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Effects of Mindful Sport Performance Enhancement (MSPE) on Running Performance and Body Image: Does Self-Compassion Make a Difference?

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Effects of Mindful Sport Performance Enhancement (MSPE) on Running Performance and Body Image: Does Self-Compassion Make a Difference?

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There has been growing interest in the use of mindfulness with athletes over the past decade, and one intervention that has been gaining empirical support is Mindful Sport Performance Enhancement (MSPE). Uncontrolled investigations of MSPE have shown promising results in several athlete populations, and the purpose of the present study was to conduct a controlled investigation of an enhanced, 6-week version of MSPE for long-distance runners. It was predicted that increases in mindful awareness and acceptance would be related to performance improvements, as well as changes in performance-related variables like flow, anxiety, and sport confidence. An additional aim of this study was to examine the impact on body image and disordered eating of including an emphasis on self-compassion in MSPE (MSPE-SC). Participants were 55 athletes from two Division I collegiate cross-country teams, who completed self-report measures at three times points (pre-workshop, post-workshop, and a 6-month follow-up), as well as pre- and post-workshop standardized time trials. One team (n = 24) served as a no-treatment control group, while athletes from the second team were randomly assigned to receive either MSPE (n = 16) or MSPE-SC (n = 15). Contrary to hypotheses, runners who received MSPE and MSPE-SC showed no changes in state or trait mindfulness, self-compassion, performance, most performance-related variables, or body image. The lack of change in mindfulness and self-compassion suggests that the changes that were observed in dissociative thoughts during running and disordered eating were not the result of the workshop. Also

contrary to prediction, the few significant group differences at post-test and follow-up favored the no-treatment control group (e.g., lower concentration disruption and higher flow compared to MSPE-SC). While these results might seem to indicate that MSPE may not be an effective intervention for athletes, consideration of the obstacles faced in the present study, the unique difficulties associated with working with an intact sports team, and the athletes' post-workshop feedback suggest that confounding variables may have affected the results of this investigation. Thus with appropriate adaptations, MSPE may remain a viable option for future research exploring the use of sport-specific mindfulness interventions with athletic teams.

This dissertation by Timothy R. Pineau fulfills the dissertation requirement for the doctoral degree in clinical psychology approved by Carol R. Glass, Ph.D., as Co-Director, Keith A. Kaufman, Ph.D., as Co-Director, and Diane B. Arnkoff, as Reader.

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Dedication

To my parents, Bev and Fred Pineau, who have supported me unconditionally in all of my endeavors.

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Acknowledgments

First I would like to thank my advisors, Carol Glass, Ph.D. and Keith Kaufman, Ph.D., for their tireless efforts in helping me to complete this process. In some ways, this dissertation feels like it is as much theirs as it is mine, and I could not have done it without them. Their guidance throughout my graduate career has been invaluable in teaching me what it means to be a professional psychologist. I would also like to thank Diane Arnkoff, Ph.D. for generously giving her time and agreeing to be on my dissertation committee, John Convey, Ph.D. for his statistics consultation, and all the coaches and athletes who agreed to be involved in this project despite their hectic schedules. And of course, I need to thank my friends, family, and other important people in my life who gave me emotional support and encouragement throughout graduate school. I feel particularly grateful for Eileen Twohy, Kevin Crowley, and Constance Cannon, without whom I do not know if this all would have been possible.

CHAPTER 1

Mindfulness in Sport Performance

Traditional sport psychology interventions, such as imagery, self-talk, and goal setting (Weinberg & Gould, 2011), generally aim to facilitate optimal performance by helping to control the internal, mental factors that can affect athletes (Gardner & Moore, 2006). Although these techniques have amassed support and are used around the world, investigations of these interventions have yielded inconsistent results and are often wrought with methodological flaws (Birrer & Morgan, 2010; Meyers, Whelan, & Murphy, 1996).

Gardner and Moore (2006) argue that the equivocal support for these traditional interventions may be due to the fact that their premise is flawed. Citing work by Wegner (1994), they propose that attempting to control negative internal states may ironically increase their occurrence by priming athletes to search for these phenomena. Such scanning can adversely impact sport performance, both by making negative thoughts and feelings more prominent in conscious awareness, and by distracting attention from the task at hand (Bertollo, Saltarelli, & Robazza, 2009; Janelle, 1999). Thus, rather than trying to control internal phenomena, it may be more beneficial for athletes to develop skills in present-moment awareness and acceptance (Gardner & Moore, 2006; Kaufman, Glass, & Arnkoff, 2009). This paradigm-shifting notion is a central tenet of an emerging group of treatments in sport psychology referred to as mindfulness-based interventions.

Psychological research on mindfulness began in part in the late 1970's (Kabat-Zinn, 1982; Langer & Imber, 1979) in two independent labs, working with two different conceptualizations of the construct. Langer's (2000) concept of mindfulness as "a flexible state of mind in which we are actively engaged in the present, noticing new things and sensitive to

context" (p. 220) is rooted in the theories and research of social psychology. According to Langer (1989), being mindful means noticing the context in which one acts. In this view, there is a particular emphasis on the active processing of new information, and the recognition that all stimuli can be seen from multiple perspectives. Langer contends that the capacity to see these various, situation-dependent points of view enhances one's ability to respond to the environment effectively and appropriately.

Kabat-Zinn's definition of mindfulness, on the other hand, has its roots in Buddhist philosophy, and involves "paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally" (Kabat-Zinn, 1994, p. 4). For those who conceptualize the construct in this way, mindfulness is not the active processing of context-dependent information, but instead is a nonreactive awareness and unconditional acceptance of whatever arises in the present-moment. This Eastern conceptualization of mindfulness has been used more widely to date, and is the primary perspective underlying approaches to sport performance enhancement (e.g., Gardner & Moore, 2004, 2007; Kaufman, Glass, & Pineau, 2012).

These two definitions of mindfulness share some important characteristics, like engagement with the present moment, although the different cultural and historical contexts in which these concepts originated have generated important differences that must be considered (Baer, 2003; Langer, 1989). A thoughtful examination of these theoretical similarities and differences will be explored throughout this chapter, which may highlight how each can contribute to this new direction in sport psychology. For the purposes of the present discussion, the two approaches will be referred to as Langer's mindfulness (LM) and Eastern mindfulness (EM). Any mention of *meditation* or a mindfulness-based *intervention* is referring to the Eastern

conceptualization of mindfulness, since Langer's mindfulness is not associated with meditation, and, to date, there are no interventions based on Langer's definition.

This chapter will begin by reviewing the existing mindfulness-based interventions for athletes, paying particular attention to Mindful Sport Performance Enhancement (MSPE; Kaufman et al., 2012). Then, the associations between mindfulness and four important sport performance-related variables (flow, attention, affect, and certain physiological factors) will be examined, and their empirical and theoretical connections with EM and LM will be presented. These discussions will attempt to illuminate points of integration and divergence between the two conceptualizations of mindfulness, in an effort to create a more comprehensive understanding of the multifaceted role of mindfulness in sport performance enhancement.

Mindfulness-based Interventions

In the first empirical test of a mindfulness-based intervention for athletes, Kabat-Zinn, Beall, and Rippe (1985) found that, following mindfulness training, a group of college rowers performed well above their coach's expectations (based on experience level and physical ability), and a group of Olympic rowers, several of whom won medals, reported feeling that the training had helped their performance. Despite these promising early results, it was nearly two decades before more rigorous empirical investigations of mindfulness-based interventions for sport performance enhancement were conducted. Currently, there are two empirically supported approaches specifically for athletes, both of which utilize the Eastern definition of mindfulness: Kaufman and colleagues' (2012) Mindful Sport Performance Enhancement (MSPE), and Gardner and Moore's (2004, 2007) Mindfulness-Acceptance-Commitment (MAC) approach. While MSPE will be the main focus of this discussion, the MAC approach and other recent

interventions for athletes will be briefly introduced, along with an example of LM that may be relevant to a discussion of improving sport performance.

Mindful Sport Performance Enhancement (MSPE)

Development. In 2006, Kaufman and Glass developed the first version of Mindful Sport Performance Enhancement (MSPE; Kaufman & Glass, 2006). This intervention draws from both Kabat-Zinn's (1990) Mindfulness-Based Stress Reduction (MBSR) and Segal, Williams, and Teasdale's (2002) Mindfulness-Based Cognitive Therapy (MBCT), as well as other relevant sources related to mindfulness and sports (e.g., Gallwey, 1974; Herrigel, 1953). MSPE is structured to be adaptable to any sport of focus. The initial version of the manual, which was designed as a 4-week protocol, incorporated concepts from books on archery (Lee & de Bondt, 2005), golf (Rotella & Cullen, 2004), and running (Dreyer & Dreyer, 2009), since athletes from those sports were included in the earliest studies of this approach. An expanded version of the MSPE manual has recently been created (Kaufman et al., 2012).

Description of MSPE. The expanded version of MSPE is a 6-week program consisting of weekly 90-minute group sessions and daily home practice (Kaufman et al., 2012). Original scripts were developed for all MSPE mindfulness exercises, and audio recordings of these exercises are provided to guide home practice. The intention of MSPE is to train athletes in the fundamentals of cultivating mindfulness, and then to help them gradually apply mindfulness skills both to their sport performance routines and lives beyond sport. In the initial sessions, an orientation and sport-specific rationale are presented to the athletes, which includes an explanation of what mindfulness is, how mindfulness training can be useful for athletes, and how the skills taught in MSPE are directly applicable to their sport. Core exercises included in the protocol are: (1) a candy exercise, a variant of the raisin exercise used by Kabat-Zinn (1990) and

Segal et al. (2002), which introduces the concept of awareness by having athletes focus on using all of their senses while slowly eating pieces of chocolate; (2) a sitting meditation that increases in length over the course of the workshop from 10 to almost 25 minutes, in which athletes are first guided to focus on their breath, then the sensations in their bodies, and finally to the sounds around them; (3) a body scan, during which athletes direct their attention to different areas of their body in sequence from their feet to their head, while being guided to notice and accept whatever sensations arise; (4) mindful yoga, which includes a series of basic yoga poses that allow athletes to practice maintaining a mindful awareness of their bodies and minds while they are in motion; (5) a walking meditation, in which athletes are guided to be fully aware of the sensations they experience within their bodies as they slowly transition from standing to walking at varying speeds; and (6) a sport-specific meditation (e.g., a running meditation), designed to give athletes the opportunity to apply the mindfulness skills they have developed throughout the workshop to the actual motions and sensations that they experience when participating in their sport.

The order in which these core exercises are taught progressively moves athletes from sedentary to active mindfulness practice. The culmination of this progression from mindfulness in stillness to mindfulness in motion is the introduction of the sport-specific meditation, which is intended create the necessary bridge between cultivating mindfulness and applying mindfulness during sport participation. The inclusion of an applied sport meditation and a rationale for the training that is adaptable to any sport represents a unique contribution of MSPE.

Empirical support for MSPE. Two studies (De Petrillo, Kaufman, Glass, & Arnkoff, 2009; Kaufman et al., 2009) and one follow-up investigation (Thompson, Kaufman, De Petrillo, Glass, & Arnkoff, 2011a) have been completed using the 4-week version of MSPE. Using a

community sample of archers and golfers, Kaufman et al. (2009) found significant increases in aspects of state and trait mindfulness for the golfers, in overall trait mindfulness for the archers, and in state flow for the whole sample. Flow, detailed later in this chapter, is the psychological construct thought to most closely approximate what athletes commonly refer to as "the zone." Additionally, post-workshop feedback indicated that the athletes felt the MSPE workshop had positively impacted their performance and that they expected additional benefit in the future. De Petrillo et al. (2009) tailored the 4-week MSPE protocol to runners and found a significant increase in state mindfulness and a dimension of trait mindfulness from pre- to post-intervention, as well as significant decreases in aspects of sport-related anxiety and perfectionism. However, no significant performance changes were found (measured by self-reported best mile time pre- and post-intervention).

A 1-year follow-up of the archers, golfers, and runners who had received the MSPE training in the earlier studies showed that the athletes experienced a significant increase in trait mindfulness since receiving the workshop (Thompson et al., 2011a). Additionally, both the golfers and runners reported significantly improved performance (i.e., self-reported 18-hole practice round scores and mile times, respectively) since the conclusion of the workshop. Without a control group, it is impossible to say if these changes were a result of the MSPE training over and above the additional year of experience the athletes had in their sport, but other results at follow up suggest this possibility. Specifically, improvements in the golfers' scores were significantly related to increases in the unambiguous feedback dimension of trait flow, and the runners' performance improvement was associated with increases in mindfulness. These results may be particularly important given that Kaufman et al. (2009) observed a significant

increase in the unambiguous feedback dimension of state flow from pre- to post-intervention, and that athletes from both earlier studies exhibited increases in mindfulness.

Mindfulness-Acceptance-Commitment (MAC) Approach

Gardner and Moore's (2004, 2007) mindfulness-acceptance-commitment (MAC) approach to performance enhancement is another manualized mindfulness-based intervention developed for and studied using athletes. This approach draws heavily from Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999), and consists of seven weekly meetings, or modules. These modules include in-session exercises and discussions, as well as between-session homework assignments designed both to reinforce the skills being taught in each module and to provide material for discussion in subsequent sessions. A more complete description of the MAC approach and its empirical support can be found in Gardner and Moore (2007), Moore (2009), and Schwanhausser (2009).

Other Mindfulness Interventions for Athletes

In an attempt to explore the impact of mindfulness training on the experience of flow, Aherne, Moran, and Lonsdale (2011) devised a basic 6-week mindfulness intervention for athletes. This training includes a handout that outlines information on mindfulness and how it can be applied to sport, and instructions for daily, individual home practice doing one of four exercises (two versions of a10-minute sitting meditation, 10-minute standing yoga, and a 30-minute body scan) from the CD "Guided Meditation Practices" (Williams, Teasdale, Segal, & Kabat-Zinn, 2007). Athletes are also given a scheduled timetable of the home practice and sent daily text message reminders to facilitate their training. No group practice or discussion is involved. In a randomized controlled investigation of this program, Aherne and colleagues

(2011) found that athletes who received this training experienced significant increases in mindfulness and flow that were not exhibited by the control group.

Baltzell and Akhtar's (2012) Mindfulness Meditation Training for Sport (MMTS) is a 6-week program consisting of two 30-minute meetings per week, and integrating mindfulness training with traditional psychological skills training (e.g., imagery and self-talk). The discussions and exercises focus on teaching open awareness, the use of positive affirmations, concentration, and tactics for coping with negative mind-states (e.g., labeling emotions and nonreactivity). In addition to the in-session meditations, participants are encouraged to practice on their own daily. In a quasi-experimental study of this approach, athletes who received MMTS showed a significantly greater increase in mindfulness than controls, while controls reported a significant increase in negative affect that was not evident in the MMTS group (Baltzell & Akhtar, 2012).

Langer's Mindfulness Approach

Langer has not specifically addressed how her mindfulness approach might impact sport performance, but Pietrasz and Langer (described in Langer, 1997) conducted a study that suggests it could have some benefits for athletes. They taught a group of children a novel sport similar to squash, which they named "smack-it ball." The experimental manipulation involved the use of conditional language when presenting the sport's instructions to half of the participants, and absolute language with the other half. It had been shown previously that the presentation of material in a conditional manner (e.g., "one way to hold your hand might be…"), rather than in an absolute manner (e.g., "this is how to hold your hand") leads to what Langer calls mindful learning, which promotes an awareness of multiple perspectives and contextual factors when working with new information (Langer, 1989, 1997). After giving the participants

time to practice the new smack-it-ball skills, the researchers secretly exchanged the ball being used for a similar looking, but much heavier one, requiring the participants to adapt and use different body movements than the ones they had been taught. As predicted, those participants who had received the absolute instructions were more likely to exhibit performance decrements (i.e., an inability to adapt) than those who had received the conditional instructions.

Although it may not have been their intention, when Pietrasz and Langer switched the balls they were actually re-creating a very common phenomenon in most, if not all, sports. Specifically, the environment of competition can be variable and unpredictable, which requires athletes to adjust the well-learned techniques they may have honed in the practice environment. Langer (2000) states that a primary myth believed about learning is that "the basics" need to be so well learned that they become automatic (a belief certainly espoused in sports). However, Langer and Imber (1979) found that such an approach may lead to over-learning, which could result in an individual losing the ability to make small adjustments to "the basics" that are often necessary in dynamic contexts (like sports). Langer's research suggests that this difficulty might be avoided with a simple linguistic change from absolute to conditional instructions that promote the mindful learning of athletic skills.

A significant component of this kind of mindful learning is mental flexibility (Langer, 1989, 1997), which is also a major part of the EM-based performance enhancement interventions described above. For instance, a foundational concept underlying the MAC program is that "a *flexible* approach to one's experiences … is essential for optimal functioning" (Gardner & Moore, 2007, p. 32). In fact, much like Pietrasz and Langer describe the negative impact of mindless learning on performance in their smack-it ball study, Gardner and Moore (2007) explain that rule-governed behavior impairs an individual's capacity to take in and respond to

situational or contextual environmental cues (Hayes, Kohlenberg, & Melancon, 1989), which can then result in actions that may not be ideally suited to the task at hand. They propose that mindfulness may be the antidote to this problem, in that it "enhances the individual's sensitivity to cues and contingencies in the environment and thus promotes greater behavioral flexibility" (p. 37). Similarly, MSPE emphasizes the importance of nonjudgmental awareness, which helps to promote mental flexibility by allowing athletes to accept the occurrence of both internal (e.g., emotions) and external (e.g., weather) events. Rather than expend mental and physical energy worrying about or wishing away unexpected or uncontrollable circumstances, mindful athletes, as defined by Kaufman et al. (2012), have more available resources to devote to the task at hand, enhancing their capacity to respond to the situation appropriately.

While both perspectives on mindfulness share an emphasis on engagement with the present moment, a distinction between them is that LM is primarily focused on working with information that is external to the individual (e.g., awareness of the situational context), whereas EM is less goal directed and focuses more on stimuli and processes that are internal to the individual (e.g., awareness of thoughts and feelings; Baer, 2003; Bishop et al., 2004). This is an important distinction, but it may be helpful to view this divergence as a way in which these views actually complement each other. Although internal factors play an important role in sport performance, all sports are in some way skill-based, requiring the ability to interact with one's surroundings. Langer's mindful learning may be a useful bridge between the internal nature of EM and the inherently external nature of the sports to which EM is being applied.

Mindfulness and Flow

Sport psychologists often associate peak-performance experiences, or being "in the zone," with states of flow (Jackson & Csikszentmihalyi, 1999; Young & Pain, 1999). Flow

typically occurs when a person perceives a balance between the challenges associated with a situation and his or her capacity to meet those challenges. While in a flow state, an individual is so involved with the task at hand, and finds the activity so inherently enjoyable, that nothing else seems to matter (Csikszentmihalyi, 1990). Such an experience is generally regarded as an optimal psychological state, as mind and body are in harmony, negative thinking and self-doubt are absent, and functioning is enhanced (Jackson, 2000). For athletes, this state can ultimately result in optimal sport performance (Jackson & Roberts, 1992; Jackson, Thomas, Marsh, & Smethurst, 2001).

Recently, a growing interest in the connection between flow and EM has developed. For example, Gardner and Moore (2004) note some important similarities between flow and mindfulness, pointing out that both constructs "share an emphasis on present-moment, non-self-conscious concentration on a particular task" (p. 714). Empirical research has supported this proposed connection, with numerous studies demonstrating not only a robust relation between measures of mindfulness and flow in athletes (Bernier, Thienot, Codron, & Fournier, 2009; Kaufman et al., 2009; Pineau, Glass, Kaufman, Tenuta, & Bernal, 2011), but also significant increases in athletes' levels of flow after receiving mindfulness-based interventions (Aherne et al., 2011; Kaufman et al., 2009).

Given this evidence, some authors suggest that flow may be one of the key paths through which mindfulness training can help athletes improve their performance (Gardner & Moore, 2004; Kaufman et al., 2009). In an attempt to provide a more complete picture of this association, the complex relation between mindfulness and flow will be explored. Almost all research to date looking at mindfulness and flow has used EM measures, but consideration is also given below to how LM may relate to flow.

Eastern Mindfulness and Flow

Most descriptions of EM include an awareness component and an acceptance component (Bishop et al., 2004; Cardaciotto, Herbert, Forman, Moitra, & Farrow, 2008). However, Baer and colleagues (Baer, Smith, & Allen, 2004; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006) propose that these aspects can be further broken down into several facets that represent different ways to operationalize awareness and acceptance. These facets of mindfulness (Baer et al., 2006, 2008) include observing (noticing a variety of internal and external stimuli), describing (applying labels to observed phenomena), acting with awareness (being fully engaged in activities as opposed to being on automatic pilot), nonjudging of inner experience (being fully accepting of thoughts and feelings), and nonreactivity to inner experience (allowing thoughts and feelings to come and go without overidentifying with them).

Two studies examining mindfulness and flow using Baer's measures found significant positive associations between mindfulness and flow in athletes (Kaufman et al., 2009; Pineau, Glass, Kaufman, Tenuta, & Bernal, 2011). However, these studies revealed a different constellation of relations between the elements of mindfulness and flow. What these results may suggest is that, while the essence of a nonjudgmental present-moment awareness could be an integral aspect of optimal sport performance in general, performance in specific sports that require unique skills may benefit differentially from a focus on certain facets of mindfulness.

For example, the acting with awareness component of mindfulness was not related to flow in rowers (Pineau, Glass, Kaufman, & Bernal, 2011a), but showed the strongest correlation with flow of any of the mindfulness factors in archers and golfers (Kaufman, 2009). Keeping in mind that acting with awareness represents the degree to which individuals do or do not perform tasks on "automatic pilot," the contrasting demands of these sports may explain this difference.

Optimal performance for rowers requires a continuous awareness through the duration of a race while repeatedly performing a single action as efficiently as possible (e.g., a stroke), whereas performance for archers and golfers involves discrete periods of focus throughout a series of unique events (e.g., shooting arrows). Thus, a degree of automaticity in performance may help rowers by freeing up the attentional resources necessary to engage in the continuous awareness of a dynamic external environment.

Such differences seem to indicate that it may be useful in future explorations of the relation between mindfulness and flow to avoid drawing sweeping conclusions about all athletes. Alternatively, discussing which components of mindfulness relate to flow for which sports may be more informative, and could contribute to the development of more targeted, sport-specific mindfulness interventions.

Langer's Mindfulness and Flow

Langer (2002) notes the likely connection between her conceptualization of mindfulness and flow, yet little research has explicitly explored this association. One of the earlier attempts to examine the relation between mindfulness and flow in athletes does provide some evidence for this possible connection. Kee and Wang (2008) defined mindfulness using an Eastern conceptualization (Bishop et al., 2004), but chose to assess the construct using Langer's Mindfulness/Mindlessness Scale (MMS; Bodner & Langer, 2001), which divides mindfulness into four characteristics: novelty seeking (openness toward new experiences), novelty producing (processing environmental stimuli to generate new and useful information), flexibility (seeing events from more than one perspective), and engagement (noticing details in the environment).

Kee and Wang (2008) found that flow was significantly related to all four of these characteristics. They also found that athletes higher in mindfulness were more likely to adopt

mental skills, such as attentional control, emotional control, and goal setting, which were themselves positively related to flow. Although causal connections cannot be drawn from these correlational data, it is possible that mindful athletes may be more likely to engage in novel strategies that help to promote flow states.

Mindfulness and Attention

Attention and Sport Performance

Sport-specific definitions of attention generally consist of four components: selective attention, sustained attention, situational awareness or orienting attention, and attentional flexibility or divided attention (Memmert, 2009; Weinberg & Gould, 2011). When effectively engaging these facets of attention, an athlete is focusing on relevant cues while disregarding irrelevant ones, holding an appropriate level of focus throughout the entirety of a performance, maintaining a constant awareness and understanding of relevant stimuli in the environment, and, when necessary, shifting attention between stimuli or allocating attentional resources to multiple stimuli. Despite the widely accepted importance of attentional processes in sport (Janelle & Hatfield, 2008; Moran, 1996), Boutcher (2008) comments that the literature base on this topic is under-developed, and thus the mechanisms through which attention affects performance are not well understood.

Some of the research on attention in sport performance has found that athletes who engage in "associative" strategies (i.e., directing attention to task-related cues) tend to perform better than those who use "dissociative" strategies (i.e., focusing attention on task-irrelevant cues; Masters & Ogles, 1998; Morgan & Pollock, 1977; Salmon, Hanneman, & Harwood, 2010). However, Hutchinson and Tenenbaum (2007) note that this effect has not been well-established in sports other than running (see Spink & Longhurst, 1986 for an exception with swimmers), and

that this difference has not always been supported even for runners (e.g., Stevinson & Biddle, 1998). Additionally, the dichotomous system of associative versus dissociative attention does not account for the fact that athletes often switch between strategies based on the type or intensity of the task they are completing (Hutchinson & Tenenbaum, 2007; Salmon et al., 2010). Salmon and colleagues (2010) propose that a mindfulness-based conceptual model of attention, with an emphasis on the nonjudgmental awareness of whatever arises in one's present-moment experience, is able to account for this shifting of attentional strategies based on task demands.

Other research focusing on more objective phenomena, including response time, response accuracy, and patterns of visual fixation (e.g., frequency, duration) has found that, in comparison to novice athletes, expert athletes are quicker and more accurate in their physical responses and exhibit fewer, but longer visual fixations (Mann, Williams, Ward, & Janelle, 2007). This suggests that expert athletes may have more efficient attentional processes than their novice counterparts, being able to glean more relevant information from fewer environmental cues, and then react to those cues more quickly and appropriately. Like Salmon et al. (2010), Moore (2009) posits that mindfulness may be important to consider when discussing attention in sport, stating that, "mindfulness practice may very well facilitate the development of this more economical mode of using and allocating cognitive (in particular) attentional resources" (p. 294). In light of these suggestions, the effects of EM training on attentional processes will be explored, as well as how this may influence sport performance. The potential impact of LM on attentional processes will also be discussed, as Langer's focus on the awareness of external stimuli and cognitive flexibility may be particularly relevant in a sport context.

