

## A Brief Mindfulness and Yoga Intervention With an Entire NCAA Division I Athletic Team: An Initial Investigation

Fallon R. Goodman, Todd B. Kashdan, Travis T. Mallard, and Mary Schumann  
George Mason University

Whereas traditional sports psychology interventions emphasize controlling or reducing distress, mindfulness-based interventions teach tolerance and acceptance of negative thoughts, feelings, and emotions. In the present pilot study, an entire men's Division I athletic team ( $n = 13$ ) provided voluntary consent and participated in a brief mindfulness-based intervention. Over 5 weeks, the team attended eight 90-min group intervention sessions immediately followed by 1-hr Hatha yoga sessions. Completer analyses showed that following the intervention, participants reported greater mindfulness, greater goal-directed energy, and less perceived stress than before the intervention. Compared with a nonrandomized control group (student athletes from various club sports;  $n = 13$ ), intervention participants reported greater goal-directed energy and mindfulness. We also explored written feedback from players to identify ways to improve the intervention. Implications for practitioners for improving mindfulness-based interventions are discussed.

*Keywords:* mindfulness, intervention, athletes, acceptance and commitment, yoga

College student athletes represent a unique group potentially at increased risk for emotional and behavioral difficulties (Proctor & Boan-Lenzo, 2010). In addition to juggling athletic obligations, academic responsibilities, and interpersonal relationships, student athletes often are pressed to present the idealized public image of a college student athlete (Heyman, 1986; Parham, 1993). Several studies have shown that student athletes, particularly those playing at highly competitive levels, engage in riskier behaviors (e.g., drug use and binge drinking) compared with their nonathlete peers (Marcello, Danish, & Stolberg, 1989; Martens, Dams-O'Connor, & Beck, 2006; Nelson & Wechsler,

2001; Yusko, Buckman, White, & Pandina, 2008). Given that athletic performance and quality of life can be compromised by stress unrelated to sports (Haney, 2004), psychological interventions might be particularly useful for athletes.

### Traditional Psychological Interventions With Athletes

Traditional sports psychology, commonly referred to as *psychological skills training* (PST; Meichenbaum, 1977; Whelan, Mahoney, & Meyers, 1991), emphasizes control of internal states. Athletes are taught to control or reduce unwanted thoughts, emotions, and sensations to increase their potential for achieving an ideal mental state conducive to optimum performance (Hardy, Jones, & Gould, 1996). A primary assumption of PST is that decreases in negative internal experiences (e.g., thoughts, emotions) minimize distractions and enhance opportunities for positive experiences and confidence building. Unfortunately, studies have reported inconsistent findings regarding whether reductions in anxiety improve well-being or athletic performance (for a review, see Gardner & Moore, 2004).

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Fallon R. Goodman, Todd B. Kashdan, Travis T. Mallard, and Mary Schumann, Department of Psychology, George Mason University.

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Correspondence concerning this article should be addressed to Fallon R. Goodman, Department of Psychology, MS 3F5 George Mason University, Fairfax, VA 22030. E-mail: [fgoodman@gmu.edu](mailto:fgoodman@gmu.edu)

In fact, efforts to control or entirely suppress negative experiences may be a suboptimal and even counterproductive strategy for improving athletes' performance. An unwillingness to maintain contact with unpleasant internal thoughts and emotions is referred to as experiential avoidance (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). Although avoiding unpleasant experiences can provide temporary relief from distress, repeated attempts to eliminate or suppress internal experiences often engender a rebound effect of increasing such unwanted states (e.g., Farach, Mennin, Smith & Mandelbaum, 2008; Kashdan et al., in press; Marx & Sloan, 2005). When dysfunctional regulatory strategies are used, such as trying to suppress negative emotions, limited cognitive resources are depleted or exhausted, which in turn impairs the ability to adapt to fluctuating situational demands and promotes a rigid orientation toward experiences called *psychological inflexibility*. Such rigidity can hinder the pursuit of valued and meaningful behavior (Hayes, Strosahl, & Wilson, 1999), is associated with a variety of mental health problems (see Kashdan & Rottenberg, 2010 for a review), and may ultimately be detrimental to athletic performance. Accordingly, minimizing or eliminating experiential avoidance and promoting psychological flexibility are potentially worthwhile goals in improving athletic performance.

