…[but] this may only be the case when perfectionistic strivings are not accompanied by elevated levels of perfectionistic concerns" (p. 301). Attention is brought to Stoeber's statement because the regression coefficients obtained in the current study capture relationships between athletes' perfectionistic strivings and putting performance (see Table 3.2) after controlling for perfectionistic concerns. In other words, the regression coefficients provide information about the independent relationship between perfectionistic strivings and putting performance after controlling for perfectionistic concerns (and gender, ability, and stress levels). Of course, the same logic applies to the non-significant regression coefficients that capture the relationships between perfectionistic concerns and putting performance. Thus, in the context of the current regression results, it may be more appropriate to refer to the perfectionistic strivings variable as "pure" perfectionistic strivings (see Jowett et al., 2016, p. 87) or "residual" perfectionistic

strivings (see Stoeber & Gaudreau, 2017, p. 380) because the overlap or shared variance that perfectionistic strivings have with perfectionistic concerns (r = .41: see Table 3.1) has been controlled/removed. Regardless of the label employed, higher perfectionistic strivings corresponded to superior putting performance (see Table 3.1 and Table 3.2) in the two trials, whereas perfectionistic concerns was unrelated to performance in both trials.

As noted above, the regression results were similar for the two trials that systematically differed in terms of athletes' average stress levels. The fact that self-reported stress levels differed in the two trials is important for two reasons. Most importantly, the primary intention for using the false-failure feedback after the first trial was to enable the researcher to determine if participants reacted in a manner that would indicate the laboratory task was perceived as a 'real' competitive event. The fact that the athletes reported significantly higher cognitive anxiety, lower state optimism, and higher perceived threat after receiving the false-failure feedback indicates that participants appeared to have experienced the task as a real competitive event where the possibility of losing was magnified after the first trial. However, the false-failure feedback manipulation also presented an opportunity to explore the relationships between perfectionistic strivings, perfectionistic concerns, and putting performance under different conditions of stress: namely, a lower stress condition (Trial 1) and a higher stress condition (Trial 2). As seen in Table 3.1, the size and direction of the bivariate correlations between perfectionistic strivings and putting performance were almost identical in Trial 1 (r = -.30) and Trial 2 (r = -.29); this was also the case for the bivariate correlations between perfectionistic concerns and putting performance in Trial 1 (r = -.11) and Trial 2 (r = -.12). On the basis of these results, it appears that the relationships between perfectionistic strivings, perfectionistic concerns, and golf-putting performance were similar in the two trials regardless of the apparent

differences in stress that existed prior to each trial.

Understanding why perfectionistic concerns were unrelated to performance in both trials is difficult to ascertain. Although research has found little or no association between perfectionistic concerns and performance in sport (see Stoeber et al., 2009; Stoll et al., 2008), it has been tentatively hypothesized that heightened perfectionistic concerns would be associated with decreased performance because (a) perfectionistic concerns in sport are built upon self-critical evaluation, fear of failure, and negative reactions to imperfection, and (b) when failure is experienced or perceived (as was the case following the false-failure feedback), "any form of perfectionism which encompasses tendencies for self-critical appraisal [i.e., heightened perfectionistic concerns] may negatively affect" athletic performance (Hall, 2016, p. 280). Although the false-failure feedback sent a message to participants that they were failing in terms of beating their opponent, it is possible that the task and feedback did not elicit sufficient stress that might have caused athletes with higher perfectionistic concerns to engage in overly critical self-evaluations (which, in turn, could impede task-relevant focus and performance). Alternatively, participants may have been content with their own self-referenced performance levels which may also have negated any tendency to engage in self-critical evaluation. Clearly more research is required to identify if, how, and when variations in athletes' perfectionistic concerns may be associated with performance under differing conditions of competitive stress.

Although the current study sheds light upon the relationships between perfectionistic strivings, perfectionistic concerns, and performance in a competitive setting, the study contains a number of limitations. For example, despite every effort to create the 'illusion' of a competitive task, the study lacks ecological validity in that participants were not actually engaged in a real-world sport competition (cf. Stoeber et al., 2009). This limits the degree to which results may be

generalized to ‘real-world’ sport competitions where athletes compete in their primary sport and where it is likely that achieving success or avoiding failure in competition would be more heavily valued than if athletes won or lost a laboratory-based golf-putting task. Given that 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 potentially mediate relationships between athletes’ perfectionistic strivings, perfectionistic concerns, and performance in sport.

Another potential limitation of this study revolves around the fact that the researcher cannot determine if any form of self-selection bias existed within the sample. More specifically, it is not possible to determine if athletes with lower levels of perfectionistic concerns 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 could be restricted which could attenuate or obfuscate possible relationships between perfectionistic concerns and performance. That being said, the means and standard deviations for perfectionistic strivings and perfectionistic concerns obtained in this study (see Table 3.1) are similar to those reported in a previously published study with intercollegiate varsity athletes who completed the same measure of domain-specific perfectionism that was used in this study (see Rasquinha et al., 2014).

Finally, the use of a variable-oriented correlational approach to investigate relationships between perfectionistic strivings, perfectionistic concerns, and performance limits the researcher’s ability to make inferences about how different types of perfectionistic individuals (e.g., healthy/adaptive vs. unhealthy/maladaptive perfectionists: see Stoeber & Otto, 2006) may

perform in competition. In other words, this study does not provide information on whether athletes with different patterns/profiles of perfectionistic strivings and concerns (see Dunn, Causgrove Dunn, Gamache, & Holt, 2014; Lizmore, Dunn, & Causgrove Dunn, 2016) might differ in terms of their performance. To this end, future research may benefit from adopting a person-oriented approach to studying perfectionism and performance in competitive sport.

Despite the aforementioned limitations, the current study provides valuable information about relationships between perfectionism and performance in sport. To the best of the researcher's knowledge, this study is also the first of its kind to assess the perfectionism-performance relationship in athletes using a domain-specific measure of perfectionism with multiple indicators (subscales) of perfectionistic strivings and perfectionistic concerns in sport. In doing so, this study more fully captures the breadth of these higher-order dimensions (see Stoeber & Madigan, 2016) than has been accomplished in previous research investigating the perfectionism-performance relationship in sport settings (e.g., Stoeber et al., 2009; Stoll et al., 2008). Although there is little, if any, evidence in the literature indicating that higher perfectionistic concerns correspond with enhanced performance in sport/athletic tasks, the results do indicate that there may be performance benefits associated with heightened perfectionistic strivings in competitive sport (Stoeber, 2012; Stoeber et al., 2009; Stoll et al., 2008).

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Table 3.1

Means, Standard Deviations, and Bivariate Correlations for all Variables

	Demographics		Perfectionism		Trial 1				Trial 2			
	Gender	Ability	Strivings [a]	Concerns [a]	CAnx.1[b]	Opt.1[b]	Thrt.1[b]	Putt.1	CAnx.2[b]	Opt.2[b]	Thrt.2[b]	Putt.2
Ability	-.37***	-										
Strivings	-.21*	.15	-									
Concerns	-.07	.11	.41***	-								
CAnx.1	.12	-.24*	.06	.15	-							
Opt.1	-.33***	.27**	.09	-.18	-.34***	-						
Thrt.1	.22*	-.17	-.01	.19	.68***	-.31**	-					
Putt.1	.27**	-.30**	-.30**	-.11	.17	-.24*	.11	-				
CAnx.2	.07	-.04	.07	.20	.50***	-.04	.47***	-.08	-			
Opt.2	-.31**	.24*	.12	-.24*	-.13	.71***	-.21*	-.19	-.14	-		
Thrt.2	.19	-.14	-.01	.16	.64***	-.14	.71***	.00	.61***	-.16	-	
Putt.2	.33**	-.52***	-.29**	-.12	.17	-.24*	.18	.59***	-.08	-.16	.03	-
Mean	-	-	3.61	2.93	4.56	6.52	3.19	73.23	5.18	5.85	3.84	59.00
(*SD*)	-	-	(0.52)	(0.59)	(2.39)	(2.19)	(2.24)	(33.90)	(2.33)	(2.24)	(2.41)	(25.48)

Note. Correlations (*r*) are in the lower triangular matrix. Variable abbreviations: Ability = Golf ability; Strivings = Perfectionistic strivings; Concerns = Perfectionistic concerns; CAnx.1 = Cognitive anxiety trial 1; Opt.1 = Optimism trial 1; Thrt.1 = Perceived threat trial 1; Putt.1 = Mean distance from target per putt (cm) trial 1; CAnx.2 = Cognitive anxiety trial 2; Opt.2 = Optimism trial 2; Thrt.2 = Perceived threat trial 2; Putt.2 = Mean distance from target per putt (cm) trial 2. Numerical coding for gender: 1 = male, 2 = female. Numerical coding for golf ability: 1 = novice, 2 = low, 3 = moderate, 4 = high.

[a] Items measured on 5-point scale. [b] Items measures on 11-point scale.

* $p < .05$. ** $p < .01$. *** $p < .001$. ($N = 94$).

Table 3.2

Summary of Contributions of Each Independent Variable Entered at Each Step in Hierarchical Regression Analyses Predicting Golf-Putting Performance

Predictor variable		R^2	ΔR^2	ΔF	β	*t*
			Putting performance in Trial 1			
Step 1		.12	.12	6.28**		
	Gender				.18	1.74
	Golf ability				-.24	-2.24*
Step 2		.15	.02	.84		
	Gender				.16	1.45
	Golf ability				-.20	-1.81
	Cognitive anxiety				.12	.88
	Optimism				-.12	-1.11
	Perceived threat				-.08	-.60
Step 3		.20	.06	3.11*		
	Gender				.12	1.08
	Golf ability				-.17	-1.59
	Cognitive anxiety				.16	1.16
	Optimism				-.12	-1.04
	Perceived threat				-.09	-.67
	Perf. concerns				-.01	-.10
	Perf. Strivings				-.24	-2.23*
			Putting performance in Trial 2			
Step 1		.30	.30	19.05***		
	Gender				.16	1.66
	Golf ability				-.47	-4.93***
Step 2		.30	.01	.23		
	Gender				.17	1.66
	Golf ability				-.46	-4.71***
	Cognitive anxiety				-.05	-.42
	Optimism				-.01	-.08
	Perceived threat				-.04	-.31

Step 3		.34	.04	2.50*		
	Gender				.14	1.36
	Golf ability				-.46	-4.69***
	Cognitive anxiety				-.03	-.28
	Optimism				.02	.22
	Perceived threat				-.05	-.39
	Perf. concerns				.05	.50
	Perf. Strivings				-.22	-2.18*

Note. Numerical coding for gender: 1 = male, 2 = female. Numerical coding for golf ability: 1 = novice, 2 = low, 3 = moderate, 4 = high. Perf. concerns = Perfectionistic concerns; Perf. strivings = Perfectionistic strivings.