Eastern Mindfulness and Attention

A core feature of EM is the ability to pay attention (Kabat-Zinn, 1994, 2003), and, in fact, research has shown that mindfulness training can improve attentional abilities (e.g., Jha, Krompinger, & Baime, 2007; see Chiesa, Calati, & Serretti, 2011 for a review). In non-athlete populations, mindfulness has been shown to relate to superior selective attention (Chan & Woollacott, 2007; Jensen, Vangkilde, Frokjaer, & Hasselbalch, 2012; van den Hurk, Giommi, Gielen, Speckens, & Barendregt, 2010), sustained attention (Chambers, Lo, & Allen, 2008; Valentine & Sweet, 1999), situational awareness (Jensen et al., 2012; Moore & Malinowski, 2009), and attentional flexibility (Hodgins & Adair, 2010). It has been suggested that these attentional enhancements may be an important mechanism through which mindfulness training can improve sport performance (Gardner & Moore, 2004; Moore, 2009), but little research has looked specifically at the effects of mindfulness training on the attentional processes of athletes.

Weinberg and Gould (2011) propose that several important dimensions of flow involve high levels of attention and concentration. Thus, the flow research provides some indirect evidence for the connection between mindfulness and attention, as mindfulness has been shown to relate to the merging of action and awareness, concentration on the task at hand and a sense of control, and the processing of unambiguous feedback (Aherne et al., 2011; Kaufman et al., 2009; Pineau, Glass, Kaufman, & Bernal, 2011a), which have conceptual similarities to selective attention, sustained attention, and situational awareness, respectively.

Additionally, in her case study of a springboard diver, Schwanhausser (2009) provides qualitative data regarding the effects of the MAC approach on sustained and selective attention, as the athlete reported after the intervention that he noticed an increased ability to "stay focused despite distractions" (p. 390). This evidence seems to bolster Gooding and Gardner's (2009)

conclusion that "the positive performance enhancing qualities inherent in mindfulness may be due to its relationship to the self-regulation of attention" (p. 315).

Salmon and colleagues (2010) propose a mindfulness-based model that includes both awareness and acceptance (e.g., nonreactivity) to explain how certain attentional processes can enhance sport performance. For example, while the enhanced awareness of bodily sensations may give athletes a more accurate perception of their level of physical exertion, it is the nonreactive attitude taken toward those bodily sensations that allows them to more efficiently use their available resources by avoiding the distracting, self-evaluative worries, and subsequent physical consequences that often accompany feelings of fatigue and exhaustion (see the physiology and mindfulness section for additional discussion of this topic). This idea makes sense considering that performance setbacks can cause attentional shifts from task-relevant cues to self-evaluative cues (i.e., being judgmental of oneself), which may result in performance decrements (Klinger, Barta, & Glas, 1981), while "detachment" (i.e., nonreactivity) has been cited by elite pentathletes as an important strategy to counteract the debilitative attentional and emotional consequences of making mistakes during sport performance (Bertollo et al., 2009).

Some negative findings have also been found regarding the link between mindfulness and attention, with research demonstrating no difference between meditators and non-meditators on measures of attention (Josefsson & Broberg, 2011), no improvement compared to controls in attentional processes following an 8-week mindfulness intervention (Anderson, Lau, Segal, & Bishop, 2007), and even a significant association between mindfulness and exaggerated lapses in attention (Schmertz, Anderson, & Robins, 2009). Such mixed results may be due to a variety of methodological flaws within the body of research (Jensen et al., 2012), or to the use of varied measures of attention that may relate differently to mindfulness skills (Josefsson & Broberg,

2011). Considering this latter possibility, after finding no differences between meditators and non-meditators on two measures of attention, Josefsson and Broberg (2011) conclude that "mindfulness meditators may have an increased awareness of internal processes and the ability to quickly attend to them but this type of refined attentional ability does not seem to be related to performance on attention tests requiring responses to external targets" (p. 291). This conclusion is quite striking since responding to external targets is precisely what many athletes are required to do. Given the recognition that a primary difference between EM and LM is that the latter focuses more on the awareness of external, rather than internal, stimuli (Baer, 2003; Bishop et al., 2004), it appears that LM could play an important role in the attentional processes of athletes.

Langer's Mindfulness and Attention

Langer (1997) states that a commonly believed "myth" about attention is that "paying attention means staying focused on one thing at a time" (p. 2). She proposes that this mindset actually inhibits attentional capacity because, in accordance with this belief, one may put excessive amounts of mental energy into trying to maintain focus on a single stimulus from just one perspective. In studying this hypothesis, Langer and her colleagues have consistently found that, for a variety of populations, when people are given instructions to vary their focus of attention in some way, their attentional performance improves (Langer, 2000; Langer & Bayliss, described in Langer, 1997; Levy, Jennings, & Langer, 2001).

Langer has not explicitly examined this idea in a sport context, but she does mention sport as a particularly well-suited atmosphere for the implementation of this kind of varied attention, noting, "in tennis or table tennis or any sport, we move around so that the stimulus is never quite the same" (Langer, 1997, p.42). This notion of the usefulness of varied attention does have some indirect support in the sport psychology literature, as attentional flexibility has

been linked with expert sport performance (Memmert, 2006; Nougier & Rossi, 1999; Pesce & Audiffren, 2011). In one particularly relevant example, Memmert and Furley (2007) found that, when not given a specific task to focus on (e.g., make a specific play), the breadth of athletes' attention seems to broaden and become more flexible, as they search the environment for a variety of optimal tactical opportunities rather than just a limited few, potentially enhancing overall performance. Such broadening of attention may also produce significant increases in creative play in the complex environments of team sports (Memmert, 2007). These results seem to support Langer's proposition that certain mindsets (e.g., "I need to make a specific play") can inhibit one's ability to attend fully to the environment, while other, more mindful mindsets can have the opposite effect.

For athletes, increasing levels of LM could result in a broadening of attention, which might allow them to more quickly notice relevant cues, shift their focus to new cues, and make more creative connections between these cues. This could enhance their ability to solve emergent problems, make effective decisions, and ultimately improve performance. However, more research is needed examining the possible effects of LM on attention in sport, as only one study to date has found a link between this conceptualization of mindfulness and attention in athletes (Kee & Wang, 2008).

Mindfulness and Affect

Affect and Sport Performance

The notion that both positive and negative emotions can impact athletic performance is firmly established in the sport psychology literature (Hanin, 2000; Lazarus, 2000; McCarthy, 2011). Feeling intrinsic enjoyment in sport participation (i.e., autotelic experience) is an integral part of flow (Csikszentmihalyi, 1990; Jackson, 2000; Jackson & Csikszentmihalyi, 1999), and

both anecdotal and empirical evidence suggest that enjoyment of sport participation is a significant factor in sustained successful involvement in athletics (Fitzgerald, 2010; McCarthy & Jones, 2007; Scanlan, Russell, Beals, & Scanlan, 2003). A variety of positive emotions in athletes (e.g., happiness) have also been positively correlated with self-rated performance (Totterdell, 1999; Vast, Young, & Thomas, 2010), improved reaction times (Woodman et al., 2009), and a broadening of attention, leading to more openness, attentional flexibility, and an enhanced capacity to integrate information (Carver, 2003; Fredrickson, 2001). Additionally, hope and optimism may be protective factors against burnout in athletes (Chen, Kee, & Tsai, 2008; Gustafsson, Hassmen, & Podlog, 2010).

Regarding the impact of negative emotions, it appears that high levels of such feelings tend to have detrimental effects on sport performance. For instance, excessive levels of anxiety have been shown to be associated with more muscle tension and fatigue (Pijpers, Oudejans, Holsheimer, & Bakker, 2003), narrowed attentional focus (Landers, Wang, & Courtet, 1985), concentration disruption (Hatzigeorgiadis & Biddle, 2001; Otten, 2009), and an overall decrease in the efficiency of cognitive processing (Wilson, 2008). Increased levels of anxiety, as well as other forms of negative affect (e.g., depressive symptoms), are also characteristics of burnout (Hackney, Perlman, & Nowacki, 1990) and overtraining syndrome (Armstrong & VanHeest, 2002), which are largely defined by worsening performance.

Considering the importance of affect for athletes, the link between emotions and mindfulness will be explored, with a focus on the role of mindfulness in emotion regulation. Also, Langer's (1989, 2002) emphasis on the importance of perspective in determining affective responses will be discussed, as it may serve as an important point of departure from EM, and could have implications for the relation between anxiety and sport performance.

Eastern Mindfulness and Affect

An ample body of literature has demonstrated a robust association between EM and psychological well-being (Greeson, 2009; Keng, Smoski, & Robins, 2011; Orzech, Shapiro, Brown, & McKay, 2009). Evidence with non-athlete populations suggests that mindfulness training can both enhance positive affect (e.g., Anderson et al., 2007; Geschwind, Peeters, Drukker, van Os, &Wichers, 2011; Nyklicek & Kuijpers, 2008) and decrease negative affect (e.g., Chambers et al., 2008; Shapiro, Schwarz, & Bonner, 1998; Zeidan, Johnson, Gordon, & Goolkasian, 2010; see Toneatto & Nguyen, 2007 for contradictory evidence regarding the effects of mindfulness on depression and anxiety).

A smaller literature with athletes supports the association of mindfulness with higher levels of positive affect and lower levels of negative affect. For instance, significant inverse correlations have been found between mindfulness and sport-related anxiety (Pineau, Glass, Kaufman, & Bernal, 2011a; Thompson, Kaufman, De Petrillo, Glass, & Arnkoff, 2011b), while positive relations have been found between mindfulness and both general optimism (Pineau, Glass, Kaufman, & Bernal, 2011a) and sport-related optimism (Kaufman, 2009; Pineau, Glass, Kaufman, & Bernal, 2011a). Additionally, in response to MAC and MSPE, athletes have been shown to demonstrate significant reductions in aspects of sport-related anxiety (DePetrillo et al., 2009; Gardner & Moore, 2004), and significant increases in sport-related optimism (Kaufman et al., 2009). Moreover, it appears that athletes continue to experience these benefits over time, as Thompson et al. (2011a) found that, 1 year after MSPE workshops, athletes exhibited a significant reduction in sport-related anxiety and reported an increase in general life satisfaction, with several indicating enhanced enjoyment of their sport.

While this ability to directly alter levels of specific emotions may be an important feature of mindfulness for athletes, it is possible that the promotion of emotion regulation may actually produce even greater benefits for sport performance. It has been suggested that enhancing emotion regulation may be a primary mechanism of change in mindfulness interventions (see Gratz & Tull, 2010 for a review), and emotion regulation is an important construct in the sport psychology literature (e.g., M. V. Jones, 2003). For example, an important distinguishing factor between unsuccessful and successful athletes may be their degree of susceptibility to changes in mood in response to situational factors (Coker & Mickle, 2000). Also, Lemyre, Treasure, and Roberts (2006) found that increased variability of negative affect was predictive of burnout.

Gratz and Tull (2010) offer that a useful conceptualization of emotion regulation "may arguably focus on adaptive ways of responding to emotional distress, rather than on the control of emotions or dampening of emotional arousal in general" (p. 111), since research has suggested that efforts to control or avoid internal experiences (e.g., emotions) often have a paradoxical effect, leading these experiences to be more frequent or intense (Hayes, Luoma, Bond, Masuda, & Lillis, 2006; Janelle, 1999; Wegner, 1994). Without discussing emotion regulation directly, both the MAC approach and MSPE describe the ability to resolve this "ironic mental process" (Wegner, 1994) as one of the primary benefits of a mindfulness- and acceptance-based approach over traditional control-oriented psychological skills training for athletes.

Evidence directly linking mindfulness and emotion regulation in athletes is lacking. However, such a connection is indicated by the work of Baltzell and Akhtar (2012), who recently found that athletes who received MMTS showed virtually no change across a variety of dimensions of positive and negative affect over 6 weeks, while a control group exhibited

significant fluctuations on 10 different items reflecting positive and negative affect. Additionally, athletes who receive mindfulness-based interventions appear to engage in less experiential avoidance and become more accepting of their current emotional experiences, whatever they may be (Gardner & Moore, 2004; Schwanhausser, 2009). This is concordant with the conceptualization of EM as a way to cultivate emotional balance (Kabat-Zinn, 1990), and the demonstrated association in non-athletes between mindfulness and emotion regulation (Arch & Craske, 2006; Chambers, Gullone, & Allen, 2009; Hayes & Feldman, 2004). Taken together, this evidence implies that mindfulness interventions may help athletes improve their performance by not only increasing positive emotionality and decreasing negative emotionality, but also by helping them to regulate their reactions to the strong emotions that are inevitably produced by competitive sports.

Langer's Mindfulness and Affect

The accumulated body of research on LM has shown that greater levels of mindfulness are associated with increased feelings of competence, more positive affect, enhanced creativity, and a reduced risk of occupational burnout (Langer, 1989, 1997), all of which could suggest a link between mindfulness and improved sport performance. Indeed, there appears to be some empirical support for this proposed association. For instance, Denny and Steiner (2009) found that in a diverse group of athletes, mindfulness (assessed on the MMS) was positively related to happiness and overall life satisfaction, and negatively related to distress. Mindfulness also significantly predicted life satisfaction, while performance-related factors (e.g., amount of playing time, scholarship status) did not. Additionally, Haigh, Moore, Kashdan, and Fresco (2011) found that the MMS and a measure of emotion regulation were positively correlated in non-athletes, and Kee and Wang (2008) found that the MMS was significantly related to

emotional control in athletes. These findings support a potential relationship between LM and emotion regulation, which, as noted above, may be important for superior sport performance (M. V. Jones, 2003).

Along with this empirical evidence, there are theoretical arguments to explain how LM may influence the emotional experience of athletes, and thus impact sport performance. Langer (2002) points out that everything individuals evaluate as negative can be seen as positive from a different perspective, and vice versa. The process of seeing this duality (i.e., being mindful) gives people a greater sense of control over their experience of the world. Thus, Langer (1997, 2002) suggests that one should actively seek out a variety of judgments or evaluations to create the possibility of changing one's perspective on any given situation from negative to positive.

Langer has documented the power of perspective, showing that when the same activity is presented as "play" or "work," people with the "play" perspective enjoyed the experience more and were more engaged than those doing "work" (Snow & Langer, described in Langer, 1997). This importance of perspective may relate to the concept of entrapment theory in the sport psychology literature, which suggests that athletes who feel like they have to participate in their sport or who have low levels of self-determined motivation are at greater risk for burnout than those who feel like they participate because they want to or who have high levels of self-determined motivation (Lonsdale, Hodge, & Rose, 2009; Raedeke, 1997).

Langer's ideas on perspective also fit nicely with G. Jones' (1995) theory of facilitative and debilitative anxiety, which asserts that how an athlete interprets feelings of anxiety in large part determines the effect of that anxiety as helpful or harmful. According to Langer's view, in actively searching for these multiple interpretations of anxiety, athletes give themselves a choice to perceive, and to be affected by, the more beneficial interpretation in that moment. This aspect

of choice is particularly relevant given Jones' emphasis on the perception of control in determining whether anxiety will be experienced as facilitative or debilitative. Langer (1989) writes that, "[e]ven the most apparently fixed and certain situations can become subject to control if viewed mindfully" (p. 74). In contrast, EM encourages the "letting go" of any judgment, positive or negative (Kabat-Zinn, 1990), and so an EM approach would guide athletes to nonjudgmentally observe their anxiety as a feeling that is not necessarily representative of reality (i.e., neither facilitative nor debilitative). This may neutralize the potentially negative effects of anxiety, but it could remove facilitative effects as well.

It seems that LM may play an important and distinct role in the association between affect and sport performance. However, when the theoretical and empirical evidence connecting affect to both concepts of mindfulness is considered, there appears to be support for the conclusion that EM and LM may complement each other such that interventions designed to incorporate both views might be more beneficial than either approach alone.

Mindfulness and Physiology

Sport is an inherently physical pursuit, and sport psychologists have endeavored to understand the physiological correlates and determinants of optimal athletic performance. In particular, emerging neuroimaging technologies have allowed researchers to examine the neurological underpinnings of superior performance in sport (e.g., Hatfield & Kerick, 2007). Such technologies have also created the opportunity to explore the neurological correlates of mindfulness (Siegel, 2007; Treadway & Lazar, 2010). The neurological factors that have been found to be associated with both mindfulness and sport performance will be reviewed, with a particular focus on research relating EM, neurological processes, and the perception of pain and fatigue. Langer's mindfulness will also be addressed, as some literature suggests that the

openness to new ideas and perspectives that is characteristic of LM may be an important prerequisite for mindfulness-based interventions to produce physiological effects, and may also alter the impact of pain and fatigue.

Eastern Mindfulness and Physiology

A number of physiological effects relevant to sport performance have been shown in response to mindfulness-based interventions (e.g., decreased pre-competitive cortisol production indicating reduced pre-competitive stress, John, Verma, & Khanna, 2011), but one of the more potentially intriguing associations between mindfulness and physiological processes with relevance for sport performance has to do with the experience of pain. Early research on MBSR involving chronic pain patients demonstrated that mindfulness training can decrease perceptions of pain intensity, emotional reactivity to pain, and the use of pain-relieving drugs, and that some of these benefits are maintained up to 4 years later (Kabat-Zinn, 1982; Kabat-Zinn, Lipworth, & Burney, 1985; Kabat-Zinn, Lipworth, Burney, & Sellers, 1987). More recent controlled studies of mindfulness-based interventions using healthy participants also found decreases in pain sensitivity (Kingston, Chadwick, Meron, & Skinner, 2007; Zeidan, Gordon, Merchant, & Goolkasian, 2010), providing further support for mindfulness as an effective way to enhance one's pain tolerance. This relation between mindfulness and coping with pain seems potentially meaningful for athletes, since many sports involve pushing the body toward its maximum physical capacity, which can be a painful experience.

Most sport and exercise scientists assume that fatigue and exhaustion in sport, which are often accompanied by muscle pain, are the result of purely physiological phenomena (Noakes, St. Claire Gibson, & Lambert, 2005). However, it has been observed that the *perception* of effort while performing may predict exhaustion better than any physiological measure does

(Noakes, 2008), and as such, "exercise tolerance in highly motivated subjects is ultimately limited by perception of effort" (Marcora & Staiano, 2010, p. 763). Considering this possible key role of perception in the reaction to and effects of physical pain during sport performance, Kaufman et al. (2012) argue that an enhanced ability to cope with pain might be one of the principal ways that mindfulness training could benefit athletes who participate in sports in which pain is often experienced as a limiting factor of performance.

This potential advantage for mindful athletes is highlighted by the work of Grant and Rainville (2009), who found that not only did meditators have a generally higher pain threshold than controls, but also, when they were asked to pay mindful attention to a painful stimulus, controls reported an increase in pain sensitivity while meditators showed a slight decrease. This finding seems particularly meaningful given the research of Hutchinson and Tenenbaum (2007), who found that attentional focus during physical activity is mediated by the intensity of the task, such that, "during high intensity exercise attention is focused on overwhelming physiological sensations, which dominate focal awareness" (p. 244). These studies seem to suggest that athletes engaging in physically demanding sports that result in muscle pain would necessarily have their attention drawn to that pain, resulting in increased pain sensitivity for those with no mindfulness training, but decreased pain sensitivity for experienced meditators. In light of the apparent importance of the perception of effort, which, for many athletes, includes the interpretation of muscle pain as an indication of physical exhaustion (Marcora & Staiano, 2010; Noakes, 2008), the potential implications for performance are clear: more mindful athletes may perceive a sport as less painful, thus allowing them to use more of their available physiological resources to outperform less mindful competitors.

Some authors propose that underlying this enhanced capacity of mindfulness practitioners to tolerate pain are actually a variety of structural (e.g., Grant, Coutemanche, Duerden, Duncan, & Rainville, 2010) and functional (e.g., Zeidan et al., 2011) neurological adaptations. Specifically, meditation appears to be related to cortical thickening of brain areas typically associated with attention, such as the right anterior insula (Hölzel et al., 2008; Lazar et al., 2005), anterior cingulate cortex (Grant et al., 2010), and prefrontal cortex (Lazar et al., 2005). This observed effect in the anterior cingulate cortex also indicates a link between mindfulness and emotion regulation, while the cortical thickening of the right anterior insula, as well as the sensory cortex (Grant et al., 2010), demonstrates a connection between mindfulness and brain regions involved in awareness of bodily sensations (i.e., interoceptive awareness). Increased cerebral blood flow has also been found in several of these regions (anterior insula, anterior cingulate cortex, and orbitofrontal cortex) in response to painful stimuli following mindfulness meditation (Zeidan et al., 2011). As attention, emotion regulation, and interoceptive awareness are all involved in the perception of pain, this evidence provides support for the hypothesis that neuroplastic changes may account for the altered pain sensitivity of meditators.

This evidence may also warrant an even broader conclusion. Namely, mindfulness practice may produce most, or even all of its benefits (e.g., improved emotion regulation and attentional capacity) through the promotion of neuroplasticity, or the brain's ability to adapt, both structurally and functionally, in response to a repeated task (Davidson, 2002; Siegel, 2007; see Treadway & Lazar [2010] for a review of EM and neuroplasticity; see Marks [2008] for a review of the neural correlates of EM in relation to sport performance). For instance, following an 8-week MBSR course, individuals exhibited a pattern of increased activation of left-sided anterior brain regions, which is associated with reduced negative affect, increased positive affect,

and enhanced emotion regulation (Davidson et al., 2003). Similarly, fMRI studies have found that, compared to those with little or no meditation experience, experienced meditators tend to show greater activation of the medial prefrontal cortex during meditation (Hölzel et al., 2007), and greater activation of insula and cingulate cortices in response to emotional stimuli (Lutz, Brefczynski-Lewis, Johnstone, & Davidson, 2008), which are all brain regions known to be involved in emotional processing. Regarding attention, EEG research has shown a link between decreased brain activity and superior attentional capacity following 3 months of intensive meditation training (Slagter et al., 2007), which suggests that mindfulness practice may improve attention by increasing the efficiency of the allocation of neural resources for attention-related processes.

Given the importance of positive affect to peak performance experiences (Jackson, 2000; Jackson & Csikszentmihalyi, 1999), and the integral role of emotion regulation (M. V. Jones, 2003) and attention (Moran, 1996) in superior sport performance, this collective evidence supports the conclusion that the neuroplastic effects of mindfulness training could produce beneficial effects for a wide variety of sports, and not just those in which performance is limited by muscle pain. In fact, when discussing the potential effects of mindfulness on the brain, Marks (2008) posits that, taken in sum, the neural correlates research suggests that mindfulness training is related to "significant enhancements in areas that facilitate attentional control, emotion-regulation, and the perception of others' actions and intentions–skills that allow for effective athletic training and make peak performance possible" (p. 220).

Langer's Mindfulness and Physiology

Langer and her colleagues have consistently demonstrated the potential impact of one's mindset on a variety of phenomena, including athletics and exercise. For instance, Langer,

Djikic, Pirson, Madenci, and Donohue (2010) found that, when primed with the mindset that athletes have better vision than non-athletes, participating in an athletic activity improved visual acuity. Crum and Langer (2007) designed a study to examine whether a mindless or mindful mindset could impact the physiological effects of exercise. They evaluated a sample of people engaged in an occupation (cleaning) classified by the Surgeon General as moderate physical activity likely to produce health benefits (Centers for Disease Control and Prevention, 1996). Despite the fact that participants were getting daily exercise through their work, when they were first asked whether they exercised regularly, two-thirds of the sample said no. To help promote a mindful perspective on their daily activities, half of the participants were then informed that their occupation could be considered both work and exercise, while the other half were not.

After 4 weeks, while the actual eating and exercise behaviors of the group as a whole did not change, the people who were given a new way to view their work (i.e., as exercise) not only reported increases in their perceived amount of exercise, but also showed decreases in weight, blood pressure, body fat, waist-to-hip ratio, and body mass index when compared to the control group. These results suggest that mindfulness, specifically the capacity to be flexible in one's mindset when novel information is presented, may be necessary for individuals to experience the added potential benefits of activities about which they already have preconceived beliefs. This could be particularly important with regard to mindfulness-based interventions for sport performance enhancement, as openness to the idea that an unfamiliar approach to mental training could improve performance may be integral in allowing the training to produce its effects.

Additionally, like EM, LM may have important implications for sport performance through its potential effects on the perception of pain. Specifically, the emphasis on contextual reframing (Langer, 1989) aligns well with the work of Noakes and colleagues (2005; Noakes,

2008), who theorize that muscle pain and fatigue are not purely physical phenomena, and are more correctly conceptualized as sensations that can be unattached to a specific physical manifestation (e.g., performance decrements). When athletes believe that feeling fatigued necessarily impacts their physical ability, this belief can become reality and they may reduce their effort simply because they assume they must (Fitzgerald, 2010). However, if athletes can take on a new perspective and recognize that the feeling of fatigue is just that, a feeling, sensation, or mental event, that has no more of a direct connection to their physical limits than any other thought or emotion, then they could potentially gain the capacity to outperform equally talented competitors who mindlessly believe in the physical nature of fatigue. In sum, this may be yet another important point of integration between the two concepts of mindfulness, as athletes may first need an open and flexible mindset for mindfulness training to produce the level of physiological or psychological benefits discussed in this chapter.

Conclusions and Future Directions

Controlled research on mindfulness-based interventions for athletes using objective assessment of sport performance is just beginning to emerge (e.g., John et al., 2011). However, controlled research indicating improvements in self- and coach-rated performance (Wolanin & Schwanhausser, 2010) and uncontrolled research and case studies showing significant effects on self-reported performance and important performance-related psychological variables (DePetrillo et al., 2009; Kabat-Zinn et al., 1985; Kaufman et al., 2009; Lutkenhouse, 2007; Schwanhausser, 2009; Thompson et al., 2011a) provide significant support for the potential effectiveness of mindfulness training for sport performance enhancement.