### Mindfulness-Based Interventions With Athletes

Recent psychological interventions for athletes have turned away from approaches that emphasize control of internal states (e.g., Daw & Burton, 1994; Gould & Udry, 1994) in favor of mindfulness and acceptance-based approaches. These latter interventions draw on research from acceptance and commitment therapy (ACT; Hayes, Strosahl, & Wilson, 1999) in which the core message is to observe and accept what is beyond one's control or ability to change and to commit to actions that are aligned with personal values. ACT-based approaches emphasize *mindfulness*, which is defined as bringing conscious attention to the present moment in a receptive, curious manner (Bishop et al., 2004; Kabat-Zinn, 2003). Individuals are taught to engage in self-observation by intentionally allowing thoughts, emotions, and

bodily sensations to occur without judgment, allowing for greater engagement in life as it naturally unfolds. Researchers have found that self-reported levels of mindfulness are associated with adaptive emotion regulation strategies (Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007), even after controlling for anxiety, stress, and depression (Gratz & Roemer, 2004). Regular mindfulness practice can help individuals become more adept at guiding attention toward desired stimuli, allocating limited cognitive resources toward valued ends, and improving task performance (Slagter et al., 2007; Zeidan, Johnson, Diamond, David, & Goolkasian, 2010). It is important to note that mindful athletes are more likely to experience *flow*, a state of energized focus and full involvement, during athletic performance (Bernier, Thienot, Codron, & Fournier, 2009; Jackson & Csikszentmihalyi, 1999; Kee & Wang, 2008). In one study of 13 university athletes, a 6-week self-administered mindfulness training exercise increased frequency and duration of flow states (Aherne, Moran, & Lonsdale, 2011). In another mindfulness-based intervention, athletes reported increases in trait mindfulness and flow and decreased task-related worries and task irrelevant thoughts (Thompson, Kaufman, De Petrillo, Glass, & Arnkoff, 2011). Moreover, researchers have found that regular mindfulness practice is associated with improvements in cognitive processing, such as attention orientation, executive attention, and working memory (Jha, Stanley, Kiyonaga, Wong, & Gelfand, 2010; van den Hurk, Gionmi, Gielen, Speckens, & Barendregt, 2010). In short, training student athletes in mindfulness and acceptance might be a better alternative to enhancing performance than more traditional PST.

### The Mindfulness-Acceptance-Commitment Approach

Gardner and Moore (2004, 2007) developed the Mindfulness-Acceptance-Commitment (MAC) program for athletes. As the name implies, the MAC program has three main components: mindfulness, acceptance, and commitment. Participants first learn the foundations of mindfulness through psychoeducation and group discussions. They practice various experiential exercises to learn how to more flexibly attend and react to internal experiences. As ath-

letes become increasingly aware of their internal experiences, they are in a better position to understand how and when particular experiences impede performance. Awareness facilitates understanding of the antecedents, consequences, and contexts in which distress arises and when it is helpful to rely on acceptance as opposed to change strategies.

The MAC program places a strong emphasis on values, which can be defined as guiding life principles that influence daily decision making and serve as the foundation of meaningful goals. Because individuals do not have the capacity to highly value everything, given limited personal resources, values are often prioritized to determine which values are most important to achieving relevant goals. The MAC program helps student athletes evaluate their values while making an important distinction between goals and values. Whereas goals pertain to specific outcomes, values are continuously constructed dynamic patterns of behaviors. For example, a basketball player may set the achievable goal of scoring 20 points each game, while he may value being a reliable, productive team member; this value may guide his behavior to achieve his goal. Unfortunately, negative momentary thoughts and feelings often promote emotion-driven behaviors that conflict and interfere with adhering to values. Because emotions—particularly negative ones—often derail goal-related efforts, the MAC program teaches athletes how to use mindfulness skills to increase acceptance of unwanted internal experiences. Accordingly, the basketball player can learn how to accept unwanted feelings (e.g., anxiety) and commit to behavior (e.g., practicing free throw shooting) that is in line with his value of being a reliable teammate. Together, awareness and acceptance build commitment toward values-driven behavior.