* $p < .05$. ** $p < .01$. *** $p < .001$. ($N = 94$)

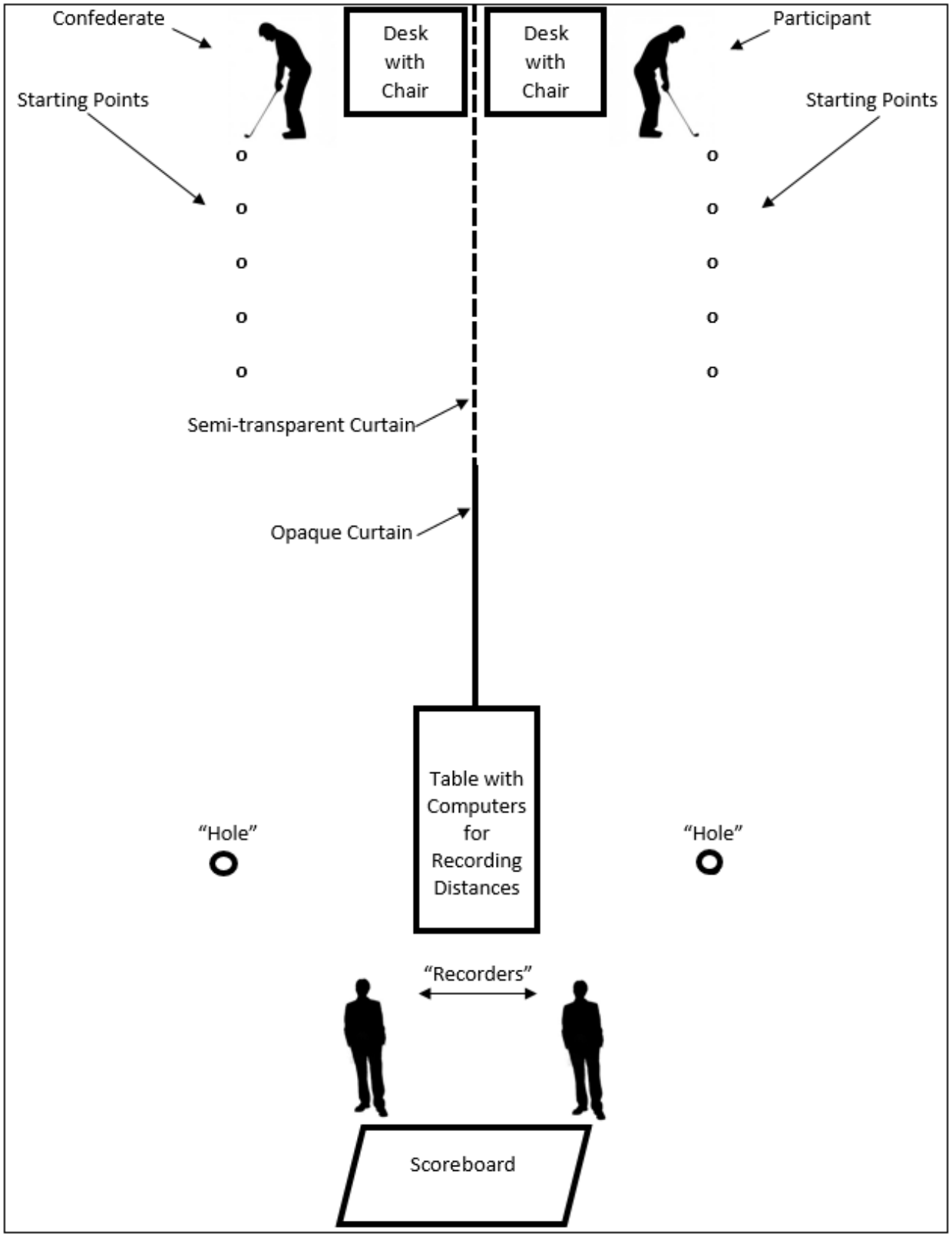

Figure 3.1. Graphical representation (not to scale) of laboratory set-up.

Plate 3.1: Putter used by participant.

Plate 3.2: Putting and data collection area.

Plate 3.3: Researcher and “participant”

Plate 3.4: Measurement device and ball.

CHAPTER 4

Study 3

Assessing the Impact of a Mental-Training Intervention on Athletes' Perfectionistic Concerns in Sport

It has been proposed in the sport psychology literature that "the best…and most successful athletes have one characteristic in common: they failed often, using their failure to learn, improve, and eventually achieve at the highest level" (Anshel, 2016, p. x). Failure in sport—defined as any process or outcome in the sporting domain that is deemed by an individual to fall short of a desired and attainable result—is often seen as being "inevitable in an imperfect world…essential to succeeding and performing at the highest level…[and] part of the process of growing" (Anshel, 2016, p. ix). Failure, in and of itself, does not necessarily lead to personal growth or athletic success. Rather, growth and success are likely predicated upon an individual's (or organisation's) ability and willingness to adopt a positive mindset towards failure whereby the failure experience is used as a learning opportunity that helps the performer move towards the accomplishment of a desired goal (see Edmondson, 2011; Sarkar, Fletcher, & Brown, 2015).

'Mindset' is a term used to represent a collection of "ideas and attitudes with which a person approaches a situation, especially when these [situations] are seen as being difficult to alter" (Collins English Dictionary). This collection of beliefs and attitudes can shape a person's reality and ultimately determine the types of cognitive, emotional, and behavioural responses an individual employs when confronted with challenging or stressful situations (McGonigal, 2015). Having a positive mindset towards failure has been identified as an important component of psychological resilience among athletes (Fletcher & Sarkar, 2012); conversely, having a negative mindset towards failure—where failure is viewed by the performer as an unacceptable and/or ego-threatening event that is to be avoided at almost any cost—has been linked with numerous dysfunctional/maladaptive personal, interpersonal, and performance consequences for athletes including heightened burnout (Madigan, Stoeber, & Passfield, 2015), reduced perceptions of social acceptance (Ommundsen, Roberts, Lemyre, & Miller, 2005), and substandard performance (Seligman, Nolen-Hoeksema, Thornton, & Thornton, 1990). Helping athletes to

develop a positive mindset towards failure that enables them to respond to failure in an adaptive or functional manner has been recognized as an important objective for sport psychology practitioners (see Anshel, 2016; Lizmore, Dunn, & Causgrove Dunn, 2016).

Adopting a positive mindset towards failure—where failure, personal mistakes, or setbacks are viewed as acceptable (Hamachek, 1978) and even essential (Sarkar et al., 2015) aspects of performance and growth—is particularly relevant to athletes involved in specialized developmental competitive youth sport programs where the pursuit of excellence and competitive success often become explicit goals for participants and service providers alike (Sport for Life Society, 2016). One potential way to help athletes adopt a positive mindset towards failure, mistakes, and setbacks is to create brief theory-driven and evidence-based psychological/mental-training interventions that can be delivered by sport practitioners (i.e., sport psychologists, mental performance consultants, and coaches) to athletes (Harmison & Casto, 2012). McGonigal (2015) argued that even "a single brief [mindset] intervention, designed to change how [individuals] think about something, can improve…health, happiness, and success, even years into the future" (p. 4). Thus, creating and delivering mental-training programs that are specifically designed to provide athletes with the psychological tools that can enhance their ability to interpret and respond to failure in adaptive or functional ways may benefit athletes as they pursue their personal goals in competitive sport.

One individual-difference variable that appears to be closely linked to the mindset that athletes adopt towards failure in sport is perfectionism. Perfectionism is a multidimensional achievement-motivation disposition that is comprised of two higher-order dimensions labelled *perfectionistic strivings* and *perfectionistic concerns* (Stoeber, 2012; Stoeber & Otto, 2006). In the context of sport, perfectionistic strivings reflect the tendency of athletes to set and strive for extremely high standards of personal performance (Stoeber, 2011). In contrast, perfectionistic

concerns reflect the tendency of athletes to be concerned about making mistakes, to fear the negative social evaluation of others should mistakes occur, to doubt the adequacy of their personal readiness or preparation, to react negatively to imperfection, and to perceive pressure to live up to the high performance standards set by the self or by others (Dunn et al., 2016; Stoeber, 2011, 2012).

Research indicates that heightened perfectionistic strivings in sport are occasionally associated with maladaptive correlates, but when the overlap with perfectionistic concerns is controlled, heightened perfectionistic strivings are more typically associated with adaptive correlates in sport (for recent reviews see Gotwals, Stoeber, Dunn, & Stoll, 2012; Jowett, Mallinson, & Hill, 2016). In contrast, heightened perfectionistic concerns are usually associated with maladaptive psychological, affective, and/or behavioural correlates in sport (or negatively associated with adaptive correlates: see Jowett et al., 2016), and in the context of personal failure have been linked with reduced confidence/optimism (Lizmore et al., 2016), heightened anger/dejection (Lizmore et al., 2016), reduced self-compassion (Lizmore, Dunn, & Causgrove Dunn, 2017 [Study 1]), heightened pessimism and rumination (Lizmore et al., 2017), heightened use of avoidance coping strategies (Dunn, Causgrove Dunn, Gamache, & Holt, 2014), heightened negative affect (Sagar & Stoeber, 2009), heightened self-criticism and embarrassment (Gotwals & Spencer-Cavaliere, 2014), and an inability to remove thoughts and/or mental images of mistakes from consciousness during competition (Frost & Henderson, 1991). Accordingly, programs or interventions aimed at reducing athletes' perfectionistic concerns in sport have been advocated (see Gotwals et al., 2012).

A number of studies in the clinical psychology literature have employed interventions that focus on reducing both perfectionistic strivings and perfectionistic concerns (e.g., Egan & Hine, 2008; Riley, Lee, Cooper, Fairburn, & Shafran, 2007). Such studies often involve

cognitive-behavioural interventions that are framed within clinical models of perfectionism (Shafran, Cooper, & Fairburn, 2002) where the prevailing view among researchers is that reductions in perfectionistic strivings and/or concerns will serve an adaptive function (for a recent review see Lloyd, Schmidt, Khondoker, & Tchanturia, 2015). Although many of these studies have been effective in reducing perfectionistic strivings and perfectionistic concerns among individuals who have clinical diagnoses (see Lloyd et al., 2015), it should be noted that a number of researchers who study perfectionism in sport have proposed that heightened perfectionistic strivings—especially when their overlap with perfectionistic concerns is controlled—can have adaptive or beneficial effects for performers in achievement settings (e.g., Gotwals et al., 2012; Jowett et al., 2016; Stoeber, 2011, 2012).[1]

Despite the success of certain intervention studies to reduce perfectionistic concerns in clinical and general psychology settings (see Lloyd et al., 2015), there is a notable absence of research that has "investigated the effectiveness of programs and techniques in reducing perfectionistic concerns *in athletes* [emphasis added]" (Stoeber, 2011, p. 139). Indeed, to date, no studies in the applied sport psychology literature have specifically sought to reduce athletes' perfectionistic concerns in sport, although a few studies have presented changes in athletes' perfectionistic concerns as 'peripheral' or 'secondary' evidence supporting the beneficial impact of mental-training programs (see De Petrillo, Kaufman, Glass, & Arnkoff, 2009; Kaufman, Glass, & Arnkoff, 2009; Mosewich, Crocker, Kowalski, & DeLongis, 2013).

In consideration of research evidence that shows positive relationships between athletes' perfectionistic concerns and maladaptive responses in sport, Gotwals et al. (2012) recommended that mental-training interventions designed to influence athletes' perfectionism in sport "should

[1] There are other intervention studies that have targeted perfectionism in non-clinical contexts (e.g., Pleva & Wade, 2007; Kearns, Forbes, & Gardiner, 2007). The majority of these studies either conceptualize perfectionism as a unidimensional construct or involve interventions that target the reduction of both perfectionistic strivings and perfectionistic concerns.

primarily focus on reducing levels of perfectionistic concerns" (p. 275) as opposed to reducing perfectionistic strivings. Similarly, Sellars, Evans, and Thomas (2016) more recently suggested that athletes with very high perfectionistic concerns could "benefit from education and training in specific skills or techniques that could be used…to reduce facets of perfectionism [that correspond with perfectionistic concerns]" (p. 228).

Given the absence of intervention studies that have explicitly sought to reduce athletes' perfectionistic concerns in sport, and considering the central role that perfectionism plays in the cognitive, affective, and behavioural functioning of athletes in sport (see Hill, Appleton, & Hall, 2014), the overarching purpose of this study was to assess the impact that a brief mental-training intervention had upon athletes' perfectionistic concerns in sport. The content of the intervention was based upon the tenets of perfectionism theory and focussed on the adoption of a positive mindset towards failure in sport. A corresponding purpose of the study was to explore if/how athletes applied the lessons from the intervention to reinforce and/or change their perceptions of and reactions to performance failure in sport.