Although the existing literature on mindfulness in athletes is predominantly from the EM perspective, this chapter proposes that there is strong theoretical support for the utility of LM in

performance-enhancing interventions in at least two important ways. First, evidence seems to indicate that the openness to novelty that is characteristic of LM could play a crucial role in enhancing the potential effectiveness of EM interventions. Specifically, it has been observed that athletes who tend to conceptualize training as a physical pursuit rather than a mental one may exhibit resistance to dedicating time to unfamiliar training methods that do not provide the same immediate, tangible effects (e.g., muscle soreness) that are often experienced in physical training (A. Baltzell, personal communication, March 23, 2012). Interestingly, Stanley, Schaldach, Kiyonaga, and Jha (2011), who discuss the possible resistance to mindfulness training that may be found in groups similar to athletic teams, found that levels of LM significantly predicted the amount of time participants spent meditating over an 8-week mindfulness training, while time spent meditating was positively related to changes in EM. This study was not in a sport context, but it could nonetheless be relevant for athletes. The results suggest that the open-mindedness associated with LM may attenuate potential resistance to an EM approach to performance enhancement, thus making athletes more likely to practice the relevant mindfulness skills, and ultimately benefit from the training.

The second way in which LM may complement EM is through LM's focus on the awareness of external stimuli. The foundational EM skills of awareness and acceptance, which are generally internally oriented (Baer, 2003; Bishop et al., 2004), may provide a variety of benefits for athletes with regard to their cognitive, emotional, and physiological processes. However, incorporating aspects of LM (e.g., cognitive flexibility and awareness of external contexts) in EM interventions may help athletes develop the capacity to apply EM skills, which are generally practiced in sedentary ways, to novel, dynamic situations in daily life (e.g., sport).

MSPE has attempted to address this application issue by prescribing a progression of meditations that evolve from sedentary to active. However, incorporating aspects of LM into future versions of MSPE might facilitate this process even further (e.g., including didactic components in group discussions that explicitly address concepts integral to LM, and ensuring that conditional, rather than absolute phrasing, is used when introducing mindfulness exercises). This could improve athletes' ability to apply the mindfulness skills they develop in specific situations during the workshop (e.g., laying on the ground to do a body scan in a quiet room) to a variety of new contexts in which they have not previously practiced (e.g., waiting for the start of a race in a crowded stadium).

The evidence appears to suggest a complementary association between the two conceptualizations of mindfulness in relation to sport performance. Considering the potential benefit of including LM in EM-based sport performance enhancement interventions, an important future direction for research could be examining the effectiveness of such an integrative approach. Additional research on the neurological correlates of both perspectives is also needed. While a growing body of literature contends that many of the psychological effects of EM training observed in athletes may be attributable to neuroplastic changes, the potential neurological correlates of LM remain unknown. Neuroimaging research would contribute to a better understanding of the mechanisms of LM, and could elucidate how the two views of mindfulness overlap with, differ from, or complement each other with regard to the brain processes that likely govern how mindful attitudes are outwardly expressed. Finally, more research on the efficacy of current EM interventions for athletes, such as MSPE and the MAC approach, is also needed. In particular, studies using objective assessments of performance and randomized comparisons of mindfulness-based and traditional sport psychology interventions are

a necessary next step to build on the emerging evidence demonstrating the performance-enhancing effects of mindfulness training for athletes.

CHAPTER 2

Effects of Mindful Sport Performance Enhancement (MSPE) on Running Performance and Body Image: Does Self-Compassion Make a Difference?

Many mental training strategies designed to help promote optimal sport performance are based on the assumption that negative emotions and cognitions are detrimental to performance, and thus need to be altered or stopped (Gardner & Moore, 2006). However, a growing body of evidence suggests that attempting to suppress or manipulate negative affective or cognitive experiences does not consistently produce performance-enhancing effects (e.g., Holm, Beckwith, Ehde, & Tinius, 1996). Interventions focusing on changing negative internal states may, in fact, increase awareness of these states, boosting their frequency and harming performance (Janelle, 1999; Wegner, 1994).

Mindfulness-based interventions, which emphasize experiencing negative internal states with an accepting and nonjudgmental attitude rather than trying to eliminate or change them, could thus be a more effective way to enhance performance (Gardner & Moore, 2004; Kaufman, Glass, & Arnkoff, 2009) and represent a needed paradigm shift in sport psychology. Since Kabat-Zinn, Beall, and Rippe's (1985) initial systematized application of mindfulness with elite rowers, several mindfulness-based programs have been designed specifically for athletes, like the Mindfulness-Acceptance-Commitment (MAC) approach (Gardner & Moore, 2004, 2007) and Mindful Sport Performance Enhancement (MSPE; Kaufman, Glass, & Pineau, 2012). Such programs have shown promise (Bernier, Thienot, Codron, & Fournier, 2009; Moore, 2009; Thompson, Kaufman, De Petrillo, Glass, & Arnkoff, 2011a; Wolanin & Schwanhausser, 2010), and, while a larger evidence base is still needed to support their effectiveness, Gardner and Moore (2012) recently concluded that, "mindfulness and acceptance-based interventions should

be considered viable, empirically informed interventions for the enhancement of athletic performance" (p. 316).

The literature examining these interventions, as well as other research looking at the role of mindfulness in sports, suggests that both the acceptance and awareness components of mindfulness may be crucial with regard to athletic performance. For example, several key aspects of flow (Jackson & Csikszentmihalyi, 1999; Jackson & Eklund, 2002), which is the psychological factor thought to most closely approximate "the zone" for athletes (e.g., Young & Pain, 1999), require a heightened *awareness* of both internal (e.g., unambiguous feedback) and external (e.g., concentration on the task at hand) stimuli. Additionally, Birrer, Röthlin, & Morgan (2012) suggest that experiential *acceptance* may be a prime impact mechanism through which mindfulness training can help athletes enhance their performance of the well-learned motor skills of their sport. Furthermore, both the acceptance and awareness components of mindfulness have been found to relate positively to flow and negatively to sport anxiety and cognitive interference in runners, archers, and golfers (Pineau, Glass, & Kaufman, in press; Pineau, Glass, Kaufman, & Bernal, 2011b; Pineau, Glass, Kaufman, Tenuta, & Bernal, 2011). Additionally, De Petrillo, Kaufman, Glass, and Arnkoff (2009) found that runners who participated in a 4-week MSPE program showed a significant increase in the awareness aspect of mindfulness, as well as significant decreases in sport anxiety and several dimensions of perfectionism.

Another construct that is related to mindfulness and may have relevance to athletic performance is self-compassion (Neff, 2003a), which is a multidimensional construct consisting of being kind and understanding toward oneself (self-kindness), perceiving one's self and one's experiences as part of a universal human experience (common humanity), and being able to keep

a balanced perspective on painful thoughts and feelings instead of over-identifying with them (mindfulness). While self-compassion has been cited as a necessary component in the development of mindfulness (Marlatt & Kristeller, 1999; Neff, 2003a, 2003b), relatively little is known about how it is incorporated into existing mindfulness interventions. Baer (2010) highlighted that the most widely used mindfulness-based intervention, Mindfulness Based Stress Reduction (MBSR: Kabat-Zinn, 1990), includes a self-compassion component (i.e., the loving-kindness meditation) during one session, yet not all MBSR studies include this exercise (Carmody & Baer, 2009).

Nonetheless, self-compassion training has been shown to produce a variety of benefits that may be important for athletes. For instance, enhancing self-compassion has been shown to reduce levels of self-criticism (Gilbert & Irons, 2004, 2005; Gilbert & Procter, 2006), which is a key component in maladaptive sport perfectionism (Anshel, Kim, & Henry, 2009; Anshel & Sutarso, 2010). Self-criticism in athletes has also been shown to relate inversely to self-reported goal progress, and is a significant risk factor for negative affect after setbacks in the pursuit of personal goals (Powers, Koestner, Lacaille, Kwan, & Zuroff, 2009). Additionally, self-compassion has been found to correlate inversely with a variety of maladaptive emotional responses (e.g., shame) and positively with other adaptive emotional responses (e.g., authentic pride) in young female athletes (Mosewich, Kowalski, Sabiston, Sedgwick, & Tracy, 2011).

It has also been suggested that including a focus on self-compassion may increase the effectiveness of mindfulness-based treatments for body dissatisfaction and eating disorders (Stewart, 2004). In fact, several acceptance-based interventions that include components conceptually similar to self-compassion have led to significant decreases in body dissatisfaction (Delinsky & Wilson, 2006; Wade, George, & Atkinson, 2009) and increases in satisfaction with

weight and appearance (Atkinson & Wade, 2012). Although such research has yet to be conducted using sport interventions, these effects may likely apply to athletes, as Mosewich et al. (2011) found that self-compassion was negatively associated with social physique anxiety and objectified body consciousness in young female athletes. These findings have particular relevance for the potential well-being of athletes, because body dissatisfaction is a significant predictor of disordered eating behavior in both male and female college athletes (Milligan & Pritchard, 2006; Pritchard, Rush, & Milligan, 2007). Furthermore, in a large study of athletes from sports identified by coaches as high-risk for eating disorders, Johnson, Powers, and Dick (1999) concluded that elite college athletes, especially women, are at significant risk for engaging in disordered eating behavior, and the prevalence rates of subclinical and clinical eating disorders have been found to be higher in both male and female athletes than in the general population (Sundgot-Borgen & Torstveit, 2004). Thus, a mindfulness program, particularly one with an emphasis on self-compassion, may have important benefits for athletes.

Among athletes, long-distance runners may be an ideal population with which to utilize mindfulness interventions. One reason is that these athletes are considered a high-risk group for eating disorders (Johnson et al., 1999). For female athletes, the prevalence of eating disorders appears to be greatest in sports that emphasize thinness, including endurance sports like distance running (Sundgot-Borgen, 1994). Although some research has not found an increased risk for disordered eating behavior in runners (e.g., Hausenblas & McNally, 2004), Garner, Rosen, and Barry (1998) conclude that, despite equivocal findings for this population as a whole, there is clearly a subgroup of runners at significant risk for engaging in pathogenic eating and weight control behaviors. Additionally, long-distance running frequently produces pain, fatigue, and boredom, conditions that can facilitate negative internal states, which may interfere with

performance (Dreyer & Dreyer, 2009). Such states could be managed with particular effectiveness using skills developed through mindfulness training.

Following recommendations by Kaufman et al. (2009) and De Petrillo et al. (2009) to increase the length of MSPE, the present study examined the impact of an expanded and enhanced 6-week MSPE intervention on athletic performance and several performance-related psychological variables in long-distance runners. A second objective was to examine how the present-moment awareness and acceptance dimensions of mindfulness each related to changes in these variables, with predictions that both components of mindfulness would relate to improved performance, increases in constructs that can facilitate performance (e.g., flow), and decreases in constructs that can impede performance (e.g., anxiety). Finally, the effects of MSPE on body dissatisfaction and eating disorder symptoms in runners were examined, in particular to see if adding an emphasis on self-compassion to the expanded MSPE protocol (MSPE-SC) would enhance the effectiveness of this intervention for long-distance runners.

Method

Participants

Participants were 55 long-distance runners from two Division I college cross-country teams in the Mid-Atlantic region of the United States. The sample was composed of 26 male (47.3%) and 29 female (52.7%) athletes having an average of 5.87 years of competitive running experience (range 1.5 to 14 years). Of the participants, 70.4% self-identified as Caucasian, 13% as bi-racial or multi-racial, 7.4% as African-American, 7.4% as Asian/Pacific Islander, and 1.9% as Hispanic. One of the two teams (with 31 athletes) was designated as the treatment team: 16 runners (7 men, 9 women) were randomly assigned to receive the MSPE protocol and 15 (6 men,

9 women) to receive MSPE-SC. The second team served as a no-treatment control group (13 men, 11 women). (See Appendix A, Table A1 for demographic information.)

Procedure

The head coaches of eight college cross-country teams in the Washington DC area were contacted by phone and sent recruitment letters through e-mail and the US Postal Service (see Appendix B), and offered the opportunity for their athletes to receive a free 6-week MSPE workshop throughout the first 6 weeks of their fall competitive season. Two coaches agreed to participate, one as the intervention team and one as the control team. To maintain confidentiality, each participant was assigned a unique code number that was used on all questionnaires. Coaches did not have access to the athletes' questionnaire responses and did not know whether athletes were participating in the research aspect of the workshop.

Prior to beginning the workshop, both the principal investigator and the workshop co-leader met separately with each team to briefly explain the research, to review and obtain informed consent (see Appendix C), and to have the athletes complete a booklet of questionnaires in one of three counterbalanced orders. The athletes from the intervention team were also given the option to receive the training without completing the research measures, but all chose to participate in the research. Coaches were contacted before this first meeting to inquire as to whether any athletes on their team were under 18, and, if so, parental contact information was acquired and consent obtained from a parent or legal guardian (see Appendix D). Minor athletes were provided with assent forms (see Appendix E) during the initial meeting.

A variety of trait psychological variables, including mindfulness, eating disorder symptoms, body image, coping style for threats to body image, self-compassion, sport confidence, sport anxiety, thoughts during running, dispositional flow, and social desirability

were measured at three time points: pre-workshop, post-workshop, and follow-up (approximately 5-6 months after the post-workshop assessment). The pre-workshop questionnaire booklet also included a background questionnaire assessing athletes' running history and demographic information. In the post-workshop booklet (approximately 8 weeks after the pre-workshop assessment), a program evaluation measure was included for the groups that received the MSPE interventions, while a measure assessing running activities (e.g., frequency and volume of training) over the time period that the workshop occurred was included for the control group. A questionnaire reassessing aspects of the athletes' running training and performance satisfaction was included in the follow-up questionnaire booklet.

Participants also completed state measures directly before and after two-mile time trials, which were held both pre- and post-workshop. Quarter-mile outdoor tracks on each campus were used in order to standardize distance and terrain for the two teams. To approximate the conditions of a race, athletes were asked to approach the time trial as a competition, and the male and female athletes on each team ran these time trials in separate groups. The two teams completed the time trials on different days approximately 2 weeks apart. The athletes were given a measure of precompetitive anxiety before running, and measures of state flow and running performance and satisfaction immediately afterwards. Additionally, the state flow and performance satisfaction measures were administered after one regional competitive race, which took place several weeks following the completion of the workshop and included some athletes from both the treatment and control teams.

The MSPE and MSPE-SC programs consisted of six weekly, 90-minute sessions, each led by the principal investigator or the co-leader, a licensed clinical psychologist with expertise in both sport psychology and MSPE. The two groups received the workshop sessions in

separate, nearby locations on campus during the same time period, and the two workshop leaders alternated between leading the MSPE and MSPE-SC groups each week to control for the possibility that characteristics of the workshop leaders might influence outcomes. During the first session, the rationale and supporting evidence for MSPE (or MSPE-SC) were provided, and participants then completed a questionnaire assessing their perceptions of the credibility of the workshop and expectations for change. At the beginning of each subsequent session, athletes were asked to complete a brief questionnaire assessing details of their running and mindfulness practice from the previous week. At the end of each session, participants' levels of state mindfulness were assessed, after which they were provided with suggested daily home practice for the upcoming week. Participants were given CDs with recordings of the guided meditations they were to complete for the home practice, and asked to make entries on a daily log detailing their mindfulness practice throughout the week.

Measures

Pre/post/follow-up measures. Eleven measures were included at all three times.

Philadelphia Mindfulness Scale (PHLMS). The PHLMS (Cardaciotto, Herbert, Forman, Moitra, & Farrow, 2008) is a 20-item self-report measure of trait mindfulness (see Appendix F), with items rated on a 5-point Likert scale ranging from 1 (Never) to 5 (Very often) assessing frequency of certain experiences in the last week. This scale produces two mindfulness factors: present-moment awareness and acceptance.

Five Facet Mindfulness Questionnaire (FFMQ). The FFMQ (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Baer et al., 2008) is a measure of trait mindfulness that assesses total mindfulness, as well as five mindfulness facets: observing, describing, acting with awareness, nonjudging of inner experience, and nonreactivity to inner experience (see Appendix

G). The 39 items are rated on a 5-point Likert scale ranging from 1 (Never or very rarely true) to 5 (Very often or always true).

Eating Attitudes Test (EAT-26). The EAT-26 (Garner, Olmsted, Bohr, & Garfinkel, 1982) is a 26-item measure of disordered eating behaviors (see Appendix H). Items are rated on a 6-point Likert scale, using the anchors "Never" and "Always."

Multidimensional Body-Self Relations Questionnaire-Appearance Scale (MBSRQ-AS). The 34-item MBSRQ-AS (Brown, Cash, & Mikulka, 1990; Cash, 2000) is a measure of body image satisfaction. Items are rated a 5-point Likert scale with varying anchors. This scale yields five factor scores: appearance evaluation, body areas satisfaction, appearance orientation, overweight preoccupation, and self-classified weight. Higher scores on the first two factors indicate satisfaction with one's appearance, while higher scores on the latter three factors indicate body dissatisfaction.

Body Image Coping Strategies Inventory (BICSI). The BICSI (Cash, Santos, & Williams, 2005) is a 29-item measure of how frequently various coping methods are used when faced with circumstances that challenge one's body image. Items are rated on a 4-point Likert scale, ranging from 0 (Definitely <u>not</u> like me) to 3 (Definitely like me). Three subscale scores represent different categories of coping (avoidance, appearance fixing, and positive rational acceptance).

Self-Compassion Scale (SCS). The SCS (Neff, 2003b) is designed to assess three dimensions of self-compassion (self-kindness, common humanity, and mindfulness), each of which is quantified in two subscale scores, representing opposing poles of the respective dimensions: self-kindness and self-judgment, common humanity and isolation, mindfulness and over-identification (see Appendix I). A 5-point Likert scale ranging from 1 (Almost never) to 5

(Almost always) is used for the 26 items to assess the frequency with which individuals engage in self-compassion-related thoughts and behaviors. Higher scores indicate more self-compassion, so for the three subscales that appear to suggest less self-compassion (self-judgment, isolation, and over-identification) higher scores indicate lower levels of these factors.

Carolina Sport Confidence Inventory (CSCI). The CSCI (Manzo, Silva, & Mink, 2001) is a 13-item measure of how confident athletes are of themselves when participating in their sport (see Appendix J). For each item, athletes choose one of two statements, representing high or low confidence, and rate the degree to which it applies to them ("Somewhat true for me" or "Very true for me"). The scale provides a total confidence score as well as two subscale scores: dispositional optimism and sport competence.

Sport Anxiety Scale (SAS). The SAS (Smith, Smoll, & Schutz, 1990) is a 21-item measure of athletes' tendency to experience anxiety before and during a competition (see Appendix K). Items are rated on a 4-point Likert scale ranging from 1 (Not at all) to 4 (Very much so), producing a total score, as well as three subscales: somatic anxiety, worrying, and concentration disruption. Smith, Cumming, and Smoll's (2006) revised scoring method was used in the present study.

Thoughts During Running Scale (TDRS). The TDRS (Goode & Roth, 1993) assesses the frequency of various thoughts that athletes experience while running (see Appendix L). The 38 items are rated on a 5-point Likert scale ranging from 0 (Never) to 4 (Very often), and the scale yields one associative factor and four dissociative factors (thoughts about daily events, interpersonal relationships, external surroundings, and spiritual reflections).

Dispositional Flow Scale-2 (DFS-2). The DFS-2 (Jackson & Eklund, 2002, 2004) is a theoretically grounded (Csikszentmihalyi, 1990), 36-item scale intended to measure dispositions

toward experiencing the characteristics of flow while participating in a sport. The items are rated on a 5-point Likert scale from 1 (Never) to 5 (Always), and yield scores for total flow, as well as nine dimensions of flow: challenge-skill balance, action-awareness merging, clear goals, unambiguous feedback, concentration on the task at hand, sense of control, loss of self-consciousness, time transformation, and autotelic experience.

Marlowe-Crowne Social Desirability Scale (Short Form). This 10-item, true-false measure of social desirability (see Appendix M) was adapted by Strahan and Gerbasi (1972) from the original 33-item measure (Crowne & Marlowe, 1960), and has been shown to have better psychometric properties than the original measure (Fischer & Fick, 1993). Higher scores indicate greater levels of social desirability.

Background questionnaire. Designed for the present study, this pre-treatment questionnaire assesses demographic information (e.g., gender, age, ethnic background), running history, and exercise behavior (see Appendix N). Running history questions ask which events runners have competed in, best times for the distances of 1-mile and 5-kilometers (personal best and within the past 12 months), and how long runners have been competing. Exercise behavior items deal with in-season averages of running volume (both with and without the team), and the frequency of non-running exercise. This questionnaire also asks for a list of one's top three reasons for running, and, using a 5-point Likert scale, to rate one's satisfaction with current running performance, and the degree to which one believes internal and external factors can negatively affect running performance. Finally, three dichotomous items assess previous exposure to sport psychology, and past and current exposure to meditation and yoga practices, with space provided to describe these experiences. For the treatment groups only, this questionnaire also asks for a list of the top three things one hopes to get out of the workshop.

Program evaluation measure. Given only to the treatment groups, this post-test measure (see Appendix O) assesses best 1-mile and 5-kilometer times achieved during the workshop (past 6 weeks), current exercise behaviors, top three reasons for participating in competitive running, and the degree to which runners believe internal and external factors negatively impact running performance. Four open-ended questions regarding runners' evaluations of the workshop are also included. Finally, athletes rate on 5-point Likert scales how confident they are about continuing to incorporate mindfulness into their sport training and daily lives, and the extent to which they discussed the workshop with teammates between sessions.

Running practice log. Designed for the present study, this measure assesses the running behavior of the control group over the 8 weeks between the first and second time trials (see Appendix P). Items inquire about average weekly mileage, whether weekly mileage changed over the 8 weeks (decrease, increased, or stayed the same), and the lowest and highest weekly mileages run. This questionnaire also assesses overall perception of performance over the 8 weeks with a categorical item (generally got faster, slower, or stayed the same), and performance satisfaction over the past week using a 5-point Likert scale.

Follow-up questionnaire. This questionnaire reassesses many of the same domains as the initial background questionnaire, including best 1-mile and 5-kilometer times (since the second time trial approximately 5-6 months earlier), current volume of training, top three reasons for participating in competitive running, current satisfaction with performance, and the extent to which one believes that internal and external factors negatively impact running performance (see Appendix Q). Two additional items were included for the treatment groups, first asking runners to rate on 5-point Likert scales the degree to which they have incorporated mindfulness into their

training and their lives outside of running, and then whether they have continued formal mindfulness practice (and the nature of this practice).

Time trial/race measures. Three measures were given at the time of an actual run.

Revised Competitive Sport Anxiety Inventory-2 (CSAI-2R). The CSAI-2R (Cox, Martens, & Russell, 2003; Martens, Vealey, & Burton, 1990) is a state measure of precompetitive anxiety (see Appendix R). The 17 items are rated on a 4-point Likert scale, ranging from 1 (Not at all) to 4 (Very much so), and produce three subscales: cognitive state anxiety, somatic state anxiety, and state self-confidence. This measure was administered before both time trials, but not before the race.

Flow State Scale-2 (FSS-2). The FSS-2 (Jackson & Eklund, 2002, 2004) is a theoretically grounded measure of state flow (Csikszentmihalyi, 1990), designed to be completed directly following a sport participation experience. Runners completed this measure after both time trials and the race. This measure is identical to the DFS-2 except that items are phrased in the past tense, and the anchors of the 5-point rating scale rage from "Strongly disagree" to "Strongly agree."

Assessment of running performance. Pre- and post-workshop running performance measures were designed for the present study to be completed immediately after the time trials and actual race. The pre-workshop forms (see Appendix S) ask athletes to report the distance they completed, the time they achieved, whether this was their personal best time for that distance, and their performance satisfaction on a 5-point Likert scale from 1 (Not at all satisfied) to 5 (Very satisfied). Three additional items are included in the post-workshop form (see Appendix T) to assess whether participants believe the skills learned in the workshop affected their performance (yes or no), and if so, which skills (open-ended), and the degree to which these

skills had a negative or positive effect on their performance (on a 5-point Likert scale from "Very negatively" to "Very positively").

In-session measures. Several measures were administered during workshop sessions.

Credibility and Expectations Questionnaire (CEQ). This 6-item measure was adapted from Devilly and Borkovec's (2000) credibility/expectancy questionnaire for use with the MSPE interventions for distance runners (see Appendix U). Four of the items use a 9-point Likert scale with various anchors, and two items are given a percentile rating, with response options at 10-point intervals. Three of the six items produce a credibility score, while the other three items produce an expectancy score. The two percentile-rated items and one Likert-rated item are included in the expectancy score, and so these scores are standardized. For the percentile-rated items, the scores are adjusted as follows: 0% = 1, 10% = 2, … 100% = 11. The Likert-rated item is standardized by multiplying the response by 11/9 (i.e., 1 = 1.22, 2 = 2.44, … 9 = 11).

Weekly practice log. This measure asks participants to report details about their running behaviors and mindfulness practice over the previous week, including volume of running training, ratings of satisfaction with performance, frequency and type of mindfulness practice, and ratings of enjoyment of mindfulness practice (see Appendix V).

Toronto Mindfulness Scale (TMS). The TMS (Bishop et al., 2004; Lau et al., 2006) is a 13-item self-report measure of state mindfulness (see Appendix W). Items are rated on a 5-point Likert scale ranging from 0 (Not at all) to 5 (Very much), and two subscale scores are calculated: curiosity and decentering.

Mindfulness practice log. Adapted by Kaufman et al. (2009) from Segal, Williams, and Teasdale's (2002) Homework Record From, this log asks participants to track their between-

session mindfulness practice (date and duration), and to record any comments regarding their experiences (see Appendix X).