Although the MAC approach is based on empirically supported mindfulness- and acceptance-based therapies, research on the efficacy of the MAC program is scant (for a review, see Gardner & Moore, 2012). Two open trials have been published: one with 11 collegiate-level field hockey and volleyball athletes (Wolanin, 2005) and another with seven elite adolescent golfers (Bernier et al., 2009). Three case studies were reported with athletes from lacrosse, swimming, and powerlifting teams (Gardner & Moore, 2004; Lutkenhouse, 2007; Schwan-

hauser, 2009). Participants in these studies have generally reported increased levels of mindfulness, acceptance, and flow, and several have found increases in objective measures of athletic performance (Bernier et al., 2009; Gardner & Moore, 2004) and coaches' evaluations (Lutkenhouse, Gardner, & Moore, 2007). Nevertheless, there has yet to be a peer-reviewed study of the MAC program that includes a controlled comparison group for team sports. Lutkenhouse, Gardner, and Moore (2007) conducted a large randomized control trial that compared MAC with PST, but this remains unpublished, and Bernier et al.'s (2009) controlled trial with golfers did not evaluate the efficacy of the MAC program in the context of team sports. The primary goal of this study is to fill this gap and contribute to the small but growing body of literature regarding the efficacy of the MAC intervention. Because we were especially interested in student athletes' well-being, we included multiple measures of psychological and emotional functioning.

### Yoga as Physical Practice of Mindfulness

Mindfulness practices can be taught through mind-body exercises such as yoga. The central message of yoga is to learn how to listen and respond to bodily sensations. This awareness helps individuals move to a comfortable "physical and mental space" while challenging their body (Shiffmann, 1996). Various physical poses and movements are used to increase awareness of one's physical and mental states. Yoga practitioners are shown how to mindfully focus their attention on the present moment. Several studies have supported the physical and psychological benefits of yoga. In a comprehensive review of 81 studies that compared yoga to other types of physical exercise (e.g., walking, running, cycling), Ross and Thomas (2010) found that yoga was equally or more effective at improving multiple factors related to one's well-being, including decreased stress and fatigue. Some of these benefits have been documented at a physiological level (e.g., decreased cortisol; Kamei et al., 2000). More frequent yoga practice has been associated with more positive emotions, fewer negative emotions, and increased satisfaction with life (Impett, Daubenmier, & Hirschman, 2006), and some studies have observed beneficial effects after a

single yoga session (e.g., Telles, Gaur, & Balkrishna, 2009). In addition, yoga-based interventions have been associated with reductions in levels of depression and anxiety (Kirkwood, Rampes, Tuffrey, Richardson, & Pilkington, 2005; Pilkington, Kirkwood, Rampes, & Richardson, 2005). When compared with contemplative practices that lack active physical activity (e.g., body scanning, meditation), researchers have found yoga to be more effective at increasing mindfulness and well-being and reducing perceived stress and anxiety (Carmody & Baer, 2008).

### The Present Study

In this study, we explored the utility, feasibility, and potential efficacy of a comprehensive mindfulness intervention for student athletes. We evaluated whether a 5-week intervention could improve the well-being of an entire men's NCAA Division I athletic team. We used Gardner and Moore's (2007) MAC program to teach athletes how to be mindful and accepting of negative thoughts, identify values, and commit to behaviors that align with their values. We modified Gardner's original protocol in two ways. First, we condensed the 8-week protocol (one session per week) to 5 weeks (two sessions each week, one session the first and last weeks) to increase the feasibility and practicality of delivering the intervention. Second, student athletes participated in 60-min yoga classes after each session to incorporate more physical movement into the intervention.

## Method

### Participants

Participants were 26 college student athletes ( $M$  age = 20.23,  $SD$  = 1.53). For the experimental group, an entire NCAA Division I male Varsity team (13 student athletes) participated in the intervention ( $M$  age = 20.08,  $SD$  = 1.26). Eleven (84.6%) of the participants were African American, 1 (7.7%) participant was Caucasian, and 1 (7.7%) participant identified as other. This study was approved by the university's institutional review board and the Director of Athletics. Before the intervention, researchers met with the student athletes (without coaching staff) to introduce the program and address any concerns. Participants

were told that their choice to participate would not affect their standing with their athletic team or the university, and at no point would their individual data be shared with coaching personnel.