To assess the impact of the mental-training intervention on athletes' perfectionistic concerns (and strivings), measures of perfectionism were taken at multiple time points throughout the study. In doing so, the study addresses an important gap in the extant literature where a notable absence of longitudinal research on perfectionism in sport and non-sport settings exists (Stoeber, 2018). Very little is known about the degree to which perfectionism levels in athletes change (or remain stable) over time; this lack of research prompted Hill (2016, p. 24) to propose that "more research…ideally of a longitudinal or experimental nature, in real-world and meaningful contexts, is needed" (also see Stoeber, 2014). Hall (2016) echoed Hill's sentiments, stating that a greater understanding of perfectionism in sport will likely be attained when researchers employ "longitudinal designs conducted in ecologically valid contexts" (p. 290). To

this end, the current study not only provides a longitudinal assessment of perfectionism in sport (albeit over a relatively short 12-week period), but is also conducted in an ecologically valid 'real-world' setting where athletes were part of a specialized developmental sport system in which athletes' efforts were largely focussed upon mastering performance and achieving competitive success.

Flett and Hewitt (2014) recommend that interventions designed to influence (i.e., reduce) individuals' perfectionistic tendencies "must be tailored to address the *cognitive and emotion regulation vulnerabilities* of perfectionists and their *meta-cognitive beliefs about ability, the self, and the meaning of failure*…with specific components designed to *enhance resilience* and reduce levels of risk" (emphases added; p. 899). Although Flett and Hewitt's recommendations were primarily situated within a clinical psychology context where interventions are employed with 'vulnerable' perfectionists who already have extremely high (and debilitating) levels of perfectionism, the underlying principles of these recommendations appear to be relevant when applied to athletes regardless of their actual levels of perfectionistic concerns. As such, the intervention contained elements that focussed largely upon (a) cognitive/emotional correlates of perfectionistic concerns, (b) athletes' beliefs about ability, the self, and failure in sport, and (c) cognitive/perceptual strategies that have been associated with reduced perfectionistic concerns and enhanced resilience in sport (see Lizmore et al., 2017 [Study 1]).

The mental-training intervention primarily focussed athletes' attention upon the benefits of adopting a positive mindset towards failure, mistakes, and setbacks in sport while also educating athletes about the potential dangers of adopting a negative mindset towards failure. In other words, the intervention was designed to reduce athletes' perfectionistic concerns by developing a positive or more accepting view of failure because such a perspective is largely incompatible with high perfectionistic concerns (see Flett & Hewitt, 2016; Hamachek, 1978). To

this end, the content of the intervention was largely focused upon cognitive (i.e., positive) reappraisals of failure (see Flett & Hewitt, 2014; Jones, 2012), the use of self-compassion following failure (see Leary, Tate, Adams, Batts Allen, & Hancock, 2007; Mosewich et al., 2013), the elimination of unproductive rumination following failure (see Mosewich et al., 2013), and the adoption of optimistic (as opposed to pessimistic) thinking following failure (see Anshel, 2016; Lizmore et al., 2016, 2017 [Study 1]). As such, each element of the intervention was built around constructs (or strategies) that have been negatively associated with perfectionistic concerns in the extant literature.

To examine the impact of the intervention on athletes' perfectionism levels and to explore athletes' experiences with the intervention, a parallel mixed-methods design was employed (see Creswell & Plano Clark, 2011). Quantitative data were collected at various time points to answer the question: "To what degree (if at all) do athletes' perfectionistic concerns (and strivings) in sport change over the duration of the study?" Qualitative data were also collected from athletes at various time points throughout the study as a means of social validation to answer the questions: "In what ways (if at all) do athletes apply lessons from the mental-training intervention toward their own experiences in sport?" and "How (if at all) do athletes' mindsets towards failure, mistakes, and/or setbacks change (or become reinforced) as a result of participating in the intervention?"

Method

Participants

Sixteen adolescent athletes from four intact four-person curling teams (two all-female and two all-male teams) were purposively sampled from a specialized youth sport development program. Athletes ranged in age from 15 to 18 years and had an average of 4.88 years (*SD* = 2.30) of competitive involvement in the sport of curling. All athletes were deemed to be at a

point of development that closely aligned with (a) the "investment years" phase of Côté's (1999) developmental model of sport participation, and (b) the "Train-to-Compete" stage of Canada Sport For Life's Long Term Athlete Development (LTAD) model (Sport for Life Society, 2016). The investment years mark a point in athletes' sport careers where a heightened emphasis is placed upon the development of high skill proficiency for the purpose of achieving competitive success. The investment years (typically starting around age 15) represent a period when athletes predominately focus on a single sport and where a change in the focus of sport participation occurs such that "play activities are…replaced with…intense [deliberate] practice" (Côté, 1999, p. 408) for the purpose of improving athletes' skills for competition (Côté & Vierimaa, 2014). All participants had committed to curling as their primary sport and were required to engage in approximately 6-8 hours of deliberate practice on and off the ice each week (excluding competition) as part of their involvement in the program.

Study design. The research took the form of a longitudinal quasi-experimental study that is best described as a 'single-baseline across wait-listed/staggered-groups design' (see De Petrillo et al., 2009). The study also incorporated features from single-case research designs that have been previously used (e.g., Harwood, Barker, & Anderson, 2015) and/or recommended (see Barker, McCarthy, Jones, & Moran, 2011) in the sport psychology literature. Players, coaches, and parents were contacted by a program coach and informed consent (from athletes and their parents) was obtained in accordance with the ethical guidelines set forth by the American Psychological Association. Weekly meeting times were scheduled with each team. At the start of the competitive season, one male team and one female team were randomly assigned to an Experimental Condition (EC) and the two remaining teams were randomly assigned to a Wait-Listed Condition (W-LC).

In the first week of the study—one week prior to the start of the competitive season

(Time 1)—all teams completed a demographic questionnaire and a self-report measure of perfectionism that assessed perfectionistic strivings and perfectionistic concerns in sport (see Measures section). One week later, the two EC teams participated in the first of three 45-60 minute mental-training sessions. The mental-training sessions were conducted separately with each team by the principal investigator (PI) in a classroom at the training facility on a weekly basis for three consecutive weeks. The head coach of each team was present at each session.

During the same 3-week period when the two EC teams received the mental-training sessions, the PI delivered weekly 45-60 minute 'placebo sessions' to the two W-LC teams. The placebo sessions focussed solely upon tactical/strategic game-play decision making in curling. One week after all teams had completed the three mental-training or placebo sessions, all 16 athletes completed the perfectionism measure for a second time (Time 2) and a short open-ended social-validation questionnaire (see Measures section) that asked participants to reflect upon their experiences/lessons from the sessions they attended during the preceding 3-week period.

Three weeks later, the conditions were reversed whereby the two EC teams were given the placebo (i.e., tactical/strategic decision-making sessions) over a 3-week period and the two W-LC teams were given the three mental-training sessions.[2] One week after completing the second 3-week block of sessions, all 16 athletes completed the perfectionism measure for the third time and the social validation questionnaire for the second time (Time 3). Two weeks following the administration of these measures, the athletes completed the perfectionism measure for a fourth and final time (Time 4) and were invited to participate in interviews about their experiences with the mental-training sessions. Thirteen of the 16 athletes participated in the interviews.

[2] The extended period between Time 2 and Time 3 was implemented for pragmatic reasons surrounding athlete and researcher availability in addition to providing athletes from both groups with more opportunities to apply lessons from the first intervention period into their own weekly practices and game-play.

All data collection that involved the administration of the demographic questionnaire, the perfectionism measure, the social validation questionnaire, and the semi-structured interviews were conducted by a trained research assistant (RA) who had no other involvement in the study. The RA had a Master's degree in Coaching (MCoach) with a specialization in sport psychology. All interviews were conducted by the RA within a 3-week period following the fourth administration of the perfectionism measure. Figure 4.1 (see Results section) provides a visual summary of the timings that correspond with the four administration periods (i.e., T1, T2, T3, T4) of the perfectionism measure and the delivery periods of the mental-training sessions.

Measures

Demographic questionnaire. A demographic questionnaire was provided to each athlete. The questionnaire asked participants to provide information about their age, gender, playing experience, and past involvement with their respective teams.

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 measure participants' perfectionistic strivings and perfectionistic concerns in sport. In accordance with previous research (e.g., Lizmore et al., 2017 [Study 1]; Rasquinha, Dunn, & Causgrove Dunn, 2014; Stoeber, Otto, Peschek, Becker, & Stoll, 2007; Stoeber, Stoll, Salmi, & Tiikkaja, 2009), perfectionistic strivings were measured by 12 items—seven from the *Personal Standards* (PS) subscale of the Sport-MPS-2 and five from the *Striving for Perfection* (SP) subscale of the MIPS. Perfectionistic concerns were measured by 13 items—eight from the *Concern over Mistakes* (COM) subscale of the Sport-MPS-2 and five from the *Negative Reactions to Imperfection* (NRI) subscale of the MIPS. Respondents rated items on a 5-point scale (1 = *strongly disagree*; 5 = *strongly agree*) with higher composite scores reflecting higher

levels of perfectionism on each dimension. Validity and reliability evidence supporting the use of these items/subscales as composite measures of perfectionistic strivings and perfectionistic concerns in sport has been provided in the sport psychology literature (e.g., Dunn et al., 2016; Lizmore et al., 2017 [Study 1]; Rasquinha et al., 2014).

Social validation questionnaire and interview. A social validation questionnaire (see Page & Thelwell, 2013) and a social validation interview guide (see Maykut & Morehouse, 1994) were developed to assess participants' experiences surrounding the mental-training sessions. Traditional social validation questionnaires and interviews are often used in intervention studies as a way to 'validate' or 'triangulate' quantitative findings and are used in a way that "supplements statistical analyses of objective data by subjectively assessing socially important outcomes" (Page & Thelwell, 2013, p. 62). Accordingly, the social validation questionnaires (see Appendix I) and semi-structured interview (see Appendix II) were used at different time points during the study to obtain a more in-depth understanding of participants' subjective experiences surrounding their involvement in the mental-training sessions. Questions were structured to enable participants to disclose what they had learned or applied as a result of attending the sessions, and to explain if/how their mindset towards failure had changed as a result of participating in the intervention. Thus, qualitative data were used to help interpret the quantitative data (e.g., Dunn, 1994; Harwood et al., 2015) and to answer separate (but related) research questions that went beyond the quantitative results.

Intervention Format and Structure

All experimental (i.e., mental-training) and placebo (i.e., tactics/strategy) sessions used similar delivery formats in that they each included an interactive presentation, an in-class activity, and a take-home activity. According to McGonigal (2015), effective interventions that are designed to transform mindsets involve opportunities for participants to (a) learn about a new

perspective, (b) participate in an activity that encourages the adoption of this new perspective, and (c) share the new perspective with others. These guidelines helped to inform the overall content, focus, and delivery of each session (see Table 4.1 for a brief summary of each session).

Coaches were sent an e-mail in the week following each session with a summary of the key lessons and a few 'take-home' applied coaching suggestions. In the week immediately following each session, athletes were asked to complete a brief writing task that related to (or extended upon) the writing activity they had completed during the preceding classroom session.

Researcher characteristics. The PI who delivered all of the sessions to athletes was a 29-year-old male doctoral student studying in the area of sport psychology. He was a certified National Coaching Certification Program (NCCP) club coach in curling, had won a Canadian Universities national curling championship, had twice represented Canada in curling at international levels of competition, and had previously been invited as a guest coach/consultant to the program in which the athletes were enrolled. These qualifications and experiences not only ensured that the PI had high levels of contextual intelligence in the sport (see Dunn & Holt, 2004; Sternberg, 1985, 1997), but also enhanced the PI's ability to deliver the intervention in an "ecologically sensitive" (Harwood, 2008, p. 110) manner where he was capable of adopting the perspective of a "practitioner, researcher, and coach" (Evans, Jones, & Mullen, 2004, p. 255).