Mindfulness Workshops

MSPE. The 6-week MSPE program used in the present study was customized for long-distance runners, expanding upon the treatment manual developed by Kaufman et al. (2009) for archers and golfers and the adaptation of this manual for runners by De Petrillo et al. (2009). MSPE draws from both Kabat-Zinn's (1990) MBSR and Segal et al.'s (2002) Mindfulness-Based Cognitive Therapy (MBCT), as well as sport-specific literature and personal communications with a variety of mindfulness experts and coaches. See Kaufman et al. (2012) for the complete treatment manual of the expanded MSPE intervention, and Pineau et al. (in press) for a review of the empirical support for MSPE.

A rationale for the mindfulness workshop, adapted for a particular sport, is presented during the first session, and all sessions include at least two guided mindfulness exercises using original recordings and scripts, such as the candy exercise, the body scan, meditation on the breath (three different lengths), mindful yoga, and a walking meditation. While these meditations bare a resemblance to those found in other mindfulness-based interventions (e.g., MBSR and MBCT), MSPE is unique in both its structure and content. Specifically, the ordering of the exercises through the workshop is designed to sequentially move athletes from sedentary practice to being mindful while in motion. This sequence culminates with a sport-specific meditation, during which athletes are given the opportunity to apply the mindfulness skills they are learning (e.g., increased somatic awareness) to the movements and sensations they experience in their sport of focus. Each session also involves group discussions about

participants' experiences with the various exercises, responses to any questions that may arise, and a discussion of how the mindfulness concepts taught can be applied to their sport.

MSPE-SC. The self-compassion component added in MSPE-SC was drawn from Neff's (2003a) conceptualization of self-compassion, as well as compassionate mind training, a form of psychotherapy with a particular focus on the development of self-compassion (Gilbert, 2000; Gilbert & Irons, 2004, 2005; Gilbert & Procter, 2006). The 6-week MSPE-SC protocol contains almost all of the same exercises as MSPE, but with some modified scripts to reflect the self-compassion emphasis. For example, in the exercises that involve focusing attention on specific body parts or muscle groups (e.g., the body scan, mindful yoga), in addition to bringing their awareness to those areas, athletes are invited to appreciate the functionality of those body parts, which is intended to help generate self-kindness (Neff, 2003a). The concept of common humanity (Neff, 2003a) is also incorporated into the exercises that involve motion (e.g., the walking meditation), and athletes are guided to recognize how their kinesthetic capacity is similar to that of their teammates, their competitors, and all other humans. Additionally, starting in Session 2, this version of the workshop replaces the sitting meditation with an adaptation of the loving-kindness meditation described by Kabat-Zinn (1990).

Results

Baseline Differences Between Groups

Chi-square analyses and ANOVAs were conducted to determine whether the three groups differed on any baseline characteristics, including demographic (e.g., age, gender, ethnicity) and running training factors (e.g., personal best times, years of experience, mileage per week), current performance satisfaction, previous exposure to sport psychology or mindfulness practice (e.g., meditation, yoga), and current mindfulness practice (see Appendix A, Table A1). The

groups exhibited no significant differences on any of these baseline factors except for the number of non-running exercise activities engaged in per week, $F(2, 51) = 6.62$, $p = .003$, for which the control group engaged in fewer of these exercises than the intervention groups.

ANOVAs were also conducted to examine group differences on the pre-intervention psychological measures (see Appendix A, Table A2). Significant differences were found between the groups on one measure of mindfulness: PHLMS awareness, $F(2, 52) = 3.35$, $p = .043$, and acceptance, $F(2, 52) = 5.02$, $p = .01$. Additionally, the groups differed on EAT-26 disordered eating behavior, $F(2, 52) = 10.67$, $p = .005$, one of the five subscales of MBSRQ-AS body dissatisfaction (overweight preoccupation), $F(2, 52) = 3.21$, $p = .049$, and one of the six subscales of SCS self-compassion (over-identification), $F(2, 52) = 4.99$, $p = .01$. Post-hoc Sidak comparisons indicated that the control group reported significantly higher levels of acceptance than the MSPE group, lower levels of disordered eating than both MSPE and MSPE-SC, and lower levels of overweight preoccupation than the MSPE-SC group. Additionally, the MSPE group reported higher levels of over-identification than the MSPE-SC group, while no post-hoc differences were found for mindful awareness. The Sidak correction was used for all post-hoc analyses, as it is less conservative than the Bonferonni correction and is thus more appropriate for small sample sizes when power is a concern (Field, 2005).

Similar analyses were conducted to examine pre-workshop group differences for the time trial variables (see Appendix A, Table A3). A chi-square analysis revealed that there was no difference between the groups with regard to the proportion of participants who completed the first time trial (MSPE = 13/16, MSPE-SC = 13/15, Control = 17/24, χ^2 (2) = 1.48, $p = .477$). There were also no group differences in terms of the time achieved, level of satisfaction with the time achieved, or whether their achieved time was a personal best. Additionally, on measures of

state anxiety and state flow, a one-way ANOVA found that the groups differed on only the FSS-2 loss of self-consciousness subscale, $F(2, 40) = 8.33$, $p = .001$. Sidak-corrected post-hoc analyses indicated that the control group reported significantly higher levels of this dimension of flow than both MSPE groups.

Attendance and Participation

Participants who attended fewer than four of the six treatment sessions were not considered to have completed the workshop. In the MSPE group, 13 of 16 participants (81.25%) were treatment completers; 11 attended at least five sessions and the 2 who attended only 4 were present for both the first and final sessions. In the MSPE-SC group, 11 of 15 athletes (73.33%) were treatment completers, and all attended at least five sessions. There were no significant differences in the likelihood of completion between groups, χ^2 (1) = 0.28, $p = .598$, or the average number of sessions attended, $t(22) = -0.88$, $p = .387$ (MSPE $M = 5.31$, $SD = 0.75$; MSPE-SC $M = 5.55$, $SD = 0.52$). Additionally, no difference was found between the intervention groups for the average number of weekly mindfulness practices athletes engaged in throughout the workshop, $t(22) = -1.66$, $p = .112$ (MSPE $M = 2.33$, $SD = 1.29$; MSPE-SC $M = 3.24$, $SD = 1.39$).

Forty-five participants (out of 48 completers and controls) completed the post-intervention assessment (MSPE = 12, MSPE-SC = 11, Control = 22), and 42 completed the follow-up assessment (MSPE = 12, MSPE-SC = 9, Control = 21). With regard to the performance assessments, 39 completed the pre-intervention time trial (MSPE = 11, MSPE-SC = 11, Control = 17), 28 completed the post-intervention time trial (MSPE = 10, MSPE-SC = 6, Control = 12), and 15 participated in actual race (MSPE = 9, MSPE-SC = 2, Control = 4). Because so few individuals from the MSPE-SC and control groups participated in the race, the

data from this performance assessment could not be meaningfully analyzed, and are not discussed further (See Appendix A, Table A4 for treatment completion information).

Workshop Credibility and Expectancy

Independent-samples *t*-tests revealed that there was no significant difference between the MSPE (M = 17.86, SD = 4.87) and MSPE-SC (M = 20.92, SD = 3.80) groups on the measure of the perceived credibility of the workshop, $t(24) = -1.76$, $p = .09$. Similarly, the MSPE (M = 16.42, SD = 5.71) and MSPE-SC (M = 20.76, SD = 6.16) groups did not differ significantly on their reported outcome expectations, $t(24) = -1.86$, $p = .075$ (see Appendix A, Table A5).

Within-Group Changes in Outcome Variables

To determine whether the groups changed over time, repeated-measures analyses were conducted. Two time points were used when examining time trial data (i.e., pre-workshop Time Trial 1 and post-workshop Time Trial 2), and three time points were used for most other analyses (i.e., pre-workshop, post-workshop, follow-up). The analyses of change in state mindfulness used both six time points (i.e., each session) and two time points (i.e., first and last session). To reduce the number of analyses and to control for Type I error, 11 repeated-measures MANOVAs were used to look at change in (1) mindful awareness (awareness subscale of the PHLMS and the observe, describe, and act with awareness subscales of the FFMQ), (2) mindful acceptance (acceptance subscale of the PHLMS and the nonjudgment of inner experience and nonreactivity to inner experiences subscales of the FFMQ), (3) self-compassion (all six subscales of the SCS), (4) positive body image (appearance evaluation and body area satisfaction from the MBSRQ and positive rational acceptance from the BICSI), (5) negative body image (appearance orientation, overweight preoccupation, and self-classified weight from the MBSMRQ and fixing and avoiding from the BICSI), (6) trait flow (all nine subscales of the DFS-2), (7) trait sport anxiety

(somatic, worry, and concentration disruption subscales of the SAS), (8) trait sport confidence (dispositional optimism and sport competence subscales of the CSCI), (9) dissociative thoughts during running (the four dissociative subscales of the TDRS), (10) state flow (all nine subscales of the FSS-2), and (11) state anxiety (the somatic and cognitive anxiety subscales of the CSAI-2R). Repeated-measures ANOVAs were conducted for disordered eating (EAT-26), associative thoughts during running (TDRS subscale), time trial time, time trial performance satisfaction, and state self-confidence (the self-confidence subscale of the CSAI-2R), as well as total scores on the FFMQ, DFS-2, SAS, CSCI, SCS, and FSS-2.

Trait/dispositional measures. Contrary to prediction, no significant changes were found for any of the trait mindfulness-related variables, including the total FFMQ, mindful awareness, mindful acceptance, and self-compassion (see Tables 1 and 2).

There was one significant finding among the sport-related variables, such that the MSPE group reported a significant change in dissociative thoughts during running (see Table 1). Univariate analyses on each of the TDRS dissociative subscales found significant changes in thoughts about daily events, $F(2, 22) = 3.97$, $p = .034$, and spiritual reflections, $F(2, 22) = 3.74$, $p = .04$, but Sidak-corrected post-hoc analyses found no significant differences between the time points. Visual inspection of the data suggests increases in these thoughts from pre- to post-workshop, but a return to pre-workshop levels at follow-up. No differences were found for dispositional flow, sport anxiety, sport confidence, or associative thoughts during running.

Among the disordered eating and body image measures, results revealed that levels of EAT-26 disordered eating changed significantly in the MSPE-SC group (see Table 2), with Sidak-corrected post-hoc comparisons showing a near significant decrease from pre-workshop to follow-up, and a significant decrease from post-workshop to follow-up. No change was found

Table 1

Repeated-Measures MANOVA Results for Outcome Measures

Variables	MSPE $F(2, 22)$	MSPE-SC $F(2, 16)$
Mindful Awareness	0.69[a]	0.45
Mindful Acceptance	0.63[a]	0.60
SCS	0.28	0.70
Positive Body Image	0.93[b]	0.22
Negative Body Image	1.64[b]	1.16
DFS-2 subscales	0.18[a]	0.02
SAS subscales	1.92	0.78
CSCI subscales	0.28[a]	0.41
TDRS (dissociative subscales)	3.34*	0.11
CSAI-2R anxiety subscales	3.73[c]	0.60[d]
FSS-2 subscales	0.12[c]	0.18[d]

Note. SCS = Self-Compassion Scale; DFS-2 = Dispositional Flow Scale-2; SAS = Sport Anxiety Scale; CSCI = Carolina Sport Confidence Inventory; TDRS = Thoughts During Running Scale; CSAI-2R = Revised Competitive Sport Anxiety Inventory-2; FSS-2 = Flow State Scale-2. See Appendix A, Table A10 for the pre-workshop, post-workshop, and follow-up subscale means for the individual variables.

[a] Degrees of freedom of the F statistic for these analyses are (2, 20).

[b] Degrees of freedom of the F statistic for these analyses are (2, 18).

[c] Degrees of freedom of the F statistic for these analyses are (1, 9).

[d] Degrees of freedom of the F statistic for these analyses are (1, 6).

* $p < .05$.

Table 2

Means and Repeated-Measures ANOVA Results for Outcome Measures

	MSPE				MSPE-SC			
Measure	Pre	Post	Follow-up	$F(2, 22)$	Pre	Post	Follow-up	$F(2, 16)$
FFMQ total score	117.59	122.27	119.09	0.97[a]	124.11	119.78	119.78	0.85
SCS total score	2.90	2.93	2.98	0.28	3.02	3.00	2.86	0.71
DFS-2 total score	127.27	125.18	124.97	0.18[a]	119.56	118.56	118.78	0.02
SAS total score	51.92	49.25	46.33	1.92	44.67	46.33	43.67	0.78
CSCI total score	38.64	39.09	38.18	0.28[a]	36.00	37.67	37.00	0.47
EAT-26	54.92	50.42	52.25	1.40	65.78_{ab}	60.11_{a}	54.78_{b}	6.24**
TDRS (associative)	25.42	24.83	24.42	0.44	26.22	24.33	25.89	0.51
FSS-2 total score	116.60	119.00	---	0.12[b]	111.71	108.86	---	0.18[c]
CSAI-2R (confidence)	25.80	27.60	---	0.60[b]	22.00	22.57	---	0.10[c]
Time Trial Time	648.00	637.50	---	4.56[b]	644.14	639.43	---	0.27[c]
Performance Satisfaction	3.00	3.10	---	0.02[b]	2.57	2.14	---	0.36[c]

Note. FFMQ = Five Facet Mindfulness Questionnaire; SCS = Self-Compassion Scale; DFS-2 = Dispositional Flow Scale-2; SAS = Sport Anxiety Scale; CSCI = Carolina Sport Confidence Inventory; TDRS = Thoughts during running scale; EAT-26 = Eating Attitudes Test-26; FSS-2 = Flow State Scale-2; CSAI-2R = Revised Competitive Sport Anxiety Inventory-2. Means with different subscripts are significantly different.

[a] Degrees of freedom of the *F* statistic for these analyses are (2, 20).

[b] Degrees of freedom of the *F* statistic for these analyses are (1, 9).

[c] Degrees of freedom of the *F* statistic for these analyses are (1, 6).

** $p < .01$.

for positive or negative body image.

State/time trial measures. Neither intervention group changed significantly on any of the performance-related measures, including state anxiety and self-confidence, state flow, running time, and performance satisfaction (see Tables 1 and 2). Additionally, no change was found for state mindfulness (see Table 3).

Mediation of change over time. It was the intention of the present study to test the prediction that changes in both mindful acceptance and awareness following the workshop would be related to performance improvements, as well as improvements in variables known to relate to sport performance (e.g., flow, self-confidence, and anxiety). However, because no change was found on any of these variables, the meditational analyses to test this hypothesis were not conducted.

Post-Workshop Between-Group Comparisons

Group differences on the post-test measures (including the second time trial) were explored using 11 MANCOVAs, with the same groupings of variables and subscales as described above, and with respective pre-test scores used as covariates (see Appendix A, Table A6). ANCOVAs were also conducted for the same 11 measures described previously that used a single or total score (see Appendix A, Table A7).

Initially, a series of regression analyses were conducted to insure that the relation between pre-test covariates and the post-test outcomes met the assumption of homogeneity of regression slopes. The nonreactivity to inner experience subscale of the FFMQ and the self-kindness subscale of the SCS did not meet this assumption, and these scores were thus excluded from the relevant analyses to ensure interpretability of the findings.

Trait/dispositional measures. Of the multivariate analyses conducted examining post-

Table 3

Means and Repeated-Measures MANOVA Results for the State Mindfulness Measure

	Session #						
Measure	1	2	3	4	5	6	$F(5, 30)$
TMS (all 6 sessions, n = 7)							0.87
Curiosity	18.14	15.43	15.71	14.86	15.57	15.57	
Decentering	18.29	15.14	18.57	17.29	17.43	19.00	
							$F(1, 16)$
TMS (first and last sessions, n = 17)							0.02
Curiosity	16.94	---	---	---	---	15.76	
Decentering	16.41	---	---	---	---	17.24	

Note. TMS = Toronto mindfulness scale. Due to the small number of participants who completed the TMS at all six sessions, the MSPE and MSPE-SC groups were combined for these analyses.

workshop group differences, only the sport anxiety MANCOVA was significant, $F(6, 76) = 2.55$, $p = .026$. Univariate analyses revealed that groups were different on only the concentration disruption subscale of the SAS, $F(2, 39) = 5.85$, $p = .006$, with Sidak-corrected post-hoc analyses showing that the control group reported significantly lower scores than the MSPE-SC group. The ANCOVA comparing groups on the total score of the SAS was not significant. Regarding the other ANCOVA analyses, the only group difference found was for total DFS-2 scores, $F(2, 41) = 4.13$, $p = .023$, with post-hoc comparisons revealing that the control group reported significantly higher total trait flow than the MSPE-SC group.

Additionally, contrary to prediction, no significant group differences were found in the multivariate or univariate analyses on measures of mindful awareness or acceptance, positive or negative body image, sport confidence, self-compassion, dissociative or associative thoughts during running, and disordered eating.

State/time trial measures. With regard to the time trial, a chi-square analysis including the control group and treatment completers revealed that there was no difference between the proportion of participants from each group who completed the second time trial (MSPE = 11/13, MSPE-SC = 7/11, Control = 12/24, $\chi^2 (2) = 4.32$, $p = .115$). Contrary to expectation, ANCOVA analyses on post-test scores (using respective pre-test scores as covariates) showed no group differences in terms of the time achieved or level of satisfaction with the time achieved.

MANCOVA analyses using pre-test scores as covariates found a significant difference on the measure of state flow, $F(6, 40) = 3.20$, $p = .016$. Univariate analyses and Sidak-corrected post-hoc comparisons showed that the MSPE group reported higher levels of flow (challenge-skill balance) than the MSPE-SC group, while the control group reported higher levels of merging action and awareness than both intervention groups. However, the ANCOVA for the

total state flow score was not significant. Additionally, no significant differences were found for state confidence.

Follow-Up Between-Group Comparisons

The same statistical analyses described for the post-workshop group comparisons were conducing using the follow-up data. Regression analyses examining the assumption of homogeneity of regression slopes for the pre-test covariates and the follow-up outcomes revealed that the appearance orientation subscale of the MBSRQ and the worry subscale of the SAS did not meet this assumption, and these scores were excluded from the relevant analyses.

Contrary to predictions, there were no significant MANCOVA results for the trait/dispositional measures (see Appendix A, Table A8). However, the ANCOVA for total trait flow at follow up was significant, $F(2, 37) = 4.26$, $p = .022$, with Sidak-corrected post-hoc comparisons showing that the control group reported significantly higher total DFS-2 scores than the MSPE-SC group (see Appendix A, Table A9). The groups did not differ on mindful awareness or acceptance, positive or negative body image, sport anxiety, sport confidence, self-compassion, dissociative or associative thoughts during running, and disordered eating.

Post-Workshop Feedback and Subjective Data

At the conclusion of the workshop, the athletes were asked four open-ended questions on the Program Evaluation measure about what they liked and found helpful about the workshop, as well as what they did not like and ways they thought MSPE could be improved. These responses were unitized (see Appendix Y) and coded (see Appendix Z) by two independent raters (the principal investigator and a masters-level psychology graduate with experience in sport psychology). The inter-rater reliability for these two sets of questions was excellent ($\kappa = .98$ and .98, respectively). The two coding discrepancies were resolved by the principal investigator.

Of 79 conceptually distinct answers to what the athletes liked or how they felt MSPE had helped them, the most common responses had to do with mindfulness skills (e.g., focusing, accepting negative thoughts), relaxation, and specific components of the workshop. Specifically, 42 comments (53.16%) indicated that the athletes enjoyed or felt they improved their mindfulness skills (e.g., "I can focus my attention back to running if I get sidetracked," "helped me not be so worked up when I'm feeling bad"), 21 comments (26.58%) noted the enjoyment or benefit of relaxation (e.g., "I was able to relax instead of getting stressed in races"), and 7 comments (8.86%) pointed to specific workshop exercise that the athletes liked (e.g., "I like the yoga and running meditation because I can apply them to my life").

Of 56 conceptually distinct responses to what the athletes did not like or how they felt MSPE could be improved, a majority (30 comments, 53.57%) had to do with concerns about the timing of or time commitment required for the workshop. Of these time concerns, 13 (23.21% of the total responses) noted general dissatisfaction with the amount of time that the workshop took (e.g., "too time consuming"), while other comments specifically mentioned that the home practice or individual exercises were too long (8 comments, 14.29%, e.g., "took longer to do the exercises than I wanted"), the sessions were too long (6 comments, 10.71%, "length of time each Wednesday"), or the scheduled time of the sessions was a problem (3 comments, 5.36%, e.g., "not after morning workouts"). Most of the remaining responses (16 comments, 28.57%) referenced particular aspects of the workshop that the athletes thought could be changed in order to improve MSPE. These suggestions included increasing the group leaders' involvement with the team, introducing the applied meditations earlier, decreasing the number of different mindfulness exercises in each session, and using smaller groups to help enhance discussions.

Athletes were also asked after the second time trial whether they thought the mindfulness skills they had learned through MSPE had affected their performance on that day. A majority (61.11%) indicated that they did not feel that the mindfulness training impacted their performance, although 38.89% responded in the affirmative. Similarly, when asked to rate on a 5-point Likert scale *how* they felt MSPE had affected their time trial performance (1 = very negatively, 3 = neutral, 5 = very positively), the mean response was 2.94 and the modal response was 3, with only 3 participants (16.67%) indicating that the training had a positive impact on their performance.

Regarding the continued practice of mindfulness, the Program Evaluation measure asked the athletes to rate how confident they were (1 = not at all confident, 3 = somewhat confident, 5 = very confident) that they would continue to incorporate mindfulness into their sport training and everyday lives. The average responses were 2.83 and 2.48, respectively, indicating that the athletes were not confident that they would continue to use the mindfulness skills they had learned.

Reflective of this attitude, when asked at follow-up to rate to what degree they had continued to incorporate the concepts from MSPE into their training and daily lives (1 = not at all, 3 = somewhat, 5 = very much), the average responses were 2.19 and 2.05, respectively. Additionally, a majority of individuals (80.95%) indicated that they did not continue with formal mindfulness practice after the completion of the workshop.

Discussion

The present study examined the effectiveness of the enhanced, 6-week version of Mindful Sport Performance Enhancement (MSPE; Kaufman et al., 2012), a sport-specific, meditation-based mindfulness intervention for athletes. Following several open trials of the

original 4-week version of MSPE, this investigation with Division I cross-country runners represents an advancement in the methodological rigor with which MSPE has been studied by including a control group and standardized performance assessments. While other investigations of MSPE have attempted to include self-report performance measures (e.g., Kaufman et al., 2009), the resulting data from these earlier studies could not be analyzed due to a lack of standardization between the performance metrics used. There have been other controlled studies of mindfulness-based interventions with athletes, but they typically do not include an assessment of performance (e.g., Aherne, Moran, & Lonsdale, 2011; see John, Verma, & Khanna, 2011 for an exception), or only include subjective measures of performance such as coach's ratings (e.g., Wolanin & Schwanhausser, 2010). Thus, the present study helps to address some of the methodological limitations in the previous literature.

Contrary to predictions, however, the results of this investigation suggest that MSPE and MSPE-SC had little impact on the athletes who participated in the workshop. No significant changes in trait or state mindfulness or self-compassion were found. Additionally, athletes reported no significant increases in trait or state flow, or in trait or state self-confidence, no decreases in trait or state anxiety, and exhibited no improvement in performance or performance satisfaction. With reference to these last findings, it is important to note that, while every effort was made to standardize the time trials, they had to be scheduled on different days due to constraints of the two teams. The post-test time trial for the control group occurred without incident, but, for the intervention groups, adverse weather conditions, including very strong winds, may have negatively impacted the athletes' running experience on an outdoor track. More ideal environmental conditions or conducting the time trials for both groups on the same day could have been beneficial.

These findings stand in contrast to those in previous investigations using athletes, which have shown significant improvements in flow (Aherne et al., 2011; Kaufman et al., 2009; Schwanhausser, 2009), sport confidence (Kaufman et al., 2009), and performance (John et al., 2011), along with decreases in anxiety (De Petrillo et al., 2009) following mindfulness-based interventions. In fact, reviews of collected evidence on the use of mindfulness with athletes indicate that it is not only a theoretically useful addition to the armament of sport psychology tools (Birrer et al., 2012), but also that it can now be considered an empirically informed approach to sport performance enhancement (Gardner & Moore, 2012).

In the present study, only one sport-related variable changed within the intervention groups over the course of the training, with the athletes who received MSPE reporting more dissociative thoughts during running following the workshop. This was not found for the MSPE-SC group, and neither intervention group reported changes in associative thoughts during running. No literature has looked directly at the effects of mindfulness training on the associative or dissociative cognitive strategies used by athletes. However, it has been found that for long-distance runners, associative strategies are generally linked with faster performance while dissociative strategies are related to increased endurance and less perceived exertion (Masters & Ogles, 1998), and that the strategy an athlete uses is generally dependent on the intensity of the task (Hutchinson & Tenenbaum, 2007). In proposing a mindfulness-based conceptual model of these cognitive strategies, Salmon, Hanneman, and Harwood (2010) stated that "mindful awareness is somewhat analogous to associative processing" (p. 150), but rather than creating more associative thoughts during sport performance, increasing mindfulness could help athletes accurately perceive and accept the challenges of a task in order to use the most appropriate (i.e., efficient) strategy. It may be that at the time of the post-workshop assessment,

the athletes' training demands favored a more dissociative cognitive strategy, but because no change in mindfulness was observed it is difficult to conclude that this change was a result of MSPE (especially considering that the MSPE-SC group did not also report an increase in dissociative thoughts).

In addition to this result, only one other change was found, where the MSPE-SC group showed a significant decrease in self-reported disordered eating behavior from post-workshop to follow-up. This is reflective of research in non-athlete populations, which has shown that mindfulness interventions are effective in the treatment of disordered eating (Baer, Fischer, & Huss, 2005; Wanden-Berghe, Sanz-Valero, & Wanden-Berghe, 2011). Similarly, Mosewich and colleagues (2011) found that, in female athletes, self-compassion was negatively related to aspects of body dissatisfaction, which is a significant predictor of disordered eating in college athletes (Milligan & Pritchard, 2006; Pritchard et al., 2007). However, in these other studies, the impact of mindfulness training was found directly after the interventions had been administered. In fact, improvements in body satisfaction have been observed after only a 5-minute acceptance-based intervention (Wade et al., 2009). The fact that there was no significant change in positive or negative body image, and that the change in disordered eating was not found from pre- to post-workshop, is inconsistent with previous literature looking at the impact of mindfulness interventions on disordered eating. Also, considering that no increases in mindfulness or self-compassion were found, it seems unlikely that this observed changed was the result of MSPE.

Concordant with this relative lack of change over time, very few significant group differences were found at post-test and at the 6-month follow up. At the post-workshop assessment, the control participants reported less concentration disruption (an aspect of trait anxiety) and greater total trait flow than the athletes who received MSPE-SC. The control group

also reported higher levels of the merging action and awareness dimension of state flow than both of the MSPE groups following the time trial. At follow-up, the only significant result showed that the control group reported higher total trait flow than the MSPE-SC group. With regard to differences between the intervention groups, the participants from the MSPE group exhibited higher levels of the challenge-skill balance dimension of state flow at the time trial than the MSPE-SC athletes.

This constellation of differences between the control and intervention groups, as well as the lack of change within the intervention groups, is highly contradictory to other mindfulness-based research in sport. The findings regarding group differences could, in part, be explained by the significant increases in several dimensions of trait flow (see Appendix A, Table A11) and in total trait flow (see Appendix A, Table A12) reported by the control group across the three assessment time points. Jackson (1995) describes a variety of factors that can influence the occurrence of flow states, such as confidence and motivation, and it is possible that some of the control group's training or competitive experiences that were not assessed in the present investigation affected these factors and led to increases in flow. Consistent with this hypothesis, the control group also exhibited a significant increase in state self-confidence at the second time trial (see Appendix A, Table A12). While it is unclear what specifically may have produced these changes in the control group, the possibility of such confounding variables speaks to the general threat to internal validity that exists when conducting applied quasi-experimental research in real-world settings, which should be taken into account when interpreting the findings of this study.

An additional explanation for the collection of unexpected results in this investigation may have to do with certain sample characteristics. Research suggests that some individuals,

particularly those high in self-criticism, can have a strong resistance to or fear of experiencing self-compassion (Gilbert et al., 2012; Gilbert, McEwan, Matos, & Rivis, 2011). Although no measure of self-criticism was used in the present study, maladaptive perfectionism, which includes self-criticism (Anshel et al., 2009; Anshel & Sutarso, 2010), has been linked to disordered eating behaviors in athletes (Hopkinson & Lock, 2004). The high levels of disordered eating behavior found in the intervention groups prior to the workshop may be an indirect indication of self-criticism. This could potentially have made the athletes unreceptive to the self-compassion components that are naturally involved in mindfulness practice (e.g., Kabat-Zinn, 1990), and particularly resistant to the explicit focus on self-compassion involved in MSPE-SC, which could help to explain why the intervention appears to have had no effect in this sample.

Another important characteristic of the sample used in the present study is that the participants were members of intact sports teams. This is one of the first studies to look at the effectiveness of a mindfulness intervention with an intact team, as most other mindfulness research in sport has used samples consisting of single athletes (e.g., Lutkenhouse, 2007; Schwanhausser, 2009), groups of athletes recruited from the community (e.g., De Petrillo et al., 2009; Kaufman et al., 2009), or university athletes recruited from various sports (e.g., Aherne et al., 2011). Athletes from these other studies were self-selected, as they expressed interest in learning about mindfulness by voluntarily signing up to participate, indicating a high level of motivation to engage in mindfulness training. In contrast, for the present study, coaches were the primary targets of recruitment. As such, it was the coach who decided that his or her team would receive a mindfulness intervention, and, while the athletes were given the choice to participate or not in the research portion of the workshop, MSPE became a part of regular-season training for all team members. Unlike the samples included in the earlier literature, the runners involved in

the present research did not independently express interest in learning about mindfulness, and, in fact, some individuals in the intervention groups were overtly uninterested in or resistant to the training. For instance, one of the athletes characterized several of the exercises as "ridiculous," and opted to sit out when they were conducted in the sessions. This dissension may have affected the motivation of the other athletes, who, on average, reported doing no more than half of the weekly home practice exercises. Another researcher who has recently attempted to implement a mindfulness intervention with a single collegiate sports team reported similar difficulties with resistance and motivation (A. Baltzell, personal communication, October 6, 2012). It thus seems possible that the lack of significant effects in the present study could have been a result of the challenges of teaching mindfulness to an intact team whose members may not have be interested in the training.

This possibility is bolstered when considering the results of the prior research on MSPE. In addition to increases in mindfulness, athletes who have participated in MSPE workshops have demonstrated increases in flow and sport confidence (Kaufman et al., 2009) and decreases in anxiety and perfectionism (De Petrillo et al., 2009). A 1-year follow-up using the combined samples from these two previous studies found that athletes had higher mindfulness scores and provided self-reports of improved performance (Thompson et al., 2011a). A comparison of the results of the present study with those of De Petrillo and colleagues (2009) is of special interest, as the participants of both studies were long-distance runners. While changes in mindfulness and anxiety were observed in De Petrillo's sample with the shorter 4-week MSPE protocol, no changes on these variables were observed in the present study, for either the control or the intervention groups. Some of the mindfulness literature with non-athletes provides support for the idea that the lack of motivation due to non-self-selection may explain this discrepancy. For

instance, Kabat-Zinn (1990) points out that "the attitude with which you undertake the practice of paying attention and being in the present is crucial" (p. 31), explaining that if one's commitment to practice is low, then it is difficult to successfully develop mindfulness. It has also been found that the amount of mindfulness practice people engage in during a mindfulness training significantly predicts changes in mindfulness and treatment outcomes (Carmody & Baer, 2008; Carmody, Baer, Lykins, & Olendzki, 2009). Presumably, individuals who are more motivated are also the ones engaging in more practice outside of the sessions. Additionally, in their reviews of the effects of mindfulness training in clinical and non-clinical populations, Chiesa and Serretti (2009, 2010) note that self-selection bias is a major limitation in the mindfulness literature, and must be considered when interpreting this body of research.

Other literature from within sport psychology may provide further insight into why working with an intact team may have limited the potential effectiveness of MSPE. In addition to the general stigma against utilizing sport psychology services that has been found among coaches and athletes (Martin, 2005; Martin, Lavellee, Kellmann, & Page, 2004; Zakrajsek & Zizzi, 2007), several authors have noted the unique challenges faced by sport psychologists when working with intact teams (e.g., Andersen, Van Raalte, & Brewer, 2001; Brawley & Paskevich, 1997; Dunn & Holt, 2003). Specifically, Bloom and Stevens (2002) stated that "many coaches may be reluctant to allow an 'outsider' access to his/her athletes" (p. 12), which can interfere with a sport psychologist's ability to build relationships with the athletes on the team. However, even if a coach were interested in providing a sport psychology program for his or her team, Johnson, Andersson, and Fallby (2011) found that one of the barriers to coaches using sport psychology services is difficulty integrating consultants with the team. Specifically, coaches

reported worries that a sport psychology consultant's presence would be a threat to the coach's authority, or that a consultant's personality might not mesh with the team.

These challenges speak to the importance of rapport building when implementing an intervention for a team of athletes. It has been found that developing trust and respect with athletes is essential for the successful practice of sport psychology (Dunn & Holt, 2003; Petitpas, 2000), and Andersen and colleagues (2001) discuss how flexibility with issues of time, space, and professional boundaries is necessary in developing such relationships. For example, just "hanging out" with the team is an essential part of rapport building, and can be integral in allowing the athletes to become comfortable with the presence of a sport psychologist (Andersen, 2000; Andersen et al., 2001). Additionally, although not with athletes, Bowen and Kurz (2012) demonstrated the potentially vital role of establishing rapport when providing mindfulness-based interventions, as they found that the reported strength of the therapeutic alliance was predictive of levels of mindfulness after an 8-week mindfulness training, and at a 2-month follow-up.

The importance of rapport building is a relevant consideration for the present study, given the unique role of the group leaders as both researchers and consultants. As outlined in the research protocol, the group leaders' contact with the athletes was limited to the intervention sessions. Due to the necessity of controlling the environment as much as possible to ensure the validity of the research, the group leaders could not demonstrate the flexibility recommended by Andersen and colleagues (2001), and so it may be that the lack of additional interactions with the team (e.g., not hanging out) could have negatively impacted the athletes' sense of comfort with and trust of the group leaders.

Potentially exacerbating this problem was the fact that the leaders alternated between treatment groups each week to control for the effect of their personal characteristics. Brawley

and Paskevich (1997) note the importance of controlling for this particular confound when providing interventions to sports teams, but the lack of consistency may have imposed additional limitations on the ability of the athletes to develop rapport with the group leaders. Notably, several athletes commented on the Program Evaluation measure that getting the group leaders more involved with the team (e.g., coming to practices) could have improved the training, which seems to support the contention that the lack of integration with the team may have limited the potential effectiveness of MSPE.

Other limitations regarding the implementation of MSPE, including the setting and timing of sessions, and the level of involvement of the coaching staff, may also have affected the results. First, the environment in which the MSPE groups were held was antithetical to the cultivation of mindfulness. Specifically, groups were held in the open concourse areas of a large university sports arena, which were the only available spaces on the campus that the team's coach could reserve each week. Even though these spaces were reserved, there was no way to close them off to the public, which exposed the groups to frequent distractions and interruptions (e.g., maintenance people walking through, other sports team practices occurring throughout the arena). Kabat-Zinn (1990) explains that, especially for beginning meditators, it is essential to support and protect one's mindfulness practice by designating a time and space where one can be free from distraction. Thus, it seems likely that the near constant stream of interruptions during the MSPE sessions made it difficult for the athletes to fully engage in the in-session meditations.

The timing of the program may also have impacted the workshop. Sessions were held during a late-afternoon practice time, on the same day that a morning practice was also regularly held. After a morning practice and full day of classes, the athletes came to the workshop appearing fatigued. In fact, during the discussions of the in-session meditations, many athletes

reported falling asleep, and, in the post-workshop feedback, several athletes noted that they felt the training could have been improved had it been held at a different time. This likely had a significant impact on what the athletes were able to get out of the in-session exercises, as it has been noted that fatigue makes it difficult to sustain the alert attention required for meditation (Kabat-Zinn, 1990). While the coaches were allowed to choose the timing of these sessions in an effort to make the workshop more convenient for the team, literature suggests that sport psychology consultants must consider practical barriers, like time demands, when implementing an intervention (Brawley & Paskevich, 1997; Dunn & Holt, 2003). Thus, future MSPE research with teams may benefit from a more deliberate consideration of session scheduling.

With regard to coach involvement, due to concerns about maintaining the confidentiality of the athletes who agreed to participate in the research portion of this training, the governing IRB for this study insisted that the coaches not be present during the workshop sessions. While this limited the ability of the coaches to be involved during the sessions, they were asked by the group leaders to support the intervention between sessions (e.g., remind athletes about the home practice), but they did not seem to comply with this request. The coaches' lack of involvement during and between MSPE sessions may have communicated a lack of support for the training to the athletes, possibly affecting their perceptions of MSPE.

It has been proposed that a coach's presence during initial intervention meetings can communicate support for a sport psychology program (Ravizza, 1990), but Halliwell (1990) points out that, despite the importance of this support, a coach's presence could also inhibit athletes from talking about performance-related difficulties. Dunn and Holt (2003) found that a team of collegiate ice hockey players who received an applied sport psychology program reported that the absence of their coach was a positive aspect of the training, but the authors also

noted that excluding coaches may have unintended negative consequences, like creating misalliances between the athletes and the sport psychology provider. This literature implies that it is important to strike a balance when it comes to coach involvement. Although the procedure of the present study was consistent with previous research indicating the potential benefit of a coach's absence from intervention meetings, it seems possible that a balance of coach involvement was not achieved, and so future use of MSPE with intact teams may benefit from enhanced coach support.

Despite the lack of significant findings, the experiences in the present study provide important insights into potential obstacles associated with providing meditation-based mindfulness interventions to intact sports teams, and may inform strategies to overcome these barriers. Birrer and colleagues (2012) point out that there is a vast difference between the physical and psychological demands of different sports, which must be taken into account when designing and implementing a performance enhancement intervention. By working with a single team, one is able to create a complementary match between the particular skills required by a sport and the modes of mindfulness practice best suited to affect those skills. In fact, this concept of teaching only the relevant components of mindfulness may be necessary to overcoming the apparent paradox between the characteristic nonstriving attitude of mindfulness and the traditionally goal-oriented nature of competitive sports (Birrer et al., 2012). For instance, without thoroughly explaining the sport-specific applications of mindful acceptance, an athlete may misinterpret this concept to mean that he or she should accept being behind in a race, as opposed to accepting the physical pain associated with going faster. However, in order to know which facets of mindfulness to emphasize, one must be intimately familiar with the culture of a

given sport, so that the skills and objectives of the mindfulness training can be made clearly applicable to the sport of focus (Birrer et al., 2012).

Sport-specificity is already a strength of MSPE, whereas other mindfulness-based interventions in sport (e.g., the MAC approach) are generally used with heterogeneous groups of athletes. Despite this strength, the present results indicate that adaptations may be needed in order for MSPE to be used more effectively with sports teams. Based on their work with U.S. Marine units, Stanley, Schaldach, Kiyonaga, and Jha (2011) provide recommendations for such adaptations, which can easily be applied to a sport context. For example, to address the lack of investment or motivation that can occur when not all group members are interested in learning about mindfulness, it may be prudent to include more didactic material, especially in initial sessions, which may serve to more clearly outline what the athletes could gain from the training. In line with this suggestion, Donohue et al. (2004) found that reviewing the potential benefits of a sport psychology program was an effective way to change athletes' recognition of the need for such programs. Similarly, Sears, Kraus, Carlough, and Treat (2011) proposed that mindfulness instructors should make a special effort to review and clarify expectations about meditation in order to address some of the more common doubts that are reported by new meditators (e.g., doubts about the efficacy of meditation, difficulty finding motivation to practice). Also, athletes may be more likely to engage in the experiential components of the training (e.g., meditation) if the time requirement is reduced (e.g., no more than 10-30 minutes per day), and if there is a greater focus on the application of the training to relevant skills (Stanley et al., 2011). These changes were also mentioned by the MSPE participants in post-program feedback as ways to improve the workshop, which seems to reflect the warning given by Brawley and Paskevich (1997) when talking about working with sports teams: "If the target groups fail to understand and

accept what they must do during the intervention and the intervention proceeds anyway, the level of impact expected by investigators may be seriously jeopardized" (p. 23).

It appears that the present investigation is a prime example of the outcome that Brawley and Paskevich warned against. Even though the expected impact of MSPE was not demonstrated, a thoughtful consideration of the obstacles and limitations in the present study provides valuable insight into both the practical and theoretical adaptations that need to be made to mindfulness-based interventions in order to use them effectively with intact sports teams. To accomplish these adaptations, future research will need to address the issues raised here, such as how to more effectively present the workshop to enhance motivation, balance coach involvement, and emphasize sport-relevant components of mindfulness. As it is already designed as a sport-specific intervention, MSPE appears well-suited for work with sports teams. Given this likelihood, the promising results from earlier studies, and the adverse conditions faced in the present investigation that quite probably affected the results, MSPE seems to remain poised to be on the cutting edge of this research effort to help enhance and expand the utility of mindfulness-based interventions for athletes.

Appendix A

Table A1

Participant Characteristics and Between-Group Differences

Variable	MSPE	MSPE-SC	Control	Total	Statistical Comparison
Number of Participants	16	15	24	55	
Gender					χ^2 (2) = 0.86
Male	7	6	13	26	
Female	9	9	11	29	
Age	19.06	19.40	19.50	19.35	F (2, 52) = 0.35
Ethnic Background					χ^2 (8) = 6.91
Caucasian	9	12	17	38	
African American	2	1	1	4	
Asian/Pacific Islander	1	1	2	4	
Latino/a	0	1	0	1	
Bi-/Multi-Racial	3	0	4	7	
Years of Experience	6.16	6.07	5.56	5.87	F (2, 52) = 0.35
Personal Best Times					
1 Mile (in seconds)	283.87	291.31	289.35	288.17	F (2, 45) = 0.32
5 Kilometers (in seconds)	1026.71	1038.67	1026.04	1029.87	F (2, 49) = 0.06
Exercise per Week					
Miles with team	48.50	45.71	51.21	48.98	F (2, 51) = 0.48
Miles on own	18.25	19.61	27.01	22.60	F (2, 48) = 0.90
Non-running	4.91	4.61	2.40	3.71	F (2, 51) = 6.62*
Performance Satisfaction	3.06	2.73	3.13	3.00	F (2, 51) = 0.83
Factors Negatively Impacting Performance					
Internal	3.75	4.07	3.67	3.80	F (2, 52) = 0.84
External	3.19	3.73	3.04	3.27	F (2, 52) = 2.11

Variable	MSPE	MSPE-SC	Control	Total	Statistical Comparison
Sport Psych Exposure					χ^2 (2) = 0.35
Yes	2	1	2	5	
No	14	14	22	50	
Previous Meditation/Yoga Practice					χ^2 (2) = 0.15
Yes	9	8	12	29	
No	7	7	12	26	
Current Meditation/Yoga Practice					χ^2 (2) = 2.30
Yes	2	3	1	6	
No	14	12	22	48	

Note. MSPE = Mindful Sport Performance Enhancement. MSPE-SC = Mindful Sport Performance Enhancement – Self-Compassion.
*$p < .05$.

Table A2

Pre-Test Between-Group Differences ANOVA

Measure	MSPE	MSPE-SC	Control	*F* (2, 52)
FFMQ Total	121.41	120.67	127.42	1.06
Mindful Awareness				
Awareness	35.50	31.73	35.00	3.35*
Observe	25.25	22.47	24.83	1.15
Describe	26.31	25.87	25.71	0.06
Act with Awareness	24.81	26.60	27.00	0.80
Mindful Acceptance				
Acceptance	28.19	29.20	34.46	5.02**
Nonjudgment	24.81	26.33	29.17	2.39
Nonreactivity	20.22	19.40	20.71	0.40
SCS Total	2.87	2.98	2.79	0.46
Self Kindness	2.68	2.48	2.68	0.48
Self Judgment	3.44	2.97	3.26	1.28
Common Humanity	3.19	2.87	2.60	2.77
Isolation	2.81	2.73	3.11	0.92
Mindfulness	3.22	2.88	3.00	0.68
Overidentification	3.59	2.63	3.18	4.99**
EAT-26	58.38	64.47	44.08	10.67***
Positive Body Image				
Appearance Evaluation	3.76	3.62	3.82	0.40
Body Areas Satisfaction	3.73	3.59	3.62	0.19
Positive Rational Acceptance	1.67	1.49	1.52	0.75
Negative Body Image				
Appearance Orientation	3.47	3.23	3.19	1.59
Overweight Preoccupation	2.02	2.25	1.67	3.21*
Self-Classified Weight	2.75	2.63	2.44	1.33

Measure	MSPE	MSPE-SC	Control	*F* (2, 52)
Avoidance	0.66	0.93	0.83	2.52
Appearance Fixing	1.47	1.24	1.23	0.92
DFS-2 Total	124.00	117.33	124.29	1.03
Challenge-Skill Balance	13.88	13.87	14.21	0.11
Merging Action and Awareness	13.06	11.80	12.83	1.36
Clear Goals	15.56	15.93	15.88	0.08
Unambiguous Feedback	14.38	15.33	15.17	0.62
Concentration on the Task at Hand	13.63	12.07	13.29	1.46
Sense of Control	13.81	12.07	13.71	1.95
Loss of Self-Consciousness	10.50	10.87	11.21	0.23
Time Transformation	13.31	11.27	12.38	1.38
Autotelic Experience	15.88	14.13	15.63	1.89
SAS Total	50.50	42.53	44.58	2.27
Somatic Anxiety	20.50	17.13	18.29	1.02
Worrying	23.38	19.33	20.92	3.00
Concentration Disruption	6.63	6.07	5.38	1.56
CSCI Total	38.67	36.07	36.83	0.95[a]
Dispositional Optimism	21.47	19.53	20.21	1.34 [a]
Sport Competence	17.20	16.53	16.63	0.25 [a]
TDRS				
Association	25.56	25.27	23.67	0.90
Daily Events	22.13	20.40	21.96	0.42
Interpersonal Relationships	14.63	13.20	13.13	0.96
External Surroundings	14.88	13.27	14.67	0.70
Spiritual Reflections	1.38	0.80	1.21	0.67
MCSDS	5.00	4.87	4.25	0.89

Note. MSPE = Mindful Sport Performance Enhancement; MSPE-SC = Mindful Sport Performance Enhancement – Self-Compassion; FFMQ = Five Facet Mindfulness Questionnaire; SCS = Self-Compassion Scale; EAT-26 = Eating Attitudes Test; Dispositional Flow Scale-2; SAS = Sport Anxiety Scale; CSCI = Carolina Sport Confidence Inventory; TDRS

= Thoughts During Running Scale; MCSDS-SF = Marlowe-Crowne Social Desirability Scale.
[a] Degrees of freedom of the *F* statistic for these analyses are (2, 51).
**p* < .05. ***p* < .01. ****p* < .001.

Table A3

Time Trial 1 – Between-Group Differences

Variable	MSPE	MSPE-SC	Control	Total	Statistical Comparison[a]
Number of Participants					χ^2 (2) = 1.48
Yes	13	13	17	43	
No	3	2	7	12	
Time (in seconds)	641.15	663.15	633.47	644.77	0.79
Performance Satisfaction	3.08	2.62	3.35	3.05	1.15
Personal Best Time					χ^2 (2) = 4.66
Yes	5	1	2	8	
No	8	11	15	34	
CSAI-2R					
Cognitive Anxiety	23.38	24.69	21.18	22.91	1.07
Somatic Anxiety	19.56	20.22	18.78	19.45	0.22
Self-Confidence	25.85	22.46	26.59	25.12	1.59
FSS-2 Total	119.54	111.00	129.88	121.05	2.13
Challenge-Skill Balance	12.85	12.46	14.00	13.19	0.54
Merging Action/Awareness	13.69	11.85	13.76	13.16	1.43
Clear Goals	14.23	14.46	14.65	14.47	0.05
Unambiguous Feedback	15.08	15.69	15.88	15.58	0.32
Concentration on the Task at Hand	14.54	13.54	15.65	14.67	1.09
Sense of Control	13.54	12.00	14.94	13.63	1.97
Loss of Self-Consciousness	10.69	9.00	14.41	11.65	8.33***
Time Transformation	13.08	11.69	13.12	12.67	1.30
Autotelic Experience	11.85	10.31	13.47	12.02	1.52

Note. MSPE = Mindful Sport Performance Enhancement; MSPE-SC = Mindful Sport Performance Enhancement – Self-Compassion; CSAI-2R = Revised Competitive Sport Anxiety Inventory; FSS-2 = Flow State Scale-2.

[a] Degrees of freedom of the F statistic for these analyses are (2, 40).
***$p < .001$.

Table A4

Completion Rates for Workshops and Measures

Variable	MSPE	MSPE-SC	Control	Total	Statistical Comparison
Sessions Attended	4.63	4.13	---	4.39	t (29) = 0.66
Workshop completers			---		χ^2 (1) = 0.28
Yes	13	11	---	24	
No	3	4	---	7	
Post-test measures					χ^2 (2) = 0.96
Yes	12	11	22	55	
No	1	0	2	3	
Follow-up measures					χ^2 (2) = 0.60
Yes	12	9	21	42	
No	1	2	3	6	
Pre-test time trial 1 measures					χ^2 (2) = 4.35
Yes	11	11	17	39	
No	2	0	7	9	
Post-test time trial 2 measures					χ^2 (2) = 4.32
Yes	11	7	12	30	
No	2	4	12	18	

Note. MSPE = Mindful Sport Performance Enhancement; MSPE-SC = Mindful Sport Performance Enhancement – Self-Compassion. Workshop completer = 4 or more sessions. Information on measure completion rates only for workshop completers and controls.

Table A5

Treatment Credibility and Expectancy

CEQ	MSPE	MSPE-SC	*t* (24)
Credibility	17.86	20.92	-1.76
Expectancy	16.42	20.76	-1.86

Note. MSPE = Mindful Sport Performance Enhancement; MSPE-SC = Mindful Sport Performance Enhancement – Self-Compassion; CEQ = Credibility and Expectations Questionnaire.