Data Analyses

Quantitative analyses. A repeated-measures multivariate analysis of variance (RM-MANOVA) was used to determine if athletes' perfectionism levels changed from the pre-mental-training period to the post-mental-training period. Although the mental-training sessions were designed to reduce athletes' perfectionistic concerns, it was also deemed necessary to include perfectionistic strivings as a dependent variable in the analysis. As noted by Gotwals et al. (2012), given that perfectionistic strivings and perfectionistic concerns in sport are typically

positively correlated, it may be difficult to develop interventions that reduce athletes' perfectionistic concerns without simultaneously reducing athletes' perfectionistic strivings. Moreover, including perfectionistic strivings in the analysis overcomes a recent research criticism voiced by Stoeber (2018) that "studies focusing on perfectionistic concerns (and ignoring perfectionistic strivings) represent a regression to the one-dimensional conceptions of perfectionism that dominated the 1980s and risk discounting everything…[perfectionism researchers] have learned and achieved [with respect to understanding multidimensional perfectionism] in the last 25 years" (pp. 334-335).

Acknowledging that the small sample sizes of the EC group (n = 8) and W-LC group (n = 8) pose limitations on the statistical power of the multivariate analysis, we elected to generate composite pre- and post-intervention scores (for strivings and concerns) to be used in the RM-MANOVA by removing "group" (EC and W-LC) as a potential independent variable from the analysis, and combined scores for all 16 athletes to create single pre-intervention scores and post-intervention scores. Thus, the pre-intervention strivings score for each athlete in the EC group was represented by their composite strivings score obtained at Time 1 (T1: week 1). In contrast, the pre-intervention perfectionistic-strivings score for the W-LC group was based upon the overall/weighted mean (see Gravetter & Wallnau, 2017, p. 73) of each athletes' strivings scores obtained at Time 1 (T1: week 1) and Time 2 (T2: week 5). The post-intervention strivings score for each athlete in the EC group was based upon the weighted mean of each athletes' strivings scores obtained at Time 2 (T2: week 5), Time 3 (T3: week 10) and Time 4 (T4: week 13), whereas the post-intervention strivings score for each athlete in the W-LC group was based upon the weighted mean of each athletes' strivings scores obtained at Time 3 (T3: week 11) and Time 4 (T4: week 13). A similar process was used to compute pre- and post-intervention scores for perfectionistic concerns across the two groups. Perfectionistic strivings and perfectionistic

concerns (based on scores from all 16 athletes) were therefore entered into the RM-MANOVA as the two dependent variables, and two time-periods (i.e., pre- and post-intervention) were entered as the within-subjects (i.e., repeated measures) factor. Table 4.2 contains the scores for the two perfectionism variables that were entered into the RM-MANOVA for each participant.

In the event that a statistically significant change in perfectionism scores was observed between the pre- and post-intervention periods, mean scores for each group at each of the four time points were plotted on a line graph (see Figure 1). Visual inspection of graphical data (i.e., descriptive analysis of the slopes between successive measurement points) was then conducted to further explore and interpret the results (see Harwood et al., 2015; Martin & Pear, 1996).

Qualitative analyses. Interviews were transcribed verbatim and returned to participants to give them the opportunity to add, remove, or clarify any part of their respective transcripts prior to data analysis. Social validation questionnaire and interview data were analyzed using inductive thematic analysis (Braun & Clarke, 2006) for descriptive purposes (i.e., qualitative description: see Sandelowski, 2000). Braun and Clarke's six-phase process was followed to explore the ways (if at all) that athletes applied the lessons they had been taught in the mental-training sessions and how (if it all) athletes perceived their mindset towards failure had changed as a result of undergoing the mental-training intervention. A priori rules of inclusion were established in order to identify extracts (i.e., questionnaire and/or interview responses) that reflected application of the intervention or changes resulting from the intervention. After reading through the questionnaires and interview transcripts multiple times and taking notes for each participant and then across the group, the PI conducted initial coding to identify extracts that constituted "units of meaning" from the data (Miles & Huberman, 1994, p. 56). Each extract was assigned a code (or multiple codes if appropriate) by writing notes directly onto the transcribed text. The transcripts were re-read after initial coding. The coded extracts were then collated using

qualitative data analysis software. These extracts were grouped by content into themes with the assistance of both tables and mind-maps. The themes and extracts were reviewed using Patton's (1990) criteria to determine if data extracts within each theme were coherent (i.e., internal homogeneity) and if there were clear distinctions between the developed themes (i.e., external heterogeneity). This review process involved reading extracts within each theme and returning to re-reading the entire data set. Themes were then named/defined and additional sub-themes contained within each theme were established and named. Lastly, a written account of the thematic analysis was produced where the themes were explained and extracts were presented to provide "evidence of the themes within the data" (Braun & Clarke, 2006, p. 93). The PI's doctoral supervisor was consulted as a "critical friend" (see Smith & McGannon, 2017, p. 13) during the thematic analysis to provide the PI with a "theoretical sounding board to encourage reflection" (p. 13). This process was intended to enable the PI to "maintain analytic distance and suspend…scientific or personal preconceptions" (Holt & Dunn, 2006, p. 353) given the PI's close ties to the construction and delivery of the intervention.

Results

Quantitative Results

Screening of perfectionism responses across the four data-collection periods (i.e., T1, T2, T3, and T4) revealed three missing perfectionism scores (at the item level) among a possible 1,600 responses. To replace each missing data point, an intra-individual mean item score was calculated from the scores provided by the respondent on the remaining items of the intended subscale at the same time-point (Graham, Cumsille, & Elek-Fisk, 2003). The average internal consistency (Cronbach's α) values for the perfectionistic strivings and perfectionistic concerns subscales across the four data-collection periods were .81 and .92 respectively. Bivariate correlations (*r*) between strivings and concerns across the four data collection periods ranged

from .31 to .60.

Prior to conducting the RM-MANOVA, perfectionism scores (see Table 4.2) were screened for the presence of univariate and multivariate outliers. None were found. All z-scores were ≤ 2.12 for the two dependent variables and all Mahalanobis distances were ≤ 5.18 (χ^2 [2] $_{critical}$ = 13.82, $p < .001$).

The within-subjects effect for perfectionistic strivings was not significant: Wilks' Λ = .785, F (1, 15) = 4.11, $p > .05$. In other words, there was no statistically significant change in average levels of perfectionistic strivings between the pre-intervention (M = 3.70, SD = .39) and post-intervention period (M = 3.64, SD = .56). The corresponding effect size (Cohen's [1977] d for dependent means) was small (d = .18). In contrast, the within-subjects effect for perfectionistic concerns was significant: Wilks' Λ = .217, F [1, 15] = 54.03, $p < .001$. Specifically, perfectionistic concerns were significantly lower at the post-intervention period (M = 2.45, SD = .73) than the pre-intervention period (M = 2.65, SD = .67). The corresponding effect size was moderate in size (d = .58). No significant interaction effect was detected: Wilks' Λ = .889, F (1, 15) = 1.87, $p > .05$.

Visual analyses. Given that no significant difference was observed in the pre- vs. post-intervention scores for perfectionistic strivings (and the corresponding effect size was small), descriptive visual inspection of slopes (Martin & Pear, 1996) between successive measurement periods across the two groups was only conducted upon athletes' perfectionistic concerns (see Figure 4.1). As seen in Figure 4.1, the upward/positive slope between T1 (week 1, pre-intervention) and T2 (week 5: i.e., the week immediately following the mental-training sessions) for the EC group reveals a slight increase in perfectionistic concerns during this period—a finding that is contrary to what would have been expected if the mental-training sessions had an immediate impact on athletes' perfectionistic concerns. In contrast, the downward/negative slope

during this same period (i.e., T1 to T2) for the W-LC group (who had received the tactical/ strategic placebo) showed a reduction in perfectionistic concerns. This result was also unexpected given that the placebo sessions were not designed to have any impact upon athletes' perfectionistic concerns.[3] From T2 (week 5) to T3 (week 11), the downward slopes for the two groups appear to be parallel to each other indicating similar reductions in perfectionistic concerns for the EC group (who received the placebo during weeks 8 to 10) and the W-LC group (who received the mental-training sessions) during this period. Finally, the downward slopes during the final 2 weeks of the study (i.e., T3 to T4) for the EC and W-LC groups again indicate a decrease in perfectionistic concerns (when none of the athletes had any contact with the PI).

Overall, the visual inspection of the slopes in the line graph contained in Figure 4.1 for the two groups does not provide much evidence of reductions in athletes' perfectionistic concerns in the week immediately following each 3-week mental-training block that can be uniquely attributed to the intervention. However, given that the purpose of the mental-training sessions was to reduce athletes' perfectionistic concerns, it should be noted that in only one instance was there any increase in perfectionistic concerns between successive measurement periods throughout the study (i.e., the EC group between T1 and T2) and all other slopes between successive measurement periods for both groups were in a downward/negative direction (indicating reductions in perfectionistic concerns).

Qualitative Results

Thematic analysis of social validation questionnaire and interview data revealed three superordinate themes. Each of the three themes provides insight into (a) what athletes learned and/or applied as a result of participating in the mental-training sessions, and (b) how athletes'

[3] Results of separate dependent *t*-tests indicated that the increase in perfectionistic concerns from T1 ($M = 2.69$, $SD = .73$) to T2 ($M = 2.73$, $SD = .81$) for the EC group was not statistically significant: $t(7) = 0.218$, $p = .83$, $d = .08$. Similarly, the decrease in perfectionistic concerns from T1 ($M = 2.67$, $SD = .64$) to T2 ($M = 2.56$, $SD = .70$) for the W-LC group was also not significant: $t(7) = 1.00$, $p = .35$, $d = .35$.

mindsets towards failure, mistakes, and/or setbacks changed or were reinforced as a result of participating in the mental-training sessions. Table 4.2 contains a data matrix (Miles & Huberman, 1994) that illustrates which athletes provided responses in each theme.

All 16 participants (i.e., P1, P2,…P16) provided responses that centred around the application or integration of a "*functional attentional focus*" that was credited with facilitating their ability to successfully deal with immediate/necessary task demands of the competitive situation following failure. P5 noted how it was important to "focus on W.I.N. [What's Important Now]" and to "not dwell on past shots." P10 elaborated on this principle stating,

> Yeah, like it [the mental-training sessions] just really helped me to realize like, when you miss a shot it's OK. Forget about it and just go right into the next one. It's done, it's over with; you can't change it, now just work with what you have.

Athletes reported changes in the amount or direction of attentional focus they now adopted in competition following failure. For example, P8 reported a change in focus that was task-oriented towards the immediate future as opposed to self-focussed on the past:

> [Before the intervention] I just always thought everything was my fault and I would be missing my next shot because of it… 'Cause I was discouraged and mad about missing the shot and stuff…[but now] I think I'm the complete opposite; I focus on the next shot and don't worry about the last [shot] until the game's over.

Fifteen athletes alluded to "*functional (re)appraisal of setbacks and failures*" as an important lesson (or skill) that had been emphasized during the intervention. Athletes reported that these (re)appraisals would help them respond in a manner that would enhance their ability to perform (or move forward with their thinking) following mistakes or failure. Although athletes typically spoke about failure as something that was undesirable in competition, they frequently reported that the intervention had taught them the importance of viewing failure and setbacks as

opportunities to learn, as sources of motivation, and as inevitable parts of the performance process. For example, P9 said, "I think it [the intervention] really helped reinforce how I want to deal with setbacks…By making sure like I analyze them and use my mistakes to help me move [forward] and get better." P14 spoke about the perceived inevitability of mistakes in competition and noted that "everybody makes mistakes and no one's a robot and 100% perfect, so everyone makes mistakes. It just depends on who can get over the mistakes and not make them again."