Table A6

Adjusted Means and Post-Test MANCOVA Results for Outcome Measures

Variable	MSPE Adj. *M*	MSPE-SC Adj. *M*	Control Adj. *M*	Multivariate comparison (Pillai's trace)	Univariate Comparison *F* (2, 39)
Mindful Awareness				0.28	
Awareness	33.23	33.03	35.37		
Observe	26.39	22.71	25.00		
Describe	26.70	26.14	25.67		
Act with Awareness	25.32	24.54	24.80		
Mindful Acceptance[a]				0.60	
Acceptance	30.10	31.92	29.90		
Nonjudgment	26.39	28.72	26.77		
SCS[b]				0.95	
Self-judgment	2.87	2.70	2.81		
Common humanity	2.65	2.74	2.97		
Isolation	3.12	2.98	2.83		
Mindfulness	2.87	3.02	3.05		
Over-identification	3.20	2.77	2.93		
Positive Body Image				1.14	
Appearance Evaluation	3.67	3.76	3.90		
Body Areas Satisfaction	3.75	3.58	3.87		
Positive Rational Accept	1.86	1.63	1.69		
Negative Body Image				0.26	
Appearance Orientation	3.10	3.24	3.16		
Overweight Preoccupation	1.84	1.95	1.84		
Self-Classified Weight	2.54	2.63	2.55		
Appearance Fixing	1.31	1.55	1.34		
Avoidance	1.10	1.09	1.01		

Variable	MSPE Adj. *M*	MSPE-SC Adj. *M*	Control Adj. *M*	Multivariate comparison (Pillai's trace)	Univariate Comparison *F* (2, 39)
DFS-2				0.64	
Challenge-Skill Balance	15.58	14.19	15.45		
Merge Action/Awareness	13.96	12.71	13.80		
Clear goals	15.33	14.78	16.11		
Unambiguous Feedback	14.67	14.63	16.01		
Concentration	13.09	12.19	14.50		
Sense of Control	14.01	13.32	14.52		
Loss of Self-Consciousness	10.44	10.89	12.36		
Time Transformation	12.80	11.16	11.58		
Autotelic Experience	14.16	13.90	16.24		
SAS				2.55*	
Somatic Anxiety	19.06	18.37	18.29		0.13
Worry	19.03	19.42	20.14		0.30
Concentration Disruption	6.64_{ab}	7.13_{a}	5.31_{b}		5.85**
CSCI				0.09	
Dispositional Optimism	21.23	20.10	20.84		
Sport Competence	17.01	17.54	17.28		
TDRS (dissociation)				0.58	
External Surroundings	16.09	13.34	14.88		
Interpersonal Relationships	14.20	13.03	14.20		
Daily Events	23.97	21.83	22.33		
Spiritual Reflection	2.01	1.55	1.72		
CSAI-2R				2.26	
Somatic Anxiety	21.28	17.33	15.02		
Cognitive Anxiety	24.54	21.06	19.12		
FFS-2				3.20*	
Challenge-Skill Balance	15.10_{a}	10.79_{b}	15.05_{ab}		5.30*[c]
Merge Action/Awareness	13.03_{a}	11.54_{a}	16.66_{b}		11.69**[c]

Variable	MSPE Adj. *M*	MSPE-SC Adj. *M*	Control Adj. *M*	Multivariate comparison (Pillai's trace)	Univariate Comparison *F* (2, 39)
Clear goals	14.67	14.18	15.00		0.05 [c]
Unambiguous Feedback	14.63	15.71	14.09		0.34 [c]
Concentration on Task	14.48	13.81	14.28		0.13 [c]
Sense of Control	13.77	10.70	14.60		2.03 [c]
Loss of Self-Consciousness	12.74	10.73	14.95		1.00 [c]
Time Transformation	12.94	11.06	13.58		0.79 [c]
Autotelic Experience	11.06	9.19	15.24		2.55 [c]

Note. MSPE = Mindful Sport Performance Enhancement; MSPE-SC = Mindful Sport Performance Enhancement – Self-Compassion; M Adj. = Adjusted mean; SCS = Self-Compassion Scale; DFS-2 = Dispositional Flow Scale-2; Merge Action/Awareness = Merging action and awareness; Concentration = Concentration on the task at hand; SAS = Sport Anxiety Scale; CSCI = Carolina Sport Confidence Inventory; TDRS = Thoughts During Running Scale; CSAI-2R = Revised Competitive Sport Anxiety Inventory-2; FSS-2 = Flow State Scale-2. Adjusted means with different subscripts are significantly different.

[a] The FFMQ Nonreactivity subscale was excluded from these analyses because it did not meet the assumption of homogeneity of regression slopes.

[b] The SCS Self-kindness subscale was excluded from these analyses because it did not meet the assumption of homogeneity of regression slopes.

[c] Degrees of freedom of the *F* statistic for these analyses are (2, 22).

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

Table A7

Adjusted Means and Post-Test ANCOVA Results for Outcome Measures

Variable	MSPE Adj. *M*	MSPE-SC Adj. *M*	Control Adj. *M*	*F*(2, 41)
FFMQ total score	127.50	120.40	123.23	0.91[a]
SCS total score	2.92	2.81	2.88	0.26
DFS-2 total score	123.55_{ab}	117.68_{a}	130.86_{b}	4.13*
SAS total score	44.67	45.21	43.62	0.19
CSCI total score	38.15	37.78	38.13	0.03[a]
EAT-26	48.52	50.27	53.04	1.14
TDRS (associative)	24.44	23.26	23.18	0.39
CSAI-2R (confidence)	27.05	24.40	29.27	1.35[c]
FSS-2 total score	123.29	116.80	124.83	0.43[b]
Time Trial Time	637.80	643.56	638.41	0.20[c]
Performance Satisfaction	3.14	1.92	3.10	1.93[b]

Note. MSPE = Mindful Sport Performance Enhancement; MSPE-SC = Mindful Sport Performance Enhancement – Self-Compassion; M Adj. = Adjusted mean; FFMQ = Five Facet Mindfulness Questionnaire; SCS = Self-Compassion Scale; DFS-2 = Dispositional Flow Scale-2; SAS = Sport Anxiety Scale; CSCI = Carolina Sport Confidence Inventory; EAT-26 = Eating Attitudes Test-26; TDRS = Thoughts During Running Scale; CSAI-2R = Revised Competitive Sport Anxiety Inventory-2; FSS-2 = Flow State Scale-2. Adjusted means with different subscripts are significantly different.

[a] Degrees of freedom for the *F* statistic in these analyses are (2, 40).

[b] Degrees of freedom for the *F* statistic in these analyses are (2, 22).

[c] Degrees of freedom for the *F* statistic in these analyses are (2, 23).

* $p < .01$.

Table A8

Adjusted Means and Follow-Up MANCOVA Results for Outcome Measures

Variable	MSPE Adj. *M*	MSPE-SC Adj. *M*	Control Adj. *M*	Multivariate comparison (Pillai's trace)
Mindful Awareness				1.26
Awareness	32.96	34.16	35.76	
Observe	24.30	22.39	26.09	
Describe	26.48	27.31	26.98	
Act with Awareness	25.92	24.93	24.22	
Mindful Acceptance				1.60
Acceptance	30.80	29.52	30.61	
Nonjudgment	25.73	28.95	25.84	
Nonreactivity	20.53	18.79	21.64	
SCS				0.97
Self-kindness	2.97	2.75	2.73	
Self-judgment	2.76	2.55	2.72	
Common humanity	2.73	2.86	2.98	
Isolation	3.28	2.92	2.92	
Mindfulness	2.08	2.95	3.00	
Over-identification	3.09	2.79	2.69	
Positive Body Image				1.89
Appearance Evaluation	3.84	3.96	3.94	
Body Areas Satisfaction	3.75	3.52	3.86	
Positive Rational Acceptance	1.63	1.70	1.73	
Negative Body Image[a]				1.28
Overweight Preoccupation	1.80	1.73	1.98	
Self-Classified Weight	2.46	2.73	2.54	
Appearance Fixing	1.21	1.23	1.41	
Avoidance	0.91	0.93	0.97	

Variable	MSPE Adj. *M*	MSPE-SC Adj. *M*	Control Adj. *M*	Multivariate comparison (Pillai's trace)
DFS-2				1.07
Challenge-Skill Balance	14.03	13.92	15.21	
Merging Action and Awareness	13.39	13.17	13.96	
Clear goals	15.95	16.54	16.94	
Unambiguous Feedback	15.77	16.71	15.87	
Concentration	14.10	13.92	15.60	
Sense of Control	14.22	14.14	14.73	
Loss of Self-Consciousness	9.62	9.94	11.95	
Time Transformation	12.41	11.43	13.79	
Autotelic Experience	14.14	14.21	16.22	
SAS[b]				0.31
Somatic Anxiety	17.58	18.36	18.70	
Concentration Disruption	5.29	5.88	5.50	
CSCI				0.31
Dispositional Optimism	20.58	20.31	20.99	
Sport Competence	16.93	17.41	17.19	
TDRS (dissociation)				1.04
External Surroundings	15.70	13.45	15.26	
Interpersonal Relationships	13.08	13.01	14.85	
Daily Events	21.59	22.99	22.81	
Spiritual Reflection	1.35	1.78	1.85	

Note. MSPE = Mindful Sport Performance Enhancement; MSPE-SC = Mindful Sport Performance Enhancement – Self-Compassion; M Adj. = Adjusted mean; SCS = Self-Compassion Scale; DFS-2 = Dispositional Flow Scale-2; Concentration = Concentration on the task at hand; SAS = Sport Anxiety Scale; CSCI = Carolina Sport Confidence Inventory; TDRS = Thoughts During Running Scale.

[a] The MBSRQ Appearance Orientation subscale was excluded from these analyses because it did not meet the assumption of homogeneity of regression slopes.

[b] The SAS Worry subscale was excluded from these analyses because it did not meet the assumption of homogeneity of regression slopes.

Table A9

Adjusted Means and Follow-Up ANCOVA Results for Outcome Measures

Variable	MSPE Adj. *M*	MSPE-SC Adj. *M*	Control Adj. *M*	*F*(2, 38)
FFMQ	123.80	120.70	125.00	0.59
SCS	2.97	2.78	2.86	0.75
DFS-2	123.87_{ab}	121.43_{a}	135.23_{b}	4.26*[a]
SAS	42.69	44.38	43.78	0.13
CSCI	37.43	37.78	38.20	0.16[a]
EAT-26	50.35	45.23	53.18	1.76
TDRS (associative)	23.89	24.95	22.66	1.26

Note. MSPE = Mindful Sport Performance Enhancement; MSPE-SC = Mindful Sport Performance Enhancement – Self-Compassion; M Adj. = Adjusted mean; FFMQ = Five Facet Mindfulness Questionnaire; SCS = Self-Compassion Scale; DFS-2 = Dispositional Flow Scale-2; SAS = Sport Anxiety Scale; CSCI = Carolina Sport Confidence Inventory; EAT-26 = Eating Attitudes Test-26; TDRS = Thoughts during running scale. Adjusted means with different subscripts are significantly different.

[a] Degrees of freedom for the *F* statistic in these analyses are (2, 37).

* $p < .01$.

Table A10

Means and Repeated-Measures MANOVA Results for Outcome Measures

	MSPE				MSPE-SC			
Measure	Pre	Post	Follow-up	$F(2, 22)$	Pre	Post	Follow-up	$F(2, 16)$
Mindful Awareness				0.69[a]				0.45
Awareness (PHLMS)	35.00	33.36	32.00		31.89	32.33	32.00	
Observe (FFMQ)	23.18	25.82	23.36		21.89	21.33	20.44	
Describe (FFMQ)	26.00	26.91	26.18		26.67	26.44	26.78	
Act with Awareness (FFMQ)	24.45	24.09	24.91		27.33	24.78	25.22	
Mindful Acceptance				0.63[a]				0.60
Acceptance (PHLMS)	27.18	27.91	29.64		28.22	30.78	28.44	
Nonjudgment (FFMQ)	24.73	25.00	24.55		27.67	28.89	28.56	
Nonreactivity (FFMQ)	19.23	20.45	20.09		20.56	18.33	18.78	
SCS				0.28				0.70
Self-kindness	2.70	2.93	2.92		2.64	2.76	2.71	
Self-judgment	2.65	2.78	2.70		3.07	2.96	2.69	
Common humanity	3.17	2.77	2.85		2.86	2.92	2.83	
Isolation	3.19	3.10	3.31		3.33	3.25	3.03	
Mindfulness	3.23	2.96	3.08		2.81	3.03	2.92	
Over-identification	2.46	3.00	3.00		3.39	3.08	2.97	

	MSPE				MSPE-SC			
Measure	Pre	Post	Follow-up	$F(2, 22)$	Pre	Post	Follow-up	$F(2, 16)$
Positive Body Image				0.93[b]				0.22
Appearance Evaluation (MBSRQ)	3.81	3.74	3.87		3.56	3.71	3.81	
Body Area Satisfaction (MSRQ)	3.61	3.89	3.72		3.64	3.54	3.49	
Positive Rational Acceptance (BICSI)	1.82	1.94	1.74		1.57	1.75	1.61	
Negative Body Image				1.64[b]				1.16
Appearance Orientation (MBSRQ)	3.37	3.18	3.14		3.24	3.25	3.16	
Overweight Preoccupation (MBSRQ)	1.80	1.90	1.85		2.33	2.22	1.97	
Self-Classified Weight (MBSRQ)	2.65	2.60	2.50		2.61	2.72	2.83	
Appearance Fixing (BICSI)	1.54	1.50	1.40		1.34	1.54	1.23	
Avoiding (BICSI)	0.66	1.13	0.95		0.89	1.07	0.96	
DFS-2				0.18[a]				0.02
Challenge-Skill Balance	14.45	15.18	13.82		14.44	14.89	14.00	
Merging Action and Awareness	12.82	14.09	14.00		11.67	12.44	11.89	
Clear goals	15.64	15.45	15.73		16.33	15.22	16.56	
Unambiguous Feedback	15.09	14.64	15.91		14.67	15.11	15.67	
Concentration on the Task at Hand	14.00	13.55	14.36		12.67	12.22	13.22	
Self of Control	14.45	14.27	14.27		13.00	13.56	13.33	
Loss of Self-Consciousness	10.73	10.82	9.88		10.44	10.22	9.67	
Time Transformation	13.82	12.73	12.73		11.89	11.00	10.89	

	MSPE				MSPE-SC			
Measure	Pre	Post	Follow-up	$F(2, 22)$	Pre	Post	Follow-up	$F(2, 16)$
Autotelic Experience	16.27	14.45	14.27		14.44	13.89	13.56	
SAS				1.92				0.78
Somatic anxiety	21.75	21.25	19.67		19.56	19.78	18.67	
Worry	23.33	20.67	20.75		19.56	19.44	19.11	
Concentration Disruption	6.83	7.33	5.92		5.56	7.11	5.89	
CSCI				0.28[a]				0.41
Dispositional Optimism	21.64	21.91	21.00		19.67	20.11	19.89	
Sport Competence	17.00	17.18	17.18		16.33	17.44	17.11	
TDRS (dissociative)				3.34*				0.11
External Surroundings	14.83	16.50	15.67		13.89	13.11	13.11	
Interpersonal Relationships	14.50	14.67	13.58		14.00	13.78	13.67	
Daily Events	20.33	24.17	21.17		20.56	22.33	23.22	
Spiritual Reflection	1.17	1.92	1.25		0.89	1.67	1.56	
CSAI-2R				3.73[c]				0.60[d]
Somatic anxiety	18.43	21.57	---		18.37	17.35	---	
Cognitive anxiety	22.40	24.60	---		23.71	21.71	---	
FSS-2				0.12[c]				0.18[d]
Challenge-Skill Balance	12.70	14.60	---		12.43	11.86	---	
Merging Action and Awareness	13.00	12.90	---		12.14	12.43	---	

	MSPE				MSPE-SC			
Measure	Pre	Post	Follow-up	$F(2, 22)$	Pre	Post	Follow-up	$F(2, 16)$
Clear goals	13.70	14.00	---		14.57	13.00	---	
Unambiguous Feedback	14.90	14.20	---		16.29	15.43	---	
Concentration on the Task at Hand	14.00	13.90	---		14.43	13.29	---	
Sense of Control	13.40	13.10	---		12.00	11.00	---	
Loss of Self-Consciousness	10.20	11.70	---		8.43	10.57	---	
Time Transformation	12.80	12.50	---		11.57	11.14	---	
Autotelic Experience	11.90	12.10	---		9.86	10.14	---	

Note. PHLMS = Philadelphia Mindfulness Scale; FFMQ = Five Facet Mindfulness Questionnaire; MBSRQ = Multidimensional Body-Self Relations Questionnaire; BICSI = Body Image Coping Strategies Inventory; SCS = Self-Compassion Scale; DFS-2 = Dispositional Flow Scale-2; SAS = Sport Anxiety Scale; CSCI = Carolina Sport Confidence Inventory; TDRS = Thoughts During Running Scale; CSAI-2R = Revised Competitive Sport Anxiety Inventory-2; FSS-2 = Flow State Scale-2.

[a] Degrees of freedom of the F statistic for these analyses are (2, 20).

[b] Degrees of freedom of the F statistic for these analyses are (2, 18).

[c] Degrees of freedom of the F statistic for these analyses are (1, 9).

[d] Degrees of freedom of the F statistic for these analyses are (1, 6).

* $p < .05$.

Table A11

Means and Repeated-Measures MANOVA Results for Control Group Outcome Measures

Measure	Pre	Post	Follow-up	$F(2, 40)$
Mindful Awareness				0.40
Awareness (PHLMS)	35.29	36.29	36.57	
Observe (FFMQ)	25.24	25.81	27.00	
Describe (FFMQ)	26.10	25.95	27.05	
Act with Awareness (FFMQ)	27.10	25.52	24.57	
Mindful Acceptance				2.11
Acceptance (PHLMS)	34.62	31.90	32.00	
Nonjudgment (FFMQ)	29.33	28.24	27.00	
Nonreactivity (FFMQ)	21.24	22.43	21.86	
SCS				0.06
Self-kindness	2.73	2.67	2.77	
Self-judgment	2.77	2.78	2.70	
Common humanity	2.65	2.86	2.92	
Isolation	2.93	2.81	2.86	
Mindfulness	3.08	3.05	3.01	
Over-identification	2.81	2.89	2.65	
Positive Body Image				2.31[a]
Appearance Evaluation (MBSRQ)	3.94	3.97	4.02	
Body Area Satisfaction (MSRQ)	3.69	3.88	3.89	
Positive Rational Acceptance (BICSI)	1.58	1.67	1.71	
Negative Body Image				2.53
Appearance Orientation (MBSRQ)	3.14	3.10	3.20	
Overweight Preoccupation (MBSRQ)	1.75	1.73	1.86	
Self-Classified Weight (MBSRQ)	2.48	2.48	2.48	
Appearance Fixing (BICSI)	1.24	1.23	1.31	
Avoiding (BICSI)	0.82	1.01	0.94	

Measure	Pre	Post	Follow-up	$F(2, 40)$
DFS-2				4.41*
Challenge-Skill Balance	14.57	15.67	15.29	2.23[b]
Merging Action and Awareness	12.95_a	14.05_b	14.19_b	4.51*[b]
Clear goals	16.10	16.29	17.05	1.68[b]
Unambiguous Feedback	15.67	16.14	16.24	0.54[b]
Concentration on the Task at Hand	13.67_a	14.57_a	15.76_b	6.98**[b]
Self of Control	14.00	14.76	15.05	1.93[b]
Loss of Self-Consciousness	11.10	12.29	11.93	1.16[b]
Time Transformation	12.24_{ab}	11.62_a	13.86_b	4.04*[b]
Autotelic Experience	15.86	16.43	16.43	0.95[b]
SAS				0.14
Somatic anxiety	17.19	17.29	17.38	
Worry	20.52	19.71	19.48	
Concentration Disruption	5.19	4.95	5.14	
CSCI				0.86
Dispositional Optimism	20.52	20.90	20.95	
Sport Competence	16.71	17.33	17.19	
TDRS (dissociative)				2.46
External Surroundings	14.33	14.57	15.43	
Interpersonal Relationships	12.62	12.62	14.29	
Daily Events	21.33	21.86	22.95	
Spiritual Reflection	1.38	1.86	2.00	
CSAI-2R				3.16[c]
Somatic anxiety	17.21	14.71	---	
Cognitive anxiety	21.00	18.60	---	
FSS-2				0.18[d]
Challenge-Skill Balance	14.67	14.78	---	
Merging Action and Awareness	15.33	16.11	---	
Clear goals	15.56	16.67	---	

Measure	Pre	Post	Follow-up	$F(2, 40)$
Unambiguous Feedback	15.44	14.78	---	
Concentration on the Task at Hand	16.33	15.33	---	
Sense of Control	15.67	15.11	---	
Loss of Self-Consciousness	14.56	14.22	---	
Time Transformation	14.56	14.00	---	
Autotelic Experience	14.89	14.78	---	

Note. PHLMS = Philadelphia Mindfulness Scale; FFMQ = Five Facet Mindfulness Questionnaire; MBSRQ = Multidimensional Body-Self Relations Questionnaire; BICSI = Body Image Coping Strategies Inventory; SCS = Self-Compassion Scale; DFS-2 = Dispositional Flow Scale-2; SAS = Sport Anxiety Scale; CSCI = Carolina Sport Confidence Inventory; TDRS = Thoughts During Running Scale; CSAI-2R = Revised Competitive Sport Anxiety Inventory-2; FSS-2 = Flow State Scale-2. Means with different subscripts are significantly different.

[a] Degrees of freedom of the F statistic for these analyses are (2, 38).

[b] Follow-up univariate analyses.

[c] Degrees of freedom of the F statistic for these analyses are (1, 9).

[d] Degrees of freedom of the F statistic for these analyses are (1, 8).

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

Table A12

Means and Repeated-Measures ANOVA Results for Control Group Outcome Measures

Measure	Pre	Post	Follow-up	$F(2, 40)$
FFMQ total score	129.00	127.95	127.48	0.21
SCS total score	2.83	2.84	2.82	0.06
DFS-2 total score	126.14_{a}	131.81_{ab}	135.79_{b}	4.41*
SAS total score	42.90	41.95	42.00	0.14
CSCI total score	37.24	38.24	38.14	0.86
EAT-26	44.86	46.19	48.00	2.30
TDRS (associative)	23.05	22.24	21.95	0.64
CSAI-2R (confidence)	26.10_{a}	30.00_{b}	---	5.41*[a]
FSS-2 total score	137.00	135.78	---	0.18[b]
Time Trial Time	651.50	641.60	---	2.53[a]
Performance Satisfaction	3.70	3.10	---	1.98[a]

Note. FFMQ = Five Facet Mindfulness Questionnaire; SCS = Self-Compassion Scale; DFS-2 = Dispositional Flow Scale-2; SAS = Sport Anxiety Scale; CSCI = Carolina Sport Confidence Inventory; TDRS = Thoughts during running scale; EAT-26 = Eating Attitudes Test-26; FSS-2 = Flow State Scale-2; CSAI-2R = Revised Competitive Sport Anxiety Inventory-2. Means with different subscripts are significantly different.

[a] Degrees of freedom of the F statistic for these analyses are (1, 9).

[b] Degrees of freedom of the F statistic for these analyses are (1, 8).

* $p < .05$.

Table A13

Pre-Test Correlations Between Mindfulness Measures and Other Variables (n = 55)

Measure	Awareness (PHLMS)	Acceptance (PHLMS)	FFMQ Total	Observe	Describe	Act Aware	Nonjudge	Nonreact
SCS Total	.05	.27*	.49***	.03	.23	.48***	.28*	.47***
Self-kindness	.19	.21	.56***	.25	.24	.30*	.29*	.64***
Self-judgment	-.23	.49***	.43***	-.27*	.17	.53***	.48***	.32*
Common humanity	.27*	-.19	.11	.20	.17	.07	-.21	.16
Isolation	-.21	.34**	.23	-.21	-.06	.36**	.40**	.16
Mindfulness	.41**	-.02	.50***	.32*	.41**	.32*	-.02	.52***
Over-identification	-.10	.29*	.37**	-.05	.13	.46***	.25	.33*
EAT-26	.04	-.53***	-.21	.16	.09	-.32*	-.43***	-.07
Positive Body Image								
Appearance Evaluation	.21	.34*	.43***	.27*	.28*	.22	.18	.33*
Body Area Satisfaction	.20	.07	.35**	.25	.24	.13	.11	.33*
Positive Rational Accept	.46***	-.14	.39**	.42**	.51***	.09	-.16	.39**
Negative Body Image								
Appearance Orientation	.23	-.36**	-.05	.17	.20	-.06	-.42***	.06
Overweight Preoccupation	-.12	-.31*	-.25	.02	-.05	-.21	-.34**	-.12
Self-Classified Weight	-.14	-.10	-.16	-.09	.12	-.14	-.14	-.24
Appearance Fixing	.00	-.50***	-.36**	.07	-.06	-.39**	-.38**	-.29*
Avoiding	-.08	-.43***	-.40**	.01	-.14	-.46***	-.35**	-.23

Measure	Awareness (PHLMS)	Acceptance (PHLMS)	FFMQ Total	Observe	Describe	Act Aware	Nonjudge	Nonreact
DFS-2 Total	.33*	.22	.41**	.42***	.18	.10	.11	.46***
Challenge-Skill Balance	.17	.25	.47***	.25	.30*	.28*	.13	.49***
Merge Action/Awareness	.17	.09	.04	.31*	-.20	-.16	-.02	.24
Clear goals	.29*	-.04	.20	.30*	.26*	-.03	-.13	.24
Unambiguous Feedback	.24	.24	.25	.32*	.29*	-.09	-.07	.34*
Concentration	.16	.23	.40**	.11	.27*	.23	.26	.33*
Self of Control	.35**	.30*	.54***	.27*	.34*	.38**	.22	.40**
Loss Self-Consciousness	-.03	.33*	.23	.07	-.17	.14	.41**	.20
Time Transformation	.28*	-.21	-.07	.42***	-.13	-.27*	-.25	.09
Autotelic Experience	.22	.08	.29*	.31*	.14	.08	.07	.30*
SAS Total	.16	-.38**	-.29*	.05	-.07	-.40**	-.22	-.20
Somatic anxiety	.15	-.30*	-.18	.03	-.08	-.28*	-.05	-.17
Worry	.16	-.32*	-.27*	-.01	.03	-.34*	-.29*	-.17
Concentration Disruption	.01	-.34*	-.32*	.17	-.19	-.41**	-.33*	-.14
CSCI Total[a]	.22	.22	.49***	.26*	.22	.35**	.23	.41**
Dispositional Optimism[a]	.25	.24	.49***	.38**	.16	.35**	.19	.42**
Sport Competence[a]	.12	.15	.34*	.06	.21	.25	.22	.29*
TDRS (associative)	.17	-.29*	-.12	.13	.08	-.06	-.33*	-.15
TDRS (dissociative)								
External Surroundings	.13	-.08	.01	.25	-.09	-.24	.09	.01
Interpersonal	.09	-.25	-.21	-.13	.16	-.18	-.12	-.40**

Measure	Awareness (PHLMS)	Acceptance (PHLMS)	FFMQ Total	Observe	Describe	Act Aware	Nonjudge	Nonreact
Daily Events	.12	-.15	.06	.01	.10	.09	.05	-.09
Spiritual Reflection	.07	.10	.26*	.19	.07	.16	.15	.22
Time Trial 1 Time[b]	-.07	.39*	-.16	.02	.04	-.18	-.13	.31*
Performance Satisfaction[b]	.18	.28	.44**	.28	.21	.16	.24	.55***
CSAI-2R[b]								
Somatic anxiety[b]	-.02	-.17	-.08	-.05	.01	-.09	-.03	-.12
Cognitive anxiety[b]	-.29	-.20	-.22	-.37*	-.01	.03	-.09	-.29
CSAI-2R (confidence) [b]	.44**	.16	.50***	.38*	.43**	.22	.20	.39**
FSS-2 Total[b]	.32*	.35*	.52***	.33*	.33*	.29	.23	.53***
Challenge-Skill Balance[b]	.23	.32*	.55***	.24	.38*	.39**	.23	.58***
Merge Action/Awareness[b]	.30*	.23	.31*	.30*	.17	.08	.12	.36*
Clear goals[b]	.15	.02	.26	.08	.28	.12	.09	.30*
Unambiguous Feedback[b]	.18	.56***	.41**	.19	.18	.33*	.24	.41**
Concentration[b]	.24	.27	.43**	.24	.30*	.23	.17	.48***
Sense of Control[b]	.28	.32*	.56***	.25	.43**	.39**	.28	.48***
Loss Self-Consciousness[b]	.39**	.44**	.46**	.40**	.21	.24	.23	.41**
Time Transformation[b]	-.03	-.12	-.24	.07	-.31*	-.30	-.11	-.12
Autotelic Experience[b]	.31*	.23	.53***	.37*	.35*	.28	.23	.50***

Note. PHLMS = Philadelphia Mindfulness Scale; FFMQ = Five Facet Mindfulness Questionnaire; Act Aware = Act with awareness; Nonjudge = Nonjudgmentality; Nonreact = Nonreactivity; SCS = Self-Compassion Scale; EAT-26 = Eating Attitudes Inventory-26; Positive Rational Accept = Positive rational acceptance; DFS-2 = Dispositional Flow Scale-2; Merge Action/Awareness = Merging action and awareness; Concentration = Concentration on the task at hand; SAS = Sport Anxiety Scale;

CSCI = Carolina Sport Confidence Inventory; TDRS = Thoughts During Running Scale; Interpersonal = Interpersonal relationships; CSAI-2R = Revised Competitive Sport Anxiety Inventory-2; FSS-2 = Flow State Scale-2.