Some athletes mentioned how they now appraised mistakes and failure as sources of learning and improvement. For example, P4 said, "I feel like I view my own missed shots with a better view than I did before [the intervention]. Taking the info I learned [from the miss] and using it in the next shot." P15 also described moving away from 'all-or-nothing thinking' about failures and reappraising them in a more positive/facilitative manner:

> I believe that certainly I would have dealt with [a loss or failure] differently before the sessions than now…I probably would have looked at it more as sort of an isolation event sort of and we lost this [game to get into the playoffs] and that makes the whole weekend a failure…Whereas now I look at it as, well we improved this weekend so that means we've always been improving and that we're improving towards the greater goal that we have which is winning [a major regional event] and this is sort of not secondary but sort of just a step.

It is worth pointing out that several participants elaborated on the process by which they felt their mindsets changed towards failure, noting that the importance and relevance of the lessons taught during the intervention became more apparent when failure was actually experienced on the ice during training or competition. This sentiment was best illustrated by P16 who said, "It definitely takes a few beat-downs before you start actually having to think 'oh, maybe I need to change the way I look at everything.'"

Eleven athletes provided written or oral responses that referenced how the mental-training sessions had impacted their own "*self-attitude/self-treatment following mistakes or failure*." This theme captured athletes' responses that centred upon reductions in self-criticism, increased self-kindness, heightened self-reliance, and the importance of 'keeping things in perspective.' For example, P13 discussed self-kindness when stating, "I'd say 'being your own best friend' is what you need to succeed 'cause the moment you beat yourself up on the ice [following a mistake] you just crumble." P7 spoke about the realization of having inappropriate self-criticism in reference to an activity that had been conducted during Session 2 (see Table 4.1):

> When we wrote down all the things that we say to ourselves when we're frustrated [after making mistakes] and then got asked if we would ever say one of those things to a teammate, and I definitely would not 'cause some of the things I wrote down were horrible.

In a follow-up question asking if this type of harsh self-treatment had continued since experiencing the intervention, P7 responded emphatically saying "Hardly ever." Appendix C contains a more detailed summary of the major themes (and subordinate themes) that were produced from the thematic analysis along with a selection of exemplar quotes that best illustrate the central features of each theme.

Discussion

The overarching purpose of this study was to assess the impact that a brief theory-driven mental-training intervention had upon athletes' perfectionistic concerns in sport through the development/reinforcement of a positive mindset towards failure. Results of a RM-MANOVA indicated that athletes' perfectionistic concerns were, on average, significantly lower during the post-intervention period than the pre-intervention period. In

contrast, no statistically significant change in athletes' perfectionistic strivings was observed across the same time frame. Given that the focus of the intervention was aimed at developing a positive mindset towards failure—the elements of which are antithetical to the typical negative 'perfectionistic reactivity' that individuals with high perfectionistic concerns experience following failure (see Flett & Hewitt, 2016)—it appears that the intervention helped play a role in reducing athletes' perfectionistic concerns in sport.

The reduction in perfectionistic concerns that was seen in this study is similar to findings reported by Mosewich et al. (2013) who found significant reductions in female intercollegiate athletes' perfectionistic concerns (as measured by the Concern over Mistakes subscale of the Sport-MPS-2) one week and one month after undergoing a self-compassion intervention. Taking Mosewich et al.'s (2013) findings in conjunction with the results of this study, it appears that athletes' perfectionistic concerns can change over relatively short periods of time. Such changes provide support for the view that perfectionism may be best conceptualized as a personality *disposition* rather than a stable personality *trait* (see Stoeber, 2018). These findings also highlight the potential benefits that longitudinal research can provide in helping to generate a more in-depth understanding of perfectionism in sport (see Hill, Jowett, & Mallinson-Howard, 2018).

The fact that athletes' perfectionistic concerns were significantly lower at the post-intervention period, while no significant change was observed in athletes' perfectionistic strivings during the same period, is important on two levels. First, had there also been a significant reduction in athletes' perfectionistic strivings, it could have been argued that decreases in perfectionism were simply manifestations of some form of 'stabilization to baseline levels' that naturally occur for athletes over time. However, this explanation (when applied to the observed reduction in perfectionistic concerns) seems far less plausible given

that the intervention was designed to reduce perfectionistic concerns and that perfectionistic strivings did not change during the same period. Second, given that perfectionistic strivings and concerns are usually correlated in a positive direction (see Jowett et al., 2016)—as was the case in this study—the absence of a significant change in athletes' perfectionistic strivings suggests that it may be possible to reduce athletes' perfectionistic concerns without simultaneously reducing perfectionistic strivings. This has important applied implications for sport practitioners (and sport-perfectionism researchers) who seek to help athletes reduce their perfectionistic concerns, but who adopt the position that heightened perfectionistic strivings can have adaptive cognitive, affective, motivational, and/or performance consequences for athletes in sport (see Gotwals et al., 2012; Jowett et al., 2016; Lizmore, 2018 [Study 2]; Lizmore et al., 2017 [Study 1]; Stoeber 2011, 2012).

Although the results of the RM-MANOVA revealed a significant reduction in perfectionistic concerns from the pre- to post-intervention period, it should be noted that the visual inspection of the slopes between successive measurement periods (as displayed in Figure 4.1) did not provide much evidence supporting immediate reductions in athletes' perfectionistic concerns that could be uniquely attributed to the preceding 3-week mental-training sessions. More specifically, the trajectories of the slopes for the EC and W-LC groups between the weeks immediately before and after their respective 3-week mental-training periods did not provide strong evidence of the intervention having immediate effects upon each group's perfectionistic concerns. Indeed, for the EC group, there was actually a very slight increase in perfectionistic concerns during this period (as seen by the upward/positive slope between T1 and T2 in Figure 4.1). Consequently, the direction of the slopes for the two groups between successive measurement periods throughout the study make it difficult to generate conclusions regarding the speed at which the intervention

uniquely impacted athletes' perfectionistic concerns.

Going beyond the quantitative assessment of athletes' perfectionistic concerns, another purpose of this study was to gain insight into what (if anything) athletes took from the intervention regarding their mindset towards failure and whether athletes actually felt that their mindset changed as a result of participating in the mental-training program. Thematic analysis of questionnaire and interview data indicated that athletes predominantly attributed their involvement in the intervention to the adoption of (a) a facilitative (i.e., present-directed and task-oriented) attentional focus following failure, (b) facilitative/positive (re)appraisals of failure, and (c) positive self-attitudes/self-treatment in response to failure. Given that the central cognitive, affective, and behavioural characteristics captured within each of these major themes appear to be in direct contrast to the negative (and debilitative) responses that individuals with high perfectionistic concerns typically experience following failure (see Flett & Hewit, 2016), the qualitative results provide insight into the potential mechanisms by which the mental-training program may have impacted athletes' perfectionistic concerns.

Many features of the athletes' responses that were used to develop the superordinate themes have been previously linked to low perfectionistic concerns in sport. For example, a defining characteristic of a 'facilitative attentional focus' in sport is seen via athletes' purposeful and conscious attention to task-relevant and process-oriented aspects of performance (Moran, 1996). In a study of male intercollegiate ice hockey players, Gotwals, Dunn, Causgrove Dunn and Gamache (2010) discovered that athletes who were high in certain sub-dimensions of perfectionistic concerns were prone to experiencing higher levels of concentration disruption anxiety (i.e., a dimension of anxiety that represents a tendency to lose task-relevant focus in competition). Similarly, in a study of elite athletes from a variety of team and individual sports,

Thienot et al. (2014) found a significant negative correlation between perfectionistic concerns (labelled, evaluative concerns perfectionism) and athletes' ability to mindfully refocus their attention on immediate task requirements that aid performance before or during competition. As suggested by Gotwals et al., "it is possible that healthy perfectionistic athletes [i.e., athletes with high perfectionistic strivings but low perfectionistic concerns] are better able to stay focussed on the task-at-hand because they are not distracted by the self-doubts or evaluative concerns that so often plague unhealthy perfectionists [i.e., athletes with high perfectionistic strivings and high perfectionistic concerns]" (p. 430).

The application of strategies to (re)appraise failure as an acceptable/useful condition that provides opportunity for learning, increased effort, and/or growth appears to serve an adaptive function for athletes, and in turn may be associated with a reduction in perfectionistic concerns. Perfectionism theorists have long recognized that people who have high perfectionistic concerns tend to appraise personal failure and mistakes as highly threatening conditions (to self-concept) that are considered unacceptable, should not happen, and must be avoided at almost any cost (see Blatt, 1995; Burns, 1980; Frost, Marten, Lahart, & Rosenblate, 1990; Hamachek, 1978). Such views towards failure (vis-à-vis heightened perfectionistic concerns) have been linked to heightened anger (Vallance Dunn, & Causgrove Dunn, 2006), heighted dejection (Lizmore et al., 2016), reduced optimism/confidence (Lizmore et al., 2016), and heightened fear of experiencing shame and guilt (Sagar & Stoeber, 2009) for athletes in competitive sport. Indeed, athletes with higher perfectionistic concerns (relative to athletes with lower perfectionistic concerns) are more inclined to adopt threat appraisals and less likely to adopt challenge appraisals when faced with competition in general (see Crocker, Gaudreau, Mosewich, & Kljajic, 2014). Thus, there appears to be value in teaching athletes about the benefits of appraising failure and mistakes in a positive manner, where such appraisals may ultimately play a role in reducing athletes' perfectionistic

concerns in sport.

The third superordinate category primarily captured athletes' responses that related to positive (or less critical) self-attitude/self-treatment following failure or mistakes. A defining characteristic of high perfectionistic concerns is harsh and excessive self-criticism, particularly when personal failure is experienced (Flett & Hewitt, 2016); therefore any effort to treat oneself less harshly or more kindly following personal failure is largely incompatible with high perfectionistic concerns. Many of the responses shared by the athletes regarding their self-treatment following mistakes and failure closely reflect aspects of self-compassion—defined by Neff (2003) as a "positive self-attitude" that involves "being kind and understanding towards oneself in instances of pain or failure rather than being harshly self-critical…perceiving one's experiences as part of the larger human experience rather than seeing them as separating and isolating [and] holding painful thoughts and feelings in balanced awareness rather than over-identifying with them" (p. 85). As demonstrated in previous research, heightened self-compassion in athletes has been negatively associated with perfectionistic concerns in sport (see Lizmore et al., 2017 [Study 1]; Mosewich et al., 2013). In light of this evidence, it seems reasonable to propose that the mental-training sessions may have helped reduce athletes' perfectionistic concerns by increasing (or at least reinforcing the importance of) self-compassionate behaviours following personal failure in sport.

There appears to be a strong degree of convergence between the qualitative and quantitative results. In other words, it seems reasonable to conclude from both sets of results that the mental-training intervention played a role in helping reduce athletes' perfectionistic concerns in sport. As such, the mixed-methods design can be viewed as an important methodological strength of this study. Nevertheless, it must also be acknowledged that a number of limitations also exist within this study. For example, multiple baseline measures of perfectionistic concerns

were not taken prior to the delivery of the intervention. This limits the degree to which any possible fluctuations in athletes' 'normal' levels of perfectionistic concerns could be detected (and controlled) prior to the delivery of the intervention. In other words, a stable baseline for athletes' perfectionistic concerns may not have been established prior to the implementation of the intervention (see Barker et al., 2011).

Given that the intervention was delivered in an ecologically valid 'real world' setting, it was not possible to control many variables that could have potentially impacted results. For example, it is impossible to determine the influence that the coaches of each team may have had upon the results (e.g., it is unknown if coaches reinforced or ignored the lessons from each mental-training session in team practices and/or competitions on a daily and weekly basis). Similarly, it is not possible to determine or control for different failure and/or success experiences that each athlete underwent throughout the duration of the study; such experiences could potentially influence the degree to which elements of the mental-training program were adopted (or their importance was understood) by the athletes. It seems reasonable to speculate that even athletes within the same team had different success/failure experiences (on an individual performance level) during the 12-week duration of the study, and this variability of experience may have differentially influenced the degree to which the intervention had an impact upon failure-mindset and/or perfectionistic concerns at the individual level. Furthermore, the fact that all four teams were part of the same sport development program and trained in the same facility (often at the same time) introduces the possibility that athletes from different teams may have communicated with each other about different elements of the mental-training sessions. Such interactions could also impact the degree to which individuals responded to the intervention.