[a] For these analyses, $n = 54$.

[b] For these analyses, $n = 43$.

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

Table A14

Pre-Test Correlations Between Self-Compassion and Measures of Disordered Eating and Body Image (n = 55)

Measure	SCS Total	Self-Kindness	Self-Judgment	Common Humanity	Isolation	Mindfulness	Over-Identification
EAT-26	-.12	-.13	-.28*	.14	-.19	.05	-.08
Positive Body Image							
Appearance Evaluation	.55***	.58***	.37**	.37**	.38**	.47***	.30*
Body Area Satisfaction	.46***	.47***	.23	.33*	.28*	.49***	.26*
Positive Rational Accept	.42**	.51***	.01	.61***	.04	.64***	.11
Negative Body Image							
Appearance Orientation	-.03	.06	-.23	.09	-.10	.11	-.02
Overweight Preoccupation	-.19	-.21	-.22	.05	-.15	-.16	-.15
Self-Classified Weight	-.20	-.25	-.11	-.10	-.06	-.22	-.15
Appearance Fixing	-.43***	-.29*	-.56***	-.15	-.40**	-.25	-.24
Avoiding	-.44***	-.43***	-.44***	-.25	-.47***	-.26	-.10

Note. SCS = Self-Compassion Scale; EAT-26 = Eating Attitudes Test-26.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Appendix B

Coach _____,

We are writing to offer you an exciting opportunity to help improve your athletes' running performance. Our sport psychology research team here at CUA has developed a mental training workshop to help athletes get in "the zone" and achieve their peak performance. We have published 3 articles in a prominent sport psychology journal showing the effectiveness of this workshop with archers, golfers, and distance runners. To our knowledge we are the only research team in the ears looking at sport performance in this way, and as part of our next study, we would like to offer our program for **FREE** to long-distance runners on local college teams.

Among other benefits, this workshop could help your athletes:

- Run faster
- Cope with pain and fatigue
- Manage anxiety before races
- Improve concentration and focus while running

We have found that our workshop helps athletes, but we want to know more about its specific benefits. If you take advantage of this opportunity you'll not only be helping your athletes work to improve their performance, but also helping us learn how to optimize mental and physical training for athletes everywhere. In return for your help, we'll provide you with feedback about how your team as a whole is changing and improving, and you could learn some mental training techniques to use with your athletes for years to come.

This workshop requires a moderate time commitment from your athletes for it to be effective. We will meet with your team just once a week for 6 weeks, for about 1½ to 2 hours each time. We are contacting you now so that we can find a way to schedule these meetings into your regular training schedule whenever it works for you. If this free mental training opportunity is something you would like for your team, please contact me at your earliest convenience. Thank you for your time and I look forward to hearing from you.

Sincerely,

Timothy Pineau, M.A. (518) 339-7409; 94pineau@cardinalmail.cua.edu
Carol Glass, Ph.D.
Keith Kaufman, Ph.D.
Department of Psychology, The Catholic University of America

Appendix C

Informed Consent Form

Participant Name (please print): _____ Date: _____

Title of Study: Mindful Sport Performance Enhancement (MSPE) for Distance Runners

Primary Investigator: Timothy R. Pineau, M.A.

Supervisor: Carol R. Glass, Ph.D., glass@cua.edu, The Catholic University of America

Investigator Contact Information: Timothy Pineau, (518) 339-7409, 94pineau@cardinalmail.cua.edu

Purpose of the Study: This research is designed to investigate how training in mindfulness will affect the experience, performance, and body image of runners. The study will partially fulfill the requirements for a doctoral degree in clinical psychology at The Catholic University of America.

Description of Procedures: I will be provided with a description of the program, after which I will be asked to fill out a packet of questionnaires that includes questions about my background and running experience, attitudes, thoughts, feelings, and behaviors. It will take me approximately 30-40 minutes to complete this packet, and I will be asked to complete a similar packet on three additional occasions. The program will consist of six 2-hour weekly sessions, which will involve instruction in and practice of mindfulness skills. My teammates and I will be separated into two groups to receive this training. Between sessions, I will be asked to practice mindfulness meditation exercises and continue my running training, as well as keep a log of my mindfulness meditation and running activities. I will also be asked to complete some questionnaires similar to ones I have already completed, but in conjunction with 5-kilometer time trials, to take place before the first session of the program and after the completion of the program, and in conjunction with an actual competition, to take place after the completion of the program. These time trials will be incorporated into my regular training schedule and so will not be in addition to regular practice.

Potential Risks of Participation: I understand that the risks associated with participating in this study are minimal. However, I may experience some mild psychological discomfort while answering questions about my thoughts, feelings, and behaviors. Also, I understand that injury is possible when I engage in my usual running activities, such as 5-kilometer time trials. I understand that I am able to discontinue my participation in this study at any point without consequences, and that I can decline to answer items on the questionnaires. If I choose not to complete any or all of the questionnaires, I may still be required by my coach to receive the

mindfulness training and participate in the running activities mentioned above as part of my regular practice schedule. If I have any questions or concerns about my participation in this study, I may contact the investigator or his supervisor listed above to discuss these issues.

Potential Benefits of Participation: I understand that this study may provide me with benefits associated with gaining knowledge of myself and my running performance. It is also possible that information gained from this study may benefit athletes in the future by providing a better understanding of the relationship between some psychological variables and sport performance.

Confidentiality: I understand that I will be given a code number at the beginning of the study to protect my confidentiality. This number will appear on all of my questionnaires in place of my name. I understand that my signed informed consent form and any contact information obtained by the investigator will be kept separate from my questionnaire responses in a locked cabinet. I understand that all information about me will be kept as confidential as is legally possible, that my coach will not be informed of my questionnaire responses or participation status, and that no identifying information will be included in the report of the results. I understand that all raw data obtained will be destroyed within 5 years after the study's conclusion.

Research Subject Rights: I have read all of the above.

I understand that I must be at least 18 years of age to sign this form.

I understand that I may refuse to participate or discontinue my participation at any time without penalty, and I may also decline to answer particular items on the questionnaires without penalty.

I understand that any information about me obtained as a result of my participation in this study will be kept as confidential as legally possible, and my questionnaire responses and participation status will not be shared with my coach.

I understand that if I experience any psychological distress either during or after my participation in this study and I would like to receive services to address this distress, I can contact my university's counseling center; Telephone: _____; Location: _____.

I understand that I am encouraged to ask any questions about this study and/or my participation in it, and these have been answered to my satisfaction. If I have any concerns about the conduct of this study and my rights as a participant, I have been told I can call the Office of Sponsored Programs of The Catholic University of America; Telephone: (202) 319-5218.

I understand my rights as a research participant, and I voluntarily consent to participate in this study. I will receive a signed copy of this consent form.

_____	_____
Participant's signature	Investigator's signature
_____	_____
Date	Date

If I agree, I may be contacted for a possible follow-up sometime in the next year. I understand that I am free to decline participation at that time.

___ Yes, I agree to be contacted.

___ No, I do not agree to be contacted.

If yes, please complete below:

_____	_____
Participant's signature	Street address
_____	_____
Participant's name (please print)	City, state, and zip code
_____	_____
Date	Email address
	_____
	Phone number

Appendix D

Informed Consent Form

Participant Name (please print): _____ Date: _____

Parent Name (please print): _____

Title of Study: Mindful Sport Performance Enhancement (MSPE) for Distance Runners

Primary Investigator: Timothy R. Pineau, M.A.

Supervisor: Carol R. Glass, Ph.D., glass@cua.edu, The Catholic University of America

Investigator Contact Information: Timothy Pineau, (518) 339-7409, 94pineau@cardinalmail.cua.edu

Purpose of the Study: This research is designed to investigate how training in mindfulness will affect the experience, performance, and body image of runners. The study will partially fulfill the requirements for a doctoral degree in clinical psychology at The Catholic University of America.

Description of Procedures: My child will be provided with a description of the program, after which s/he will be asked to fill out a packet of questionnaires that includes questions about his/her background and running experience, attitudes, thoughts, feelings, and behaviors. It will take him/her approximately 30-40 minutes to complete this packet, and s/he will be asked to complete a similar packet on three additional occasions. The program will consist of six 2-hour weekly sessions, which will involve instruction in and practice of mindfulness skills. My child's team will be separated into two groups to receive this training. Between sessions, my child will be asked to practice mindfulness meditation exercises and continue his/her running training, as well as keep a log of his/her mindfulness meditation and running activities. My child will also be asked to complete some questionnaires similar to ones s/he has already completed, but in conjunction with 5-kilometer time trials, to take place before the first session of the program and after the completion of the program, and in conjunction with an actual competition, to take place after the completion of the program. These time trials will be incorporated into my child's regular training schedule and so will not be in addition to regular practice.

Potential Risks of Participation: I understand that the risks associated with participating in this study are minimal. However, my child may experience some mild psychological discomfort while answering questions about his/her thoughts, feelings, and behaviors. Also, I understand that injury is possible when my child engages in his/her usual running activities, such as 5-kilometer time trials. I understand that my child is able to discontinue participation in this study

at any point without consequences, and that s/he can decline to answer any items on the questionnaires. If my child chooses not to complete any or all of the questionnaires, s/he may still be required by the coach to receive the mindfulness training and participate in the running activities mentioned above as part of the regular practice schedule. If I have any questions or concerns about my child's participation in this study, I may contact the investigator or his supervisor listed above to discuss these issues.

Potential Benefits of Participation: I understand that this study may provide my child with benefits associated with gaining knowledge of him/herself and his/her running performance. It is also possible that information gained from this study may benefit athletes in the future by providing a better understanding of the relationship between some psychological variables and sport performance.

Confidentiality: I understand that my child will be given a code number at the beginning of the study to protect his/her confidentiality. This number will appear on all questionnaires in place of my child's name. I understand that this signed informed consent form and any identifying information obtained by the investigator that pertains to my child will be kept separate from my child's questionnaire responses in a locked cabinet. I understand that all information about my child will be kept as confidential as is legally possible, that my child's coach will not be informed of his/her questionnaire responses or participation status, and that no identifying information will be included in the report of the results. I understand that all raw data obtained will be destroyed within 5 years after the study's conclusion.

Research Subject Rights: I have read all of the above.

I understand that I must be the parent or legal guardian of the participant named above to sign this form.

I understand that my child may refuse to participate or discontinue participation at any time without penalty, and s/he may also decline to answer particular items on the questionnaires without penalty.

I understand that information about my child obtained as a result of participation in this study will be kept as confidential as legally possible, and my child's questionnaire responses and participation status will not be shared with the coach.

I understand that I am encouraged to ask any questions about this study and/or my child's participation in it, and can address these questions to the researchers listed above. If I have any concerns about the conduct of this study and my child's rights as a participant, I have been told I can call the Office of Sponsored Programs of The Catholic University of America; Telephone: (202) 319-5218.

I understand my child's rights as a research participant, and I voluntarily consent to my child participating in this study. I have received a copy of this consent form to keep.

_____	_____
Participant's signature	Investigator's signature
_____	_____
Date	Date

If I and my child agree, my child may be contacted for a possible follow-up sometime in the next year. I understand that my child is free to decline participation at that time.

___ Yes, I agree my child can be contacted.

___ No, I do not agree my child can be contacted.

If yes, please complete below:

_____

Participant's name (please print)

_____

Parent's signature

_____

Date

If you consent to your child participating in this research, please return this signed consent form to the primary investigator listed above in the stamped, addressed envelope provided for you. Thank you for your time.

Appendix E

Informed Assent Form

Participant Name (please print): _____ Date: _____

Title of Study: Mindful Sport Performance Enhancement (MSPE) for Distance Runners

Primary Investigator: Timothy R. Pineau, M.A.

Supervisor: Carol R. Glass, Ph.D., glass@cua.edu, The Catholic University of America

Investigator Contact Information: Timothy Pineau, (518) 339-7409, 94pineau@cardinalmail.cua.edu

Purpose of the Study: This research is designed to investigate how training in mindfulness will affect the experience, performance, and body image of runners. The study will partially fulfill the requirements for a doctoral degree in clinical psychology at The Catholic University of America.

Description of Procedures: I will be provided with a description of the program, after which I will be asked to fill out a packet of questionnaires that includes questions about my background and running experience, attitudes, thoughts, feelings, and behaviors. It will take me approximately 30-40 minutes to complete this packet, and I will be asked to complete a similar packet on three additional occasions. The program will consist of six 2-hour weekly sessions, which will involve instruction in and practice of mindfulness skills. My teammates and I will be separated into two groups to receive this training. Between sessions, I will be asked to practice mindfulness meditation exercises and continue my running training, as well as keep a log of my mindfulness meditation and running activities. I will also be asked to complete some questionnaires similar to ones I have already completed, but in conjunction with 5-kilometer time trials, to take place before the first session of the program and after the completion of the program, and in conjunction with an actual competition, to take place after the completion of the program. These time trials will be incorporated into my regular training schedule and so will not be in addition to regular practice.

Potential Risks of Participation: I understand that the risks associated with participating in this study are minimal. However, I may experience some mild psychological discomfort while answering questions about my thoughts, feelings, and behaviors. Also, I understand that injury is possible when I engage in my usual running activities, such as 5-kilometer time trials. I understand that I am able to discontinue my participation in this study at any point without consequences, and that I can decline to answer items on the questionnaires. If I choose not to complete any or all of the questionnaires, I may still be required by my coach to receive the

mindfulness training and participate in the running activities mentioned above as part of my regular practice schedule. If I have any questions or concerns about my participation in this study, I may contact the investigator or his supervisor listed above to discuss these issues.

Potential Benefits of Participation: I understand that this study may provide me with benefits associated with gaining knowledge of myself and my running performance. It is also possible that information gained from this study may benefit athletes in the future by providing a better understanding of the relationship between some psychological variables and sport performance.

Confidentiality: I understand that I will be given a code number at the beginning of the study to protect my confidentiality. This number will appear on all of my questionnaires in place of my name. I understand that my signed informed consent form and any contact information obtained by the investigator will be kept separate from my questionnaire responses in a locked cabinet. I understand that all information about me will be kept as confidential as is legally possible, that my coach will not be informed of my questionnaire responses or participation status, and that no identifying information will be included in the report of the results. I understand that all raw data obtained will be destroyed within 5 years after the study's conclusion.

Research Subject Rights: I have read all of the above.

I understand that if I am under 18 years of age then I must sign this form and have a parent or legal guardian sign a separate consent form.

I understand that I may refuse to participate or discontinue my participation at any time without penalty, and I may also decline to answer particular items on the questionnaires without penalty.

I understand that any information about me obtained as a result of my participation in this study will be kept as confidential as legally possible, and my questionnaire responses and participation status will not be shared with my coach.

I understand that if I experience any psychological distress either during or after my participation in this study and I would like to receive services to address this distress, I can contact my university's counseling center; Telephone: _____; Location: _____.

I understand that I am encouraged to ask any questions about this study and/or my participation in it, and these have been answered to my satisfaction. If I have any concerns about the conduct of this study and my rights as a participant, I have been told I can call the Office of Sponsored Programs of The Catholic University of America; Telephone: (202) 319-5218.

I understand my rights as a research participant, and I voluntarily consent to participate in this study. I will receive a signed copy of this consent form.

_____	_____
Participant's signature	Investigator's signature
_____	_____
Date	Date

If I agree, I may be contacted for a possible follow-up sometime in the next year. I understand that I am free to decline participation at that time.

___ Yes, I agree to be contacted.

___ No, I do not agree to be contacted.

If yes, please complete below:

_____	_____
Participant's signature	Street address
_____	_____
Participant's name (please print)	City, state, and zip code
_____	_____
Date	Email address
	_____
	Phone number

Appendix F

PHLMS

Instructions: Please circle how often you experienced each of the following statements *within the past week*.

1. I am aware of what thoughts are passing through my mind.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

2. I try to distract myself when I feel unpleasant emotions.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

3. When talking with other people, I am aware of their facial and body expressions.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

4. There are aspects of myself I don't want to think about.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

5. When I shower, I am aware of how the water is running over my body.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

6. I try to stay busy to keep thoughts or feelings from coming to my mind.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

7. When I am startled, I notice what is going on inside my body.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

8. I wish I could control my emotions more easily.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

9. When I walk outside, I am aware of smells or how the air feels against my face.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

10. I tell myself that I shouldn't have certain thoughts.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

11. When someone asks how I am feeling, I can identify my emotions easily.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

12. There are things I try not to think about.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

13. I am aware of thoughts I'm having when my mood changes.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

14. I tell myself that I shouldn't feel sad.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

15. I notice changes inside my body, like my heart beating faster or my muscles getting tense.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

16. If there is something I don't want to think about, I'll try many things to get it out of my mind.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

17. Whenever my emotions change, I am conscious of them immediately.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

18. I try to put my problems out of mind.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

19. When talking with other people, I am aware of the emotions I am experiencing.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

20. When I have a bad memory, I try to distract myself to make it go away.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

Appendix G

ID #: _____ **5-FACET M QUESTIONNAIRE**

Please rate each of the following statements using the scale provided. Write the number in the blank that best describes <u>your own opinion</u> of what is <u>generally true for you</u>.

1	2	3	4	5
Never or very rarely true	**Rarely true**	**Sometimes true**	**Often true**	**Very often or always true**

_____1. When I'm walking, I deliberately notice the sensations of my body moving.

_____2. I'm good at finding the words to describe my feelings.

_____3. I criticize myself for having irrational or inappropriate emotions.

_____4. I perceive my feelings and emotions without having to react to them.

_____5. When I do things, my mind wanders off and I'm easily distracted.

_____6. When I take a shower or bath, I stay alert to the sensations of water on my body.

_____7. I can easily put my beliefs, opinions, and expectations into words.

_____8. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.

_____9. I watch my feelings without getting lost in them.

_____10. I tell myself I shouldn't be feeling the way I'm feeling.

_____11. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.

_____12. It's hard for me to find the words to describe what I'm thinking.

_____13. I am easily distracted.

_____14. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.

_____15. I pay attention to sensations, such as the wind in my hair or sun on my face.

_____16. I have trouble thinking of the right words to express how I feel about things.

_____17. I make judgments about whether my thoughts are good or bad.

_____18. I find it difficult to stay focused on what's happening in the present.

_____19. When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.

_____20. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.

1	2	3	4	5
Never or very rarely true	**Rarely true**	**Sometimes true**	**Often true**	**Very often or always true**

_____21. In difficult situations, I can pause without immediately reacting.

_____22. When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.

_____23. It seems I am "running on automatic" without much awareness of what I'm doing.

_____24. When I have distressing thoughts or images, I feel calm soon after.

_____25. I tell myself that I shouldn't be thinking the way I'm thinking.

_____26. I notice the smells and aromas of things.

_____27. Even when I'm feeling terribly upset, I can find a way to put it into words.

_____28. I rush through activities without being really attentive to them.

_____29. When I have distressing thoughts or images I am able just to notice them without reacting.

_____30. I think some of my emotions are bad or inappropriate and I shouldn't feel them.

_____31. I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.

_____32. My natural tendency is to put my experiences into words.

_____33. When I have distressing thoughts or images, I just notice them and let them go.

_____34. I do jobs or tasks automatically without being aware of what I'm doing.

_____35. When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.

_____36. I pay attention to how my emotions affect my thought and behavior.

_____37. I can usually describe how I feel at the moment in considerable detail.

_____38. I find myself doing things without paying attention.

_____39. I disapprove of myself when I have irrational ideas.

Appendix H

ID #: _____ EAT-26

Please fill out the form below as accurately, honestly and completely as possible. There are no right or wrong answers. All of your responses are confidential.

I…	Always	Usually	Often	Some times	Rarely	Never
1. Am terrified about being overweight.	__	__	__	__	__	__
2. Avoid eating when I am hungry.	__	__	__	__	__	__
3. Find myself preoccupied with food.	__	__	__	__	__	__
4. Have gone on eating binges where I feel that I may not be able to stop.	__	__	__	__	__	__
5. Cut my food into small pieces.	__	__	__	__	__	__
6. Aware of the calorie content of feeds that I eat.	__	__	__	__	__	__
7. Particularly avoid food with a high carbohydrate content (i.e. bread, rice, potatoes, etc.)	__	__	__	__	__	__
8. Feel that others would prefer if I ate more.	__	__	__	__	__	__
9. Vomit after I have eaten.	__	__	__	__	__	__
10. Feel extremely guilty after eating.	__	__	__	__	__	__
11. Am preoccupied with a desire to be thinner.	__	__	__	__	__	__
12. Think about burning up calories with I exercise.	__	__	__	__	__	__
13. Other people think that I am too thin.	__	__	__	__	__	__
14. Am preoccupied with the thought of having fat on my body.	__	__	__	__	__	__
15. Take longer than others to eat my meals.	__	__	__	__	__	__
16. Avoid foods with sugar in them.	__	__	__	__	__	__
17. Eat diet foods.	__	__	__	__	__	__
18. Feel that food controls my life.	__	__	__	__	__	__
19. Display self-control around food.	__	__	__	__	__	__
20. Feel that others presume me to eat.	__	__	__	__	__	__
21. Give too much time and thought to food.	__	__	__	__	__	__
22. Feel uncomfortable after eating sweets.	__	__	__	__	__	__
23. Engage in dieting behavior.	__	__	__	__	__	__
24. Like my stomach to be empty.	__	__	__	__	__	__
25. Have the impulse to vomit after meals.	__	__	__	__	__	__
26. Enjoy trying new rich foods.	__	__	__	__	__	__

Appendix I

HOW I TYPICALLY ACT TOWARDS MYSELF IN DIFFICULT TIMES

Please read each statement carefully before answering. To the left of each item, indicate how often you behave in the stated manner, using the following scale:

Almost never				**Almost always**
1	**2**	**3**	**4**	**5**

_____ 1. I'm disapproving and judgmental about my own flaws and inadequacies.

_____ 2. When I'm feeling down I tend to obsess and fixate on everything that's wrong.

_____ 3. When things are going badly for me, I see the difficulties as part of life that everyone goes through.

_____ 4. When I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world.

_____ 5. I try to be loving towards myself when I'm feeling emotional pain.

_____ 6. When I fail at something important to me I become consumed by feelings of inadequacy.

_____ 7. When I'm down and out, I remind myself that there are lots of other people in the world feeling like I am.

_____ 8. When times are really difficult, I tend to be tough on myself.

_____ 9. When something upsets me I try to keep my emotions in balance.

_____ 10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.

_____ 11. I'm intolerant and impatient towards those aspects of my personality I don't like.

_____ 12. When I'm going through a very hard time, I give myself the caring and tenderness I need.

_____ 13. When I'm feeling down, I tend to feel like most other people are probably happier than I am.

_____ 14. When something painful happens I try to take a balanced view of the situation.

_____ 15. I try to see my failings as part of the human condition.

Almost never				Almost always
1	2	3	4	5

_____ 16. When I see aspects of myself that I don’t like, I get down on myself.

_____ 17. When I fail at something important to me I try to keep things in perspective.

_____ 18. When I’m really struggling, I tend to feel like other people must be having an easier time of it.

_____ 19. I’m kind to myself when I’m experiencing suffering.

_____ 20. When something upsets me I get carried away with my feelings.

_____ 21. I can be a bit cold-hearted towards myself when I'm experiencing suffering.

_____ 22. When I'm feeling down I try to approach my feelings with curiosity and openness.

_____ 23. I’m tolerant of my own flaws and inadequacies.

_____ 24. When something painful happens I tend to blow the incident out of proportion.

_____ 25. When I fail at something that's important to me, I tend to feel alone in my failure.

_____ 26. I try to be understanding and patient towards those aspects of my personality I don't like.

Appendix J

CSCI

What am I like? These are statements which allow people to describe themselves. There are no right or wrong answers since people differ. First, decide which one of the two statements best describes you. Then, go to that side of the statement and check if it is "somewhat true" or "very true" **FOR YOU**.