Lastly, it is difficult to determine which (if any) specific element(s) of the mental-

training sessions had the most (or least) impact upon athletes' mindset and perfectionistic concerns. Was the intervention's apparent success due to one or two key messages or activities that were incorporated into the intervention, or was success founded upon the entire package of strategies and activities that were employed? Furthermore, as is the case with any applied intervention that is delivered to athletes in the competitive sport environment, the personality, perceived credibility/status, delivery style, and/or contextual intelligence of the person delivering the mental-training sessions will almost certainly impact the success of the program (see Dunn & Holt, 2003, 2004). Future research is required to address these issues and answer the questions that have been posed.

Despite the aforementioned limitations, the study makes important contributions to the sport perfectionism literature. Most notably, the study was conducted in an ecologically valid 'real word' setting (see Hill, 2016) where both quantitative and qualitative results indicated that athletes' perfectionistic concerns may be reduced over time (and mindsets towards failure improved) through the delivery of a theory-driven mental-training intervention that targets the way athletes appraise and respond to failure in sport. Although additional research is required to determine the extent to which the current results can be generalized to athletes competing in different sports, at different age groups, and at different competitive levels, it is hoped that the results will encourage sport psychology researchers to develop and assess ways in which (a) athletes' perfectionistic concerns in sport can be reduced, and (b) athletes can be taught to appraise and react to personal failure in a manner that can enhance their ability to perform in competition.

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Table 4.1

Summary of the Content and Focus of the Three Mental-Training Intervention Sessions

Session No. / Topic	Purpose	Content (concept or strategy)
1. Deal with the past: "Setbacks as stepping stones to success"	Learn how to think productively about misses, mistakes, and poor performances. Specific foci: (a) unhelpful nature of negative emotional responses to failure, and (b) introduce cognitive reframing (i.e., seeing *setbacks as stepping stones*) as a strategy to deal with failure and adversity.	Discussion (expectations and standards) "What's Important Now" curling video (focus cue)[a] Bracelets provided ("What's Important Now")[a] Video of coach and players from successful sport franchise (negative emotions, cognitive reframing)[b] In-class failure quote activity (cognitive reframing) Take-home video activity (cognitive reframing) Follow-up e-mail sent to team coach
2. Operate in the present: "Be your own best friend"	Learn how to actively respond to adversity. Specific foci on (a) unhelpful nature of rumination and self-criticism following failure, and (b) the role of self-compassion (i.e., *being your own best friend*) following personal failure.	Discussion (personality research in curling) Curling videos (rumination, self-compassion) Video of coach and players from successful sport franchise (focus on self-compassion)[b] In-class "treat yourself" activity (self-compassion) Take-home failure script activity (self-compassion) Follow-up e-mail sent to team coach
3. Look forward to the future: "Unlikely victories"	Learn how to have a productive attitude or optimistic outlook on what is to come. Specific foci: (a) unhelpful nature of pessimistic beliefs in the face of adversity, and (b) benefits of having an optimistic outlook (i.e., believing in the possibility of *unlikely victories*) in the face of adversity.	Discussion (personality types) Basketball comeback video (pessimism, optimism) Video of coach and players from successful sport franchise (optimism)[b] In-class "unlikely victory" activity (optimism) Take-home "unlikely victory" activity (optimism) Group writes summary of three sessions on board. Follow-up e-mail sent to team coach

[a] The concept of "What's Important Now" (W.I.N.) is taken from Holtz (1998).

[b] Indicates the same video material that was integrated across all three sessions to illustrate three different topics/concepts

Table 4.2

Pre- and Post-Intervention Perfectionism Scores Included in RM-MANOVA and Data Matrix from Thematic Analysis

	Perfectionism Dimensions				Superordinate Themes		
Participants	Strivings		Concerns		Attentional Focus	(Re)appraisal of Setbacks/Adversity	Self-Attitude/ Self-Treatment
Experimental Condition							
	Pre-Int. (T1)	Post-Int. $M_{(T2+T3+T4)}$	Pre-Int. (T1)	Post-Int. $M_{(T2+T3+T4)}$			
P1	3.50	3.28	1.92	1.67	+	+	+
P2 [a]	3.17	3.05	2.08	2.02	+	+	
P3	4.50	4.83	2.46	3.13	+	+	+
P4	4.00	4.08	2.92	2.66	+	+	
P5 [a]	3.50	3.86	3.92	3.49	+	+	
P6 [a]	4.00	4.42	3.54	3.82	+		
P7	3.25	3.75	2.62	2.31	+	+	+
P8	3.50	3.17	2.08	1.67	+	+	+
Wait-Listed Condition							
	Pre-Int. $M_{(T1+T2)}$	Post-Int. $M_{(T3+T4)}$	Pre-Int. $M_{(T1+T2)}$	Post-Int. $M_{(T3+T4)}$			
P9	4.38	4.21	3.39	2.81	+	+	+
P10	3.54	3.38	1.66	1.46	+	+	+
P11	3.58	3.50	1.85	1.46	+	+	+
P12	3.50	3.42	3.54	3.23	+	+	+
P13	3.25	2.55	2.54	2.39	+	+	+
P14	3.71	3.55	2.66	2.40	+	+	+
P15	3.96	3.79	2.73	1.93	+	+	
P16	3.84	3.34	2.54	2.70	+	+	+
Totals (*n*)					16	15	11

Note: The "+" symbol indicates the presence of an athlete's response in a particular theme.

[a] Participant completed the social validation questionnaire but did not participate in the interview.

Abbreviations: Pre-Int. = Pre-Intervention. Post-Int. = Post-Intervention. T1 = Time 1. T2 = Time 2. T3 = Time 3. T4 = Time 4.

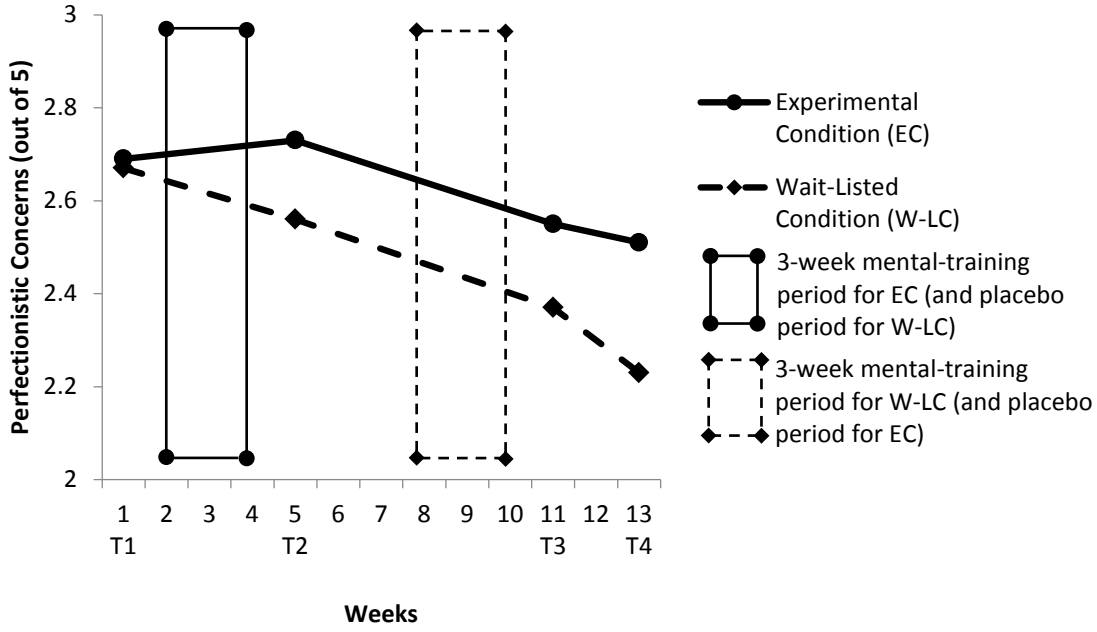

Figure 4.1. Line graph depicting athletes' perfectionistic concerns at four time points (T1, T2, T3, and T4) relative to the administration periods of the mental-training and placebo intervention for each group.

CHAPTER 5

General Discussion

The general purposes of the series of studies that comprise this dissertation were to (a) examine how perfectionism in sport is linked to the manner in which athletes respond to personal failure, mistakes, and adversity during athletic competition, (b) explore relationships between perfectionism and performance in competition, and (c) determine if perfectionistic concerns can be changed (i.e., reduced) through the implementation of a mental training program that focusses upon the adoption of a positive mindset towards failure in sport. Collectively, the results of the three studies provide insight into the potential roles that athletes' perfectionistic strivings and concerns play in competitive sport.

Study 1 detailed how perfectionistic strivings and perfectionistic concerns were related to intercollegiate athletes' cognitive response-tendencies to poor personal performance and supported the benefits of examining athletes' perfectionistic reactivity (Flett & Hewitt, 2016) in the context of failure in sport. The results of hierarchical regression analyses indicated that perfectionistic strivings were associated with a more adaptive set of cognitive responses (i.e., higher self-compassion, higher optimism, and lower pessimism), whereas perfectionistic concerns were associated with a less adaptive set of cognitive responses (i.e., lower self-compassion, lower optimism, higher pessimism, and higher rumination). These findings support a growing body of evidence in the sport psychology literature showing that heightened perfectionistic strivings can have adaptive cognitive, motivational, and/or behavioural consequences for athletes in sport (particularly when perfectionistic concerns are controlled), whereas heightened perfectionistic concerns are generally associated with maladaptive outcomes in sport (see Gotwals, Stoeber, Dunn, & Stoll, 2012; Jowett, Mallinson, & Hill, 2016).

Study 2 investigated relationships between perfectionistic strivings, perfectionistic concerns, and athletic performance in competitive situations that varied in degrees of stress and perceived threat (before and after failure). Bivariate correlations and hierarchical regression

analyses indicated that perfectionistic strivings were positively associated with golf-putting performance in low- and high-stress conditions in a sample of intercollegiate athletes, whereas perfectionistic concerns were unrelated to performance. These findings add to what is a surprisingly limited body of research that has investigated links between perfectionism and performance in competitive sport settings (see Stoeber, 2012), and provide evidence that heightened perfectionistic strivings may play an adaptive role that corresponds with enhanced performance in competition.

Study 3 adopted a mixed-methods approach to examine the impact that a mental training intervention had upon athletes' perfectionistic strivings and perfectionistic concerns in sport. The intervention was grounded in the tenets of perfectionism theory and utilized intervention guidelines (see Flett & Hewitt, 2014) that were designed to reduce perfectionistic concerns in sport. The study was conducted with adolescent curling athletes who were part of a high performance sport development program. Quantitative results revealed that athletes' perfectionistic concerns were, on average, significantly lower following the intervention, whereas athletes' perfectionistic strivings did not change significantly during the same period. Qualitative results revealed that the athletes attributed their involvement in the intervention with (adaptive) attentional focus, positive (re)appraisals of failure, and improved self-treatment or self-attitude following failure. Together, the quantitative and qualitative results in Study 3 indicate that athletes' perfectionistic concerns can change and may be impacted through a short-term intervention that promotes the adoption of a positive mindset towards failure. Moreover, the longitudinal design adopted in Study 3 provides perfectionism theorists with important information when deciding if perfectionism is best conceptualized as an unstable achievement motivation disposition (as the results of Study 3 would indicate) or as a relatively stable personality trait (see Stoeber, 2018).

Strengths and Limitations

Strengths and limitations of each individual study were addressed within the Discussion sections of each chapter. Nevertheless, it is worth elaborating upon some overarching strengths and weaknesses of the studies that have not been previously discussed. Each of the studies comprising the dissertation adopted different approaches to answering research questions about perfectionism in sport. Study 1 used a self-report cross-sectional correlational line of inquiry. Study 2 assessed links between self-reported levels of perfectionism and overt performance in a competitive task. Study 3 used a longitudinal mixed-methods quasi-experimental design that incorporated features of single-case research. Thus, the results of the three studies (and the insight they provide about perfectionism in sport) are not based upon a single methodological approach, thereby reducing the potential for measurement error to be caused by methods variance that is associated with one specific methodological approach.