Remember to check only **ONE** of the four options

Very True For Me	Somewhat True For Me			Somewhat True For Me	Very True For Me
1. ____	____	I feel I am not very good when it comes to running	**OR**	I feel I am really good at running ____	____
2. ____	____	I always look on the bright side when it comes to running	**OR**	I think of the bad things that might occur when I participate in running ____	____
3. ____	____	In the company of my peers I feel that I am always one of the best when it comes to joining running activities	**OR**	In the company of my peers I am not among the best when it comes to joining in running activities ____	____
4. ____	____	I feel that I am among the best in my peer group when it comes to running ability	**OR**	I feel that I am average or below my peers when it comes to running ability ____	____
5. ____	____	I feel that if something can go wrong for me while running, it will	**OR**	I feel that if something can go right for me while running, it will ____	____
6. ____	____	I feel that things will never work out the way I want them to while running	**OR**	I believe that things will work out for me while running ____	____

Very True For Me	Somewhat True For Me			Somewhat True For Me	Very True For Me
7. ____	____ I am not quite so confident when it comes to taking part in running	**OR**	I am among the most confident when it comes to taking part in running ____		____
8. ____	____ I believe that I have a bright future in running	**OR**	I feel that the worst is yet to come for me in running ____		____
9. ____	____ I am a little slower than most when it comes to learning new running skills	**OR**	I always seem to be among the quickest when it comes to learning new running skills ____		____
10. ____	____ I hardly ever expect things to go my way while running	**OR**	I feel that things will often go my way while running ____		____
11. ____	____ While running, I believe that "every cloud has a silver lining"	**OR**	While running, I have trouble seeing the "light at the end of the tunnel" ____		____
12. ____	____ Given the chance, I am always the first to join in running activities	**OR**	I sometimes hold back and am not usually among the first to join in running activities ____		____
13. ____	____ I feel that there is no use in really trying to get something I want in running because I probably will not get it	**OR**	I believe that if you work hard enough you will attain your running goals ____		____

Appendix K

REACTIONS TO COMPETITION

A number of statements that athletes have used to describe their thoughts and feelings before or during competition are listed below. Read each statement and then circle the number to the right of the statement that indicates how you usually feel prior to or during competition. Some athletes feel they should not admit to feelings of nervousness or worry, but such reactions are actually quite common, even among professional athletes. To help us better understand reactions to competition, we ask you to share your true reactions with us. There are, therefore, no right or wrong answers. Do not spend too much time on any one statement.

	Statement	Not At All	Some-what	Mode rately So	Very Much So
1	I feel nervous.	1	2	3	4
2	During competition, I find myself thinking about unrelated things.	1	2	3	4
3.	I have self-doubts.	1	2	3	4
4.	My body feels tense.	1	2	3	4
5.	I am concerned that I may not do as well in competition as I could.	1	2	3	4
6.	My mind wanders during sport competition.	1	2	3	4
7.	While performing, I often do not pay attention to what's going on.	1	2	3	4
8.	I feel tense in my stomach.	1	2	3	4
9.	Thoughts of doing poorly interfere with my concentration during competition.	1	2	3	4
10.	I am concerned about choking under pressure.	1	2	3	4
11.	My heart races.	1	2	3	4
12.	I feel my stomach sinking.	1	2	3	4
13.	I'm concerned about performing poorly.	1	2	3	4
14.	I have lapses in concentration during competition because of nervousness.	1	2	3	4
15.	I sometimes find myself trembling before or during a competitive event.	1	2	3	4

16.	**I'm worried about reaching my goal.**	**1**	**2**	**3**	**4**
17.	**My body feels tight.**	**1**	**2**	**3**	**4**
18.	**I'm concerned that others will be disappointed with my performance.**	**1**	**2**	**3**	**4**
19.	**My stomach gets upset before or during competition.**	**1**	**2**	**3**	**4**
20.	**I'm concerned I won't be able to concentrate.**	**1**	**2**	**3**	**4**
21.	**My heart pounds before competition.**	**1**	**2**	**3**	**4**

Appendix L

TDRS

Using the scale below, please indicate how often the thoughts represented in the following items occur while you are running.

0	1	2	3	4
Never	**Rarely**	**Occasionally**	**Frequently**	**Very Often**

___ 1. Nothing in particular, my mind wanders

___ 2. Things that have gone well for me

___ 3. How my body feels

___ 4. Financial matters

___ 5. Nature (for example, trees, flowers, sky)

___ 6. Plans for the future

___ 7. How fatigued or tired I feel

___ 8. The music that I am listening to

___ 9. How good I look because I am physically active

___ 10. The conversation I am having with a companion

___ 11. My hobbies

___ 12. Deadlines at work or school

___ 13. Religious thoughts (for example, prayer)

___ 14. My girlfriend or boyfriend

___ 15. Increasing or decreasing my pace

___ 16. How well I feel

___ 17. The scenery around me

___ 18. The proper mechanics of running

___ 19. My job

___ 20. My family (spouse and/or children)

___ 21. All of the benefits of running

___ 22. Recent successes

___ 23. What I will do when I finish my run

0	1	2	3	4
Never	**Rarely**	**Occasionally**	**Frequently**	**Very Often**

___ 24. The problems and hassles of daily life

___ 25. Housework/yardwork/daily chores

___ 26. The discomfort of exercising

___ 27. Upcoming social activities

___ 28. The buildings or homes along the run

___ 29. Family problems

___ 30. Managing my heart rate and my breathing

___ 31. Spiritual matters

___ 32. Relationships with others

___ 33. My daydreams or fantasies

___ 34. Work or school projects

___ 35. Recent incidents where I felt hurt or angry

___ 36. Watching other people

___ 37. How much farther I have to run

___ 38. Environmental hazards (dogs, crime, construction)

Appendix M

MCSDS-SF

Listed below are a number of statements concerning personal attitudes and traits. Read each item, decide whether the statement is *true* or *false* as it pertains to you personally, and mark a "T" or an "F" on the line to the left of the statement.

_____ 1. I like to gossip at times.

_____ 2. There have been occasions when I took advantage of someone.

_____ 3. I'm always willing to admit it when I make a mistake.

_____ 4. I always try to practice what I preach.

_____ 5. I sometimes try to get even rather than forgive and forget.

_____ 6. At times I have really insisted on having things my own way.

_____ 7. There have been occasions when I felt like smashing things.

_____ 8. I never resent being asked to return a favor.

_____ 9. I have never been irked when people expressed ideas very different from my own.

_____ 10. I have never deliberately said something that hurt someone's feelings.

Appendix N

Background Questionnaire

1) Gender: Male ____ Female ____

2) Age: _____

3) Ethnic background:

_____ African American _____ Asian or Pacific Islander

_____ Caucasian _____ Hispanic or Latino

_____ Native American _____ Other (please specify): _____

4) In which of these events have you competed? (Check all that apply)

5k ____ 10k ____ Half Marathon ____ Full Marathon ____

5) Please report the best times you have achieved for the distances of *1 mile* and *5 kilometers*, both your personal best and within the past 12 months:

Personal Best: 1 Mile _____ 5k _____

Past 12 Months: 1 Mile _____ 5k _____

6) For approximately how many years have you been a competitive runner? _____

7) During your competitive season, on average, how many miles do you run in a week…

With your team? _____ On your own? _____

8) During your competitive season, on average, how many times a week do you engage in non-running exercise activities? _____

9) Please list your top 3 reasons for participating in competitive running:

1. _____
2. _____
3. _____

10) On the scale below, please circle the number that best represents your level of satisfaction with your current running performance?

1	2	3	4	5
Not at All Satisfied		*Neither Satisfied Nor Dissatisfied*		*Very Satisfied*

11) On the scales below, please circle the number that best represents to what extent you believe internal factors (e.g., worry, mood, self-esteem) and external factors (e.g., relationship or academic stressors) negatively affect your current running performance:

	1	2	3	4	5
Internal Factors:	*Not at All*		*Somewhat*		*Very Much So*
External Factors:	*Not at All*		*Somewhat*		*Very Much So*

12) Have you had any previous exposure to sport psychology? Yes ____ No ____

If yes, please describe your experience(s):

13) Have you ever practiced meditation, yoga, or similar contemplative activities?

Yes ____ No ____

If yes, please describe your experience(s):

14) Do you currently practice mediation and/or yoga? Yes ____ No ____

If yes, on average, how many times do you do this per week _____? Per month _____?

15) Please list the top 3 things you hope to get out of this workshop:

1. _____
2. _____
3. _____

Appendix O

Post-Workshop Questionnaire

1) Please report your best running time *in the last 6 weeks* for the distances of 1 mile and 5 kilometers:

Past 6 Weeks: 1 Mile _____ 5k _____

2) On average, how many miles do you currently run per week…

With your team? _____ On your own? _____

3) On average, how many times a week do you currently engage in non-running exercise activities? _____

4) Right now, what are your top 3 reasons for participating in competitive running?

1. _____
2. _____
3. _____

5) On the scales below, please circle the number that best represents to what extent you believe internal factors (e.g., worry, mood, self-esteem) and external factors (e.g., relationship or academic stressors) negatively affect your current running performance:

Internal Factors:	1	2	3	4	5
	Not at All		*Somewhat*		*Very Much So*
External Factors:	1	2	3	4	5
	Not at All		*Somewhat*		*Very Much So*

6) What did you like the most about the mindfulness training workshop?

_____

_____

_____

7) How, if at all, did you find the workshop to be helpful for your running?

_____

_____

_____

8) What, if anything, did you dislike about the workshop?

_____

_____

_____

9) What recommendations do you have to improve the workshop?

_____

_____

_____

10) On the scale below, please circle the number that best represents how confident you are that you will continue to incorporate mindfulness in your sport training and your everyday life:

Sport Training:	1 *Not at All Confident*	2	3 *Somewhat Confident*	4	5 *Very Confident*
Everyday Life:	1 *Not at All Confident*	2	3 *Somewhat Confident*	4	5 *Very Confident*

11) On the scale below, please circle the number that best represents the frequency with which you discussed the workshop with your teammates between sessions:

1 *Not at All*	2	3 *Somewhat Frequently*	4	5 *Very Frequently*

Thank you very much for completing these forms and for your participation throughout this study!!

Appendix P

ID #: _____

Running Practice Log

Please answer the following questions regarding your ***running activities*** over the last 8 weeks (i.e., since the end of the first week of September). If you do not know the exact number(s) for a question, please just give your best estimate.

1) Including your cross-country practices, races, and any runs in addition to regular team activities, about how many miles did you run last week? _____

Questions 2-4 ask about your weekly mileage over the past 8 weeks of training. Think about your weekly mileage (i.e., the total number of miles you ran each week) for each of the past 8 weeks.

2) Over the past 8 weeks of training, do you think your weekly mileage has (circle one):
Generally Decreased **Stayed About the Same** **Generally Increased**

3a) Calling this past week Week 8, during which week did you run the fewest total miles? (circle one):
Week 1 **Week 2** **Week 3** **Week 4** **Week 5** **Week 6** **Week 7** **Week 8**

3b) Approximately how many miles did you run during this lowest week (circled above)?
_____

4a) During which week did you run the most total miles? (circle one):
Week 1 **Week 2** **Week 3** **Week 4** **Week 5** **Week 6** **Week 7** **Week 8**

4b) Approximately how many miles did you run during this highest week (circled above)?
_____

5) On average, how many runs did you go on each week in addition to your regularly scheduled cross-country team practices and races? _____

6) Did you typically take one or more days off each week? (circle one) **Yes** **No** If so, how many days each week? _____

7) Over the past 8 weeks of training, rate whether you think your running times (circle one):

Generally Got Slower **Stayed About the Same** **Generally Got Faster**

8) On the scale below, please circle the number that best represents how satisfied you are with your overall running performance this past week.

1	2	3	4	5
Not at All Satisfied		*Neither Satisfied Nor Dissatisfied*		*Very Satisfied*

Appendix Q

ID #: _____

Follow-up Questionnaire

1) Please report your best running time *since the last time trial* for the distances of 1 mile and 5 kilometers: 1 Mile _____ 5k _____

2) On average, how many miles do you currently run per week…

With your team? _____ On your own? _____

3) On average, how many times a week do you currently engage in non-running exercise activities? _____

4) Right now, what are your top 3 reasons for participating in competitive running?

1. _____
2. _____
3. _____

5) On the scale below, please circle the number that best represents your level of satisfaction with your current running performance?

1	2	3	4	5
Not at All Satisfied		*Neither Satisfied Nor Dissatisfied*		*Very Satisfied*

6) On the scales below, please circle the number that best represents to what extent you believe internal factors (e.g., worry, mood, self-esteem) and external factors (e.g., relationships or academic stressors) negatively affect your current running performance:

Internal Factors:	1	2	3	4	5
	Not at All		*Somewhat*		*Very Much So*
External Factors:	1	2	3	4	5
	Not at All		*Somewhat*		*Very Much So*

7) On the scale below, please circle the number that best represents to what degree you have continued to incorporate mindfulness in your sport training and your everyday life since the end of the workshop:

Sport Training:	1	2	3	4	5
	Not at All		*Somewhat*		*Very Much*
Everyday Life:	1	2	3	4	5
	Not at All		*Somewhat*		*Very Much*

8) Since the end of the workshop, have you continued to do any formal mindfulness practice (e.g., sitting meditation, body scan, mindful yoga)? Yes ____ No ____

If yes, on average, how many times do you do this per week _____? Per month _____?

Thank you very much for completing these forms and for your participation throughout this study!!

Appendix R

CSAI-2R

Directions: A number of statements that athletes have used to describe their feelings before competition are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you feel right now – at this moment. There are no right or wrong answers. Do *not* spend too much time on any one statement, but choose the answer which describes your feelings right now.

	Not At All	Somewhat	Moderately So	Very Much So
1. I feel jittery	1	2	3	4
2. I am concerned that I may not do as well in this competition as I could	1	2	3	4
3. I feel self-confident	1	2	3	4
4. My body feels tense	1	2	3	4
5. I am concerned about losing	1	2	3	4
6. I feel tense in my stomach	1	2	3	4
7. I'm confident I can meet the challenge	1	2	3	4
8. I am concerned about choking under pressure	1	2	3	4
9. My heart is racing	1	2	3	4
10. I'm confident about performing well	1	2	3	4
11. I'm concerned about performing poorly	1	2	3	4
12. I feel my stomach sinking	1	2	3	4
13. I'm confident because I mentally picture myself reaching my goal	1	2	3	4
14. I'm concerned that others will be disappointed with my performance	1	2	3	4
15. My hands are clammy	1	2	3	4
16. I'm confident of coming through under pressure	1	2	3	4
17. My body feels tight	1	2	3	4

Appendix S

Running Satisfaction Questionnaire

1) For the event you just completed, please record the distance you ran and the time you achieved:

Distance: _____ *Time*: _____

2) Was this your personal best for this distance? Yes ____ No ____

3) On the scale below, please circle the number that best represents how satisfied you are with the time you just achieved.

1	2	3	4	5
Not at All Satisfied		*Neither Satisfied Nor Dissatisfied*		*Very Satisfied*

Appendix T

Running Satisfaction Questionnaire

1) For the event you just completed, please record the distance you ran and the time you achieved:

Distance: _____ *Time*: _____

2) Was this your personal best for this distance? Yes ____ No ____

3) On the scale below, please circle the number that best represents how satisfied you are with the time you just achieved.

1	2	3	4	5
Not at All Satisfied		*Neither Satisfied Nor Dissatisfied*		*Very Satisfied*

4) Do you believe the skills you have learned and practiced in the mindfulness workshop affected your running performance today? Yes ____ No ____

4a) If yes, what skill(s) did you use?

_____

_____

_____

5) On the scale below, please circle the number that best represents how you feel the mindfulness training affected your performance:

1	2	3	4	5
Very Negatively		*Neutral*		*Very Positively*

Appendix U

CEQ

Please indicate below how much you believe, *right now*, that the workshop you are going to receive will help to improve your running performance. Belief usually has two aspects to it: (1) what one *thinks* will happen and (2) what one *feels* will happen. Sometimes these are similar, sometimes they are different. Please answer the questions below. In the first set, answer in terms of what you *think*. In the second set, answer in terms of what you really and truly *feel*.

Set I

1. At this point, how logical does the Mindfulness Sport Performance Enhancement (MSPE) workshop seem to you?

1	2	3	4	5	6	7	8	9
not at all logical				somewhat logical				very logical

2. At the point, how successful do you think MSPE will be in improving your running performance?

1	2	3	4	5	6	7	8	9
not at all useful				somewhat useful				very useful

3. How confident would you be in recommending MSPE to a friend who would like help in improving his or her running performance?

1	2	3	4	5	6	7	8	9
not at all confident				somewhat confident				very confident

4. By the end of the workshop, how much improvement in your running performance do you think will occur?

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

Set II

For this set, close your eyes for a few moments, and try to identify what you really *feel* about MSPE and its likely success. Then answer the following questions.

1. At this point, how much do you really *feel* that MSPE will help you improve your running performance?

1	2	3	4	5	6	7	8	9
not at all				somewhat				very much

2. By the end of the workshop, how much improvement in your running performance do you really *feel* will occur?

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

Appendix V

ID #: _____

Weekly Practice Log

Please answer the following questions regarding your ***running practice*** and your ***mindfulness practice*** over the last week. If you do not know the exact numbers for some of the questions, please just give your best estimate.

1) Including your practices and any extra workouts, how many miles did you run this week?
_____

2) How many runs did you go on this week in addition to your regular practices schedule?
_____

2a) Of the total number of miles you ran this week, how many were completed on these additional runs? _____

3) Did you take a day off this past week? (circle one) **Yes** **No** If so, how many? _____

4) In comparison to previous weeks of training, do you think your times were: (circle one)

Generally Slower **About the Same** **Generally Faster**

5) On the scale below, please circle the number that best represents how satisfied you are with your overall running performance this past week.

1	2	3	4	5
Not at All Satisfied		*Neither Satisfied Nor Dissatisfied*		*Very Satisfied*

6) How many days did you engage in mindfulness practice? _____

7) Please ***write in*** the number of times you did each of the following mindfulness exercises. Then please ***circle the exercise*** that you enjoyed the most:

____Body Scan ____Sitting Meditation ____Yoga ____Walking Meditation

____Running Meditation

8) While you were doing your mindfulness practice, please list the primary issue or difficulty that arose for you:

_____

9) How many days did you not do any mindfulness practice? _____

9a) If there were days that you did not practice, please list the primary reason why you did not practice:

_____

10) On the scale below, please circle the number that best represents how much you enjoyed your mindfulness practice this past week.

1	2	3	4	5
Not at All Enjoyed		*Neither Enjoyed Nor Disliked*		*Enjoyed A Lot*

Appendix W

TMS

We are interested in what you just experienced. Below is a list of things that people sometimes experience. Please read each statement, and indicate the extent to which you agree using the scale below. In other words, how well does the statement below describe what you just experienced, just now?

0 = Not at all

1 = A little

2 = Moderately

3 = Quite a bit

4 = Very much

1. I experienced myself as separate from my changing thoughts and feelings.

   0 1 2 3 4

2. I was more concerned with being open to my experiences than controlling or changing them.

   0 1 2 3 4

3. I was curious about what I might learn about myself by taking notice of how I react to certain thoughts, feelings, or sensations.

   0 1 2 3 4

4. I experienced my thoughts more as events in my mind than as a necessarily accurate reflection of the way things "really" are.

   0 1 2 3 4

5. I was curious to see what my mind was up to from moment to moment.

   0 1 2 3 4

6. I was curious about each of the thoughts and feelings that I was having.

   0 1 2 3 4

7. I was receptive to observing unpleasant thoughts and feelings without interfering with them.

   0 1 2 3 4

8. I was more invested in just watching my experiences as they arose, than in figuring out what they could mean.

   0 1 2 3 4

0 = Not at all

1 = A little

2 = Moderately

3 = Quite a bit

4 = Very much

9. I approached each experience by trying to accept it, no matter whether it was pleasant or unpleasant.

   0 1 2 3 4

10. I remained curious about the nature of each experience as it arose.

    0 1 2 3 4

11. I was aware of my thoughts and feelings without overidentifying with them.

    0 1 2 3 4

12. I was curious about my reactions to things.

    0 1 2 3 4

13. I was curious about what I might learn about myself by just taking notice of what my attention gets drawn to.

    0 1 2 3 4

Appendix X

Daily Mindfulness Log

Please monitor your daily ***mindfulness skills*** practice in the log below. Make a note of anything that comes up in your practice, so that we can talk about it at the next meeting.

Week #:

Day/Date	**Mindfulness Practice?**	**Comments**
Date:	Yes or No (circle one) Length: _____min	
Date:	Yes or No (circle one) Length: _____min	
Date:	Yes or No (circle one) Length: _____min	
Date:	Yes or No (circle one) Length: _____min	
Date:	Yes or No (circle one) Length: _____min	
Date:	Yes or No (circle one) Length: _____min	
Date:	Yes or No (circle one) Length: _____min	

Appendix Y

Program Evaluation Measure Unitizing Manual

Unitize based on separating conceptually distinct responses. Unitize by placing a slash (/) between units. Some guidelines for unitizing are as follows:

1. Conceptually distinct units will often, but not always, be separated by punctuation marks such as a period (.), semi-colon (;), or comma (,). In these cases, place the slash (/) immediately following the punctuation mark.

a. For example, "I felt I was better able to stay focused,/ remain clam,/ let go of negative thoughts" would be unitized.
b. For example, "I thought there was too much to do outside of the sessions./ I also didn't like the running meditation" would be unitized.

2. Conceptually distinct units will often, but not always, be separated by conjunctive or transitional terms such as "and," "but," "or," "however," and "yet." In these cases, place the slash (/) immediately following the conjunctive or transitional term. If a conjunctive or transitional term follows a period (.), semicolon (;), or comma (,), unitize following the conjunctive or transitional term.

a. For example, "I like how relaxing it was, and/ how it helped me stay focused" would be unitized.
b. For example, "The exercises were too long and/ I would get distracted" would be unitized.

3. Unitizing based on content takes precedence over rules #1-3 above. In other words, when it is unclear where to unitize, follow the general rule for unitizing between conceptually distinct responses.

a. For example, "Yes, it helped me focus and concentrate more,/ and helped me relax." would be unitized.
b. For example, "Maybe increase the home practice gradually. Start with just a couples times a week and move up to every day,/ because it was just too much time at first." would be unitized.

Appendix Z

Program Evaluation Measure Coding Manual

Post-Workshop Questionnaire # 6 and 7

What did you like the most about the mindfulness training?

How, if at all, did you find the workshop to be helpful for your running?

Categories:

1. Mindfulness – This category includes statements where an individual mentions concepts or abilities related to mindfulness, including awareness, focus, attention, being present, letting go of negative thoughts or feelings, nonreactivity, and emotion regulation (e.g., staying calm). Statements may indicate that an individual enjoyed learning about or developing mindfulness, or that an individual feels his or her capacity for being mindful in some way has improved. Examples include:
   My focus is better
   Yes, paying attention to different aspects of my running was helpful
   I liked the emphasis on letting go of negative thoughts

2. Relaxation – This category includes statements in which an individual mentions relaxation. Statements may indicate that an individual enjoyed experiencing feelings of relaxation, or that an individual feels his or her ability to relax has improved. Examples include:
   It was relaxing
   I liked how relaxed the meditations made me
   I was able to relax more at races

3. Workshop Activities – This category includes statements in which an individual mentions that they liked a specific activity or exercise included in the workshop, such as a particular meditation. Examples include:
   The 10 minute meditation
   The candy exercise
   Yoga was my favorite part

4. Other – This category includes statements that do not clearly fit into either of the above categories. Examples include:
   I enjoyed the challenge of applying the concepts we talked about
   Learning about the mental aspect of running
   Somewhat helpful

Post-Workshop Questionnaire # 8 and 9

What, if anything, did you dislike about the workshop?

What recommendations do you have to improve the workshop?

Categories:

1. Time Concerns (unspecified) – This category includes statements where an individual mentions a general concern about how much time the workshop takes. Statements may indicate that an individual did not like the overall amount of time the workshop took, or that an individual thinks the workshop could be improved if it took up less time. Examples include:
   Time investment
   Too time consuming
   It took away from time I could have been doing other things, like studying

2. Time Concerns (home practice/exercises) – This category includes statements where an individual mentions a specific concern about how much time was required to complete the home practice or the individual exercises. Statements may indicate that an individual did not like the amount of time the home practice/exercises took, or that an individual thinks the workshop could be improved if there were less home practice/shorter exercises. Examples include:
   Give less homework
   The length of the exercises was frustrating
   I thought the exercises were too long

3. Time Concerns (session length) – This category includes statements where an individual mentions a specific concern about the length of the workshop sessions. Statements may indicate that an individual did not like the length of the sessions, or that an individual thinks the workshop could be improved if the session length were different. Examples include:
   Length of amount of time each Wednesday
   The weekly meetings took a lot out of my day
   Have shorter sessions

4. Time Concerns (workshop scheduling) – This category includes statements where an individual mentions a specific concern about the scheduling of the workshop. Statements may indicate that an individual did not like when the sessions were scheduled, or that an individual thinks the workshop could be improved if it had been held at a different time. Examples include:
   Not after morning workouts

Changing the time of the sessions would have been helpful
The timing was inconvenient

5. Workshop Activities – This category includes statements in which an individual mentions that they did not like a specific activity or exercise included in the workshop, such as a particular meditation. Examples include:
   Body scan
   Some of the meditations were ridiculous
   Cut out the running meditation

6. Workshop Implementation – This category includes statements in which an individual mentions an aspect of how the workshop was run or structured that does not fall into one of the above categories. Statements may indicate that an individual did not like a particular aspect of the workshop, or that an individual feels changing or adding something could improve the workshop. Examples include:

   Provide specific things to do at practices
   Get more involved with the team
   Apply the concepts to running earlier

7. Other – This category includes statements that do not clearly fit into either of the above categories. Examples include:
   Everything else
   It was boring
   I always got really tired

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