All three studies employed domain-specific conceptualizations and measures of perfectionism (see Dunn, Gotwals, & Causgrove Dunn, 2005; Dunn et al., 2016). This can be viewed as a methodological strength of the dissertation because a domain-specific approach can provide a greater understanding of perfectionism in specific achievement contexts beyond that which can be accomplished by global/generic measures of perfectionism (see Dunn, Craft, Causgrove Dunn, & Gotwals, 2011; Gotwals, Dunn, Causgrove Dunn, & Gamache, 2010; Hill, 2016; Stoeber & Stoeber, 2009). All studies comprising the dissertation used multiple indicators/items from different self-report instruments to measure perfectionistic strivings and perfectionistic concerns (Gotwals et al., 2010; Stoeber, Otto, & Stoll, 2006). This can be viewed as a methodological strength because the breadth of the two higher-order dimensions of perfectionism (i.e., strivings and concerns) “cannot be fully captured with single indicators [i.e., subscales or sub-dimensions]” (Stoeber & Madigan, 2016, p. 48) from a single instrument.

Therefore, combining items and/or subscales from the Sport-Multidimensional Perfectionism Scale-2 (Sport-MPS-2: Gotwals & Dunn, 2009) and the Multidimensional Inventory of Perfectionism in Sport (MIPS: Stoeber et al., 2006) to measure strivings and concerns helps to address these concerns and partially ensures that the scope and depth of the two higher-order dimensions of perfectionism were adequately covered.

Although it is argued in the preceding paragraph that domain-specific measurement and the utilization of items from both the Sport-MPS-2 and MIPS to assess strivings and concerns are strengths of the dissertation, these approaches may also create limitations. For example, by adopting a domain-specific approach, the degree to which the results of the three studies can be generalized to achievement settings outside of sport is limited. Furthermore, other sub-dimensions of perfectionistic strivings and perfectionistic concerns have been proposed in the sport psychology literature (see Dunn et al., 2016; Hill, Appleton, & Mallinson, 2016) and therefore we do not know if the inclusion of other sub-dimensions would have impacted the results of the three studies. For example, it cannot be determined if the addition of Organization as a sub-dimension of perfectionistic strivings (see Dunn et al., 2016) would have changed the relationship between strivings and performance in Study 2, or if the inclusion of Doubts About Actions (see Dunn et al., 2016) or Socially Prescribed Performance Perfectionism (see Hill et al., 2016) as sub-dimensions of perfectionistic concerns would have altered the levels of perfectionistic concerns reported in Study 3. Future research is necessary to address these possible limitations and questions.

Suggestions for Future Research

Numerous research questions arise from the series of studies that comprise the dissertation. The first study calls for more research investigating the concept of perfectionistic reactivity (Flett & Hewitt, 2016) in sport. Flett and Hewitt largely describe perfectionistic

reactivity as a collection of (a) maladaptive responses (associated with high levels of perfectionism) that often occur following a person's failure to achieve high performance standards, or (b) the absence of adaptive responses in similar conditions. Yet the results of Study 1 indicate that certain adaptive cognitive responses to poor personal performance (e.g., higher self-compassion and optimism) were associated with heightened perfectionistic strivings. Little research or discussion in the extant literature has considered the possibility that cognitive, affective, and behavioural aspects of perfectionistic reactivity might actually be associated with adaptive functioning in sport.

Although it is acknowledged that Flett and Hewitt (2016) situate their conceptualization of perfectionistic reactivity around 'vulnerable perfectionists' who have high perfectionistic strivings combined with high perfectionistic concerns, it is hoped that the results of Study 1 will encourage researchers to consider the possibility that perfectionistic reactivity can also be operationalized in terms of adaptive responses to failure when considered in the context of athletes' perfectionistic strivings (while controlling for perfectionistic concerns). This would be consistent with an 'independent effects' approach to studying perfectionistic strivings and perfectionistic concerns in sport (see Jowett et al., 2016), where the overlap between the two dimensions is considered (or controlled) when assessing their relationships with adaptive or maladaptive criterion variables. Furthermore, as suggested by Flett and Hewitt (2016, also see Hill, 2016; Hill, Jowett, & Mallinson-Howard, 2018) it may be more insightful if researchers stop asking *if* perfectionistic strivings and perfectionistic concerns are good or bad, and change their question to ask *when* and *under what conditions* strivings and concerns may be good or bad. It is therefore advocated that future research continue to consider the role that *both* higher-order dimensions of perfectionism play in athletes' perfectionistic reactivity, and that further consideration be given to the situational *context* in which the two dimensions operate in order to

best determine "when perfectionism helps or hinders the performances and lives of athletes" (Hill, 2016, p. 24).

A good example where 'situational context' was used to examine the role of perfectionism in sport is seen in an unpublished study by Wieczorek, Flett, and Hewitt (2003; as cited in Flett & Hewitt, 2016). Wieczorek et al. examined the cognitive responses of 24 players who were competing in a golf tournament, some of whom performed well and 'made the cut' (i.e., scored low enough to compete in the second half of the tournament), and some of whom performed at a lower level and failed to 'make the cut.' For those players who made the cut, self-oriented perfectionism (i.e., a sub-dimension of perfectionistic strivings) was associated with fewer negative thoughts before competition and fewer counterproductive thoughts about mistakes during competition. In contrast, for those players who did not make the cut, self-oriented perfectionism was associated with more negative thoughts before competition and more counterproductive thoughts about mistakes during competition. The results of Wieczorek et al., in conjunction with the results of Study 1 and Study 2, highlight the potential benefits of assessing perfectionism—and the role it plays in the cognitive, affective and behavioural responses of athletes—in situations where success or failure is experienced and comparisons of individuals' reactions to these experiences can be examined (Flett & Hewitt, 2016).

The second study of the dissertation examined links between perfectionism and performance in a competitive setting where athletes competed directly against an opponent. Assessing links between perfectionism and performance in competitive settings is perhaps one of, if not *the*, most understudied area of sport perfectionism research, and requires further investigation because 'winning and losing' are salient aspects of 'real world' competitive sport settings where success- and failure-evaluations are so often based upon win-loss outcomes of competitive events. It is especially important to assess the role of perfectionism as it relates to

performance in situations where athletes compete against opponents because definitions of perfectionistic strivings and perfectionistic concerns contain explicit references to achieving high *performance* standards, concerns around *failure*/*mistakes,* and concerns around *negative social evaluation* of performance (e.g., Gotwals et al., 2012; Stoeber, 2011). Rarely, if ever, do athletes compete in a social vacuum where performance accomplishments are not measured directly against the relative performance of opponents. It is hoped that the results of Study 2 will stimulate more research into the role that perfectionistic strivings and perfectionistic concerns might play in the performance of athletes in competitive sport settings. More research in this area seems particularly relevant in light of a recent study conducted by Hardy et al. (2017) who compared the psychosocial biographies of 16 super-elite athletes (i.e., those who had won multiple medals at major international championships [i.e., Olympics or World Championships]) with 16 matched elite athletes who had competed in the same sports at the same level of competition (and for the same country) but who had failed to achieve medal success. Hardy et al. concluded that the super-elite athletes had "higher levels of obsessiveness and perfectionism with regard to sport" (p. 106) than the elite non-medalist athletes, inferring that perfectionism was a factor in differentiating performance levels of athletes at the highest levels of competition.

An implicit assumption throughout all of the studies comprising the dissertation was that perfectionistic strivings play an adaptive role in sport (especially when the overlap with perfectionistic concerns is controlled) and that perfectionistic concerns play a maladaptive role in sport (see Gotwals et al., 2012; Jowett et al., 2016). Indeed, these assumptions were considered during the creation of the intervention that was employed in Study 3 where the positive-mindset mental-training program was designed specifically to reduce athletes' perfectionistic concerns. However, it is worth noting that during an interview in Study 3, one participant (P3) stated, "I think you have to get down on yourself a certain bit, you can't just let everything roll off,

otherwise you're not gonna have any motivation to improve" (see Appendix III, p.163). This comment raises the question, "is there a certain level of self-critical perfectionistic concerns that might actually have an adaptive or functional motivational role to play for athletes in competitive sport?" No research has been conducted in the field of sport psychology that has attempted to determine if there is an 'ideal' level of perfectionistic concerns that might actually enhance the motivation of athletes to work hard, persevere, and strive to overcome their mistakes. Stated differently, "is there a point at which athletes' performance and growth might actually suffer as a result of having such low perfectionistic concerns that they become apathetic towards performance errors and failure?" Clearly more research is required to determine if there are ideal combinations of perfectionistic strivings and concerns that are most beneficial for athletes in sport. To answer this question, person-oriented approaches to studying perfectionism in sport are likely to provide more insight than the variable-oriented approaches used in the dissertation (see Gotwals & Spencer-Cavaliere, 2014; Lizmore, Dunn, & Causgrove Dunn, 2016).

Applied-Practice Considerations

The results of Study 3 provide encouraging evidence for sport practitioners (i.e., coaches, sport psychologists, and mental performance consultants) that reductions in athletes' perfectionistic concerns in sport may be achieved through the provision of a mental training program. Nevertheless, as discussed in Study 3, the degree to which the apparent success of the intervention can be attributed to specific content, activities (e.g., videos, stories, athlete testimonies, written exercises, mutual sharing activities, homework, etc.), or researcher characteristics remains unknown. Foster, Maynard, Butt, and Hays (2016) noted that the success of any mental-training program that is delivered to children or adolescent athletes is dependent upon a number of factors including the ability of the mental performance consultant to maintain athlete interest/engagement and to ensure that the messages/lessons being delivered (and the

means by which they are delivered) are interesting, relatable, and relevant to the athletes for whom the program is intended. The current intervention was developed specifically for adolescent athletes competing in the sport of curling, and was delivered by someone who had a high level of knowledge in the sport. Would the results of the intervention have changed (i.e., would athletes' perfectionistic concerns have been different) if the intervention had been delivered by someone who was not as familiar with the sport of curling, or who did not have the same level of 'credibility' in the eyes of the athletes who received the program? Would results have changed if the content of the intervention had been delivered in shorter daily 10-minute blocks immediately before practice over the same 3-week period? Would results have changed if the lead researcher had actually spoken to athletes about "perfectionism" and specifically discussed how perfectionistic strivings and concerns operate in sport, or would results have changed if the athletes possessed higher (or lower) levels of perfectionistic concerns at the outset of the study?

The issues identified above pose inherent problems within almost any study that attempts to examine the impact of mental-training programs that are delivered to athletes in 'real world' sport settings. A vast array of uncontrolled variables exist in such contexts, therefore it becomes difficult to determine which, if any, factors play the most prominent roles in affecting athletes' experiences. Researchers are further challenged to find ways to replicate such studies because athletes' out-of-classroom experiences between successive mental-training sessions are almost impossible to control. Nevertheless, despite these obstacles, it is hoped that the rationale for constructing the intervention around the adoption of a positive mindset towards failure (and how the associated content was considered antithetical to high perfectionistic concerns) can serve as a possible template for developing future mental-training programs that target the reduction of athletes' perfectionistic concerns in sport. Lastly, questions regarding the impact and efficacy of

developing mental-training programs that are designed to enhance athletes' perfectionistic strivings in sport remain unexplored.

Conclusion

There is still much to learn about perfectionism and how it plays a role in the cognitive, affective, and behavioural functioning of athletes in competitive sport. Nevertheless, the results described within the dissertation reinforce the need for researchers to treat perfectionism as a multidimensional construct and to continue efforts towards determining where, when, how, and why perfectionistic strivings and perfectionistic concerns may impact athletes' responses to the inevitable performance failures and setbacks they will encounter throughout their competitive careers. Although the focus throughout this dissertation was upon the construct of perfectionism and how perfectionism is associated with athletes' responses to failure in sport, the results also have broader implications for understanding mental toughness and psychological resilience in sport where researchers have long recognized the centrality of athletes' abilities to successfully 'bounce back from failure' (Jones, Hanton, & Connaughton, 2002), 'learn from failure' (Bull, Shambrook, James, & Brooks, 2005), and 'grow from adversity' (Howells, Sarkar, & Fletcher, 2017) as hallmarks of successful mentally tough competitors. It seems likely that certain perfectionistic characteristics (i.e., high strivings and low concerns) form part of a psychologically resilient personality profile that can ultimately assist athletes in their efforts to achieve success at the highest levels of competition (see Gould, Dieffenbach, & Moffett, 2002; Sarkar & Fletcher, 2014), and where having a positive/functional attitude towards failure is synonymous with a 'winning mindset' in sport (see Bull et al., 2005).

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APPENDICES

Appendix I

Social Validation Questionnaire (Study 3)

Your Thoughts and Suggestions for Future Players

To help develop better training workshops for athletes in the future, we would like to know what you thought about the sessions you attended over the last three weeks with [the PI]. Your responses will be used to help develop future sessions that will be given to developmental athletes [in the program]

1. Think about the sessions that you attended over the last three weeks. If you could share up to three main messages/lessons from those sessions to younger players (to help them improve) what would your messages/lessons be?

2. Do you think your mindset or perspective about anything has changed over the last three weeks as a result of attending the sessions? In particular, do you look at things in your sport any differently than you did before? Please explain.

3. Have you attempted to incorporate any of the techniques or strategies you learned over the last three weeks into your practice and/or play? (please circle one):

   YES NO

   If you circled YES, briefly describe the techniques or strategies:

4. List/describe any specific parts of the in-class sessions from the last three weeks that you found particularly useful and briefly explain why.

5. List/describe any specific parts of the in-class sessions from the last three weeks that you did not find particularly useful and briefly explain why.

6. List/describe any specific parts of the take-home activities from the last three weeks that you found particularly useful and briefly explain why.

7. List/describe any specific parts of the take-home activities from the last three weeks that you did not find particularly useful and briefly explain why.

8. Did you do any extra activities (other than the take-home activities) that relate to the topics that were covered in your classroom sessions in the last three weeks?

YES NO

If you circled YES, please describe the activity and estimate how much time you spent on it.

Appendix II

Interview Guide (Study 3)

Start of Interview: *Interviewer introduces self (i.e., own curling history, work, and interests*) *and provides an overview of the intent of the interview, steps to maintain/ensure confidentiality, and explanation of informed consent.*

1. Introductory Questions
    - [Rapport building]: What position do you play? What's your favourite part of playing that position (and curling in general)? How has the year been so far? Any injuries this season? Has anything significant changed for you this year as an athlete? How did you get started in curling? Parents play? Are they involved?
2. Focus: on perceived strengths and weaknesses of sessions and whether they were helpful/unhelpful.
    - **What things, good or bad, helpful, or unhelpful, really stood out for you from the mental-training sessions and activities you did with [the PI] this fall? <u>Anything else?</u>**
    - What strategies/techniques were you taught?
        - Follow-up: What do you think about them? (probe: Useful?. . .Not useful?. . . Easy/difficult to understand?. . .Fun?. . .Boring?)
    - Can you explain if the sessions helped or hindered you as a player? Describe how?
        - I'd like to know if there's anything you would have changed in the sessions to improve them or make them more interesting/helpful. Any suggestions?
    - Can you describe anything that you really found useful about the sessions? Not useful?
    - Can you describe how much you engaged with the take-home activities?
        - Follow-up: Did you do them? Spend a lot of time? Fun? Any suggestions?
    - Let's talk a bit about your <u>team</u> coach. Can you explain if your coach talked at all about the concepts that we covered?
        - Follow-up: did anything from sessions come up during team meetings or practices?
        - Thoughts about your coach's presence at the sessions? Helpful or unhelpful?
3. Focus: on any changes to how athletes react to or view mistakes.
    - How do you look at personal mistakes since doing the sessions with [PI]? (probe: has this changed as a result of doing the sessions with [PI]? If so, explain.)
    - Thinking about what you heard/did in the mental-training sessions with [PI]. . .if you were talking to younger curlers about how they should look at and respond to personal mistakes in competition, what would you say to them?
    - Overall, do you think the way you react to failure and/or mistakes has changed? If so, could you describe?
4. Closing Question
    - **If you could give one piece of advice—"One big thing"—to a younger athlete based on what you learned in the mental-training sessions, what would it be?**

Closing the Interview: *Provide opportunity for the participant to add anything else he/she wants to say about the mental-skills sessions. Close interview by (a) asking participant if he/she wants anything removed from the interview so that [PI] never gets to see it, and (b) thank the participant for his/her participation.*

Appendix III

Summary of Social Validation Thematic Analysis (Study 3)

Application and Change Following Intervention "Lessons"*:* Athlete either shares/recalls a lesson in reference to component(s) of the intervention, provides an example of how they applied (or would apply) components of the intervention in their own personal experiences, and/or refers to a personal change in their thoughts, feelings, or behaviour that is tied to the mental-training intervention.

Superordinate Theme	Sub-Theme	"Example Quote" (Participant #)
Functional Attentional Focus: athlete alludes to the importance of directing attention or focus towards immediate task demands/requirements or away from non-essential task focus *or* athlete refers to change in type/direction, or amount of focus.	Direction/ Type	"What's Important Now [was one of the most important parts of the intervention]" (P14) "What's Important [was one of the most important aspects of the intervention]" (P6) "I don't think about misses that may have happened earlier in the game, I think about what's important now." (P2) "Just before games we talk about, we have a technical and non-technical goal to work on and 'what's important now' is one that comes up for us many times." (P12) "[Before the intervention] I just always thought everything was my fault and I would be missing my next shot because of it…'Cause I was discouraged and mad about missing the shot and stuff…[now] I think I'm the complete opposite, I focus on the next shot and don't worry about the last until the game's over." (P8) "Yeah, like it [the mental-training intervention] just really helped me to realize like, when you miss the shot, it's OK, forget about it and just go right into the next one. It's done, it's over with, you can't change it, now just work with what you have." (P10)
	Amount	"I kind of have been more mentally aware of what I say to myself." (P7) "[I] focus more on what I have to do next" (P3) "Instead of dwelling on a miss as much I focus more on the next shot." (P3) "Focus on What's Important Now [and to] not dwell on past shots…really helped me focus on what I need to do in the moment, whether it's how I warm up for a game or how I set up [for my shot] to make the shot to best ability. This is helpful because I can focus on one thing at a time and not get stressed about it." (P5)

Functional (Re)appraisal of Setbacks/ Adversity: athlete refers to importance of appraising failure, mistakes, score deficits, and/or setbacks in a productive manner that helps to prompt learning, action, motivation, or growth *or* refers to a change in way they view or perceive losses, failure, setbacks, deficits, and/or mistakes.	Opportunity to Learn	"I think it [the intervention] really helped reinforce how I want to deal with setbacks…By making sure like I analyze them and use my mistakes to help me move and get better." (P9) "Losing and stuff, it's a big part of your game...So I don't really know how to say it. 'Cause every time you lose you're taking a better look at things than when you win. Because when you win you don't really look at your mistakes that you made whereas when you lose you're like what can I do better, what can I change and stuff?" (P8) "Cause it's disappointing to have a huge setback like that. You set such high goals and your expectations are super high and then to go out and have them kinda dashed, it hurts a little bit. But I think in the long run it helps you to be a better competitive person, if you can learn from it. Obviously if you don't take anything from your losses and your mistakes then it's never gonna get you to be where you need to be." (P16) "I don't think a whole lot has changed how I view [personal mistakes] because I've always viewed them as a way to learn." (P10) "But it definitely takes a few beat-downs before you start actually having to think oh, maybe I need to change the way I look at everything." (P16) "I feel like I view my own missed shots with a better view than I did before. Taking the info I learned and using it in the next shot." (P4)
	Source of Motivation	"Because we have had, at the beginning of the season, I don't think we won a single game [for quite some time] and then so we beat these teams in a [tournament] that no one thought we would be able to beat so that was definitely an unlikely victory and we've had a couple really great comebacks and games that we totally thought we were not [going to] come back in. So that's kind of something we hold close." (P7) "Like if you keep in right mindset and don't give up then you still have a chance, like if you stay in the game you still have a chance to win it if you're still mentally there." (P7)
	Mistakes Inevitable	"Everybody makes mistakes and no one's a robot and 100% perfect, so everyone makes mistakes, it just depends on who can get over the mistakes and not make them again." (P14) "I believe that certainly I would have dealt with [a loss or failure] differently before the sessions than now…I probably would have looked at it more as sort of an isolation event sort of and we lost this [game to get into the playoffs] and that makes the whole weekend a failure… Whereas now I look at it as well we improved this weekend so that means we've always been improving and that we're improving towards the greater goal that we have which is winning [a major regional event] and this is sort of not secondary but sort of just a step." (P15)

Functional Self-Attitude/Self-Treatment: athlete refers to importance of having a productive attitude toward the self (from within or relative to others) following setbacks or in times of difficulty *or* athlete refers to change in way they treat or perceive themselves following adversity, setbacks, or failure.	Self-Criticism	"So it's more of just not getting too down on yourself. I think you have to get down on yourself a certain bit, you can't just let everything roll off, otherwise you're not gonna have any motivation to improve. But it's important to understand how to let things go and so you can just operate again in the present and not focus on, oh I just missed my shot, crap." (P3) "I look at my personal mistakes as a stepping stone now. I don't look at them where I'm mad at myself and then beating myself up over it and like looking back on the loss and saying darn, I should've won that game or why did I play so bad? I just take it as inspiration to go out and win the next one." (P13)[a] "I'm not as hard on myself and able to move forward" (P12) "When we wrote down all the things that we say to ourselves when we're frustrated and then got asked if we would ever say one of those things to a teammate and I definitely would not 'cause some of the things I wrote down were horrible and just, yeah. QUESTION: And so now do you find yourself using any of that terminology to yourself? RESPONSE: Hardly ever." (P7)
	Self-Kindness	"I'd say 'Being your own best friend' is what you need to succeed 'cause the moment you beat yourself up on the ice you just crumble" (P13) "If I get mad and stop and have a screaming match in my head with myself that doesn't really help anything. Keep going. It won't improve me for my next shot even if I miss the first one. You just have to know that be nice to yourself 'cause you know you can do it 'cause you've practiced and you just have to believe that you do know what you're doing." (P11) "I'd say [mistakes] still impact me more than they should but I'm definitely more considerate of when I make a mistake…just I'm more accepting…" (P12)
	Self-Reliance	"Not relying on your team to help you 'cause sometimes they can't, right? Sometimes they're dealing with their own stuff, right? You have to be able to help yourself." (P10)
	Perspective Relating to Others	"You gotta kinda understand that you're gonna miss again and I think that's what we really reinforced was nobody plays 100%. It just doesn't happen, I mean everybody's bound to miss a couple shots and then we kinda looked at a couple of even the professionals missing shots or doing unfortunate things …Mistakes happen to the best of us and if you can, I think that helped me too is just being able to kinda I guess look at the bigger picture. Like OK I missed but [a former Olympic champion] misses, [a current world champion] misses, I mean I'm not, so just kinda seeing like I'm not playing at the bar you gotta respect the fact it isn't as big and I feel like when I make my issues smaller it just kinda just relaxed me." (P16)

[a] It was not uncommon for athletes to talk about multiple changes and/or applications within the same conversation or quote—as though the concepts were linked together. For example, in this instance P13 appears to be discussing both a change in appraisal and a change in focus, while also incorporating a catchphrase from the session that—in this case—could also be considered an application.