Written consent was obtained from all participants. Although all participants completed the intervention, one participant did not complete pre-program questionnaires, and four participants did not complete postprogram questionnaires. Thus, our final sample for analyses in the experimental group was eight. Those who did not complete postprogram questionnaires did not significantly differ from those completed the questionnaires on any of the baseline measures.

Because of our small sample size and the exploratory nature of this pilot study, we chose not to use imputation methods for missing data. Nonetheless, our results should be interpreted with this consideration.

To evaluate whether any effects were because of the presence of an intervention, we recruited an additional group of student athletes. The control group consisted of 13 male student athletes from club sports teams ( $M$  age = 20.38,  $SD$  = 1.80). Six (46.2%) of the participants were Caucasian, 4 (30.8%) participants were Asian, 2 (15.4%) participants were Hispanic, and 1 (7.7%) participant was African American. Participants in the control group filled out pre- and postquestionnaires but did not participate in the intervention. They were recruited from club sports teams (via flyers) from the same university to maximize similarity with the experimental group. Although club teams compete at a less competitive level than varsity teams, they often have similar time and energy demands.

### Procedure

Participants in the experimental group were recruited in coordination with the campus athletic department.<sup>1</sup> Over 5 weeks, the team attended eight 90-min mindfulness-based sessions, each followed by 60-min Hatha yoga sessions. All sessions were voluntary, and participation had no influence on the participants' standing with their respective athletic teams or the university. To determine the efficacy of the intervention, participants com-

<sup>1</sup> Our research team coordinated with athletic department to offer the intervention to all athletic teams. We chose teams based on interest and availability.



pleted self-report measures before and after the intervention. Participants in the control group were recruited through campus flyers and Listserv emails for a “study investigating the relationship between psychological processes and student athletes’ well-being.” Control group participants completed all measures at two time points 5 weeks apart, but they did not participate in the intervention. They were compensated \$20 for completing the measures.

**MAC intervention.** Two experienced facilitators led each MAC session. We followed the procedures outlined in Gardner and Moore’s (2007) protocol (see Table 1 for a summary). Instructor 1 has a doctorate in clinical psychology and is a licensed clinical psychologist. She has taught university-level courses on meditation, mindfulness, and sports psychology. Instructor 2 is a registered yoga instructor at the 500-hr level and holds professional certifications in positive psychology and advanced coaching. She is the director of a mindfulness living learning program and has taught university level courses on the science and application of mind–body integration. Participants received homework assignments at the end of each session. These assignments were voluntary (although encouraged), and no data were collected on adherence or effectiveness.

**Session 1: Introducing mindfulness.** Group instructors introduced the MAC approach and provided an explanation of fundamental concepts of mindfulness. Instructors explained that by being mindfully aware, one is better able to accept negative internal experiences (e.g., anxiety, anger) while attending to the external environment (e.g., taking a foul shot). The instructors then led the Brief Centering Exercise, where participants attended to their breath, switched their attention to their surroundings, then back to their body. The goal is to learn how to flexibly move one’s attention between internal and external sensations. The suggested homework was to practice and record mindful breathing (brief periods of focusing only on the breath, allowing thoughts to come and go, and to bring attention back to the breath). Participants were also asked to complete a worksheet, What I Have Learned About Performance and Myself, in which they re-

flected on what they learned during the session and how it related to their performance.

**Session 2: Introducing cognitive defusion.** Group instructors began the session with the Brief Centering Exercise to reinforce a pattern of mindful-based behavior. Instructors introduced the concept of cognitive fusion, which is when thoughts and feelings are seen as truth rather than subjective experiences. Thoughts and feelings are “fused” with reality (“I think I am worthless, therefore I truly am worthless”), so that individuals are unable to view themselves as experiencing thoughts as “just thoughts or feelings” and exhaust limited cognitive resources in the process. One goal of mindfulness is to create cognitive defusion, which is a state of mind characterized by psychological distance from subjective experiences (Blackledge, 2007). This distance allows one to see thoughts and feelings as fleeting psychological states rather than factual interpretations of reality. As an example, the instructors presented three statements: “I am a loser,” “I think I am a loser,” and “I am having the thought that I am a loser.” Participants used this framework to recall thoughts and feelings about a recent event and differentiate between “having a thought versus believing the thought.” Suggested homework was to use mindfulness during a simple daily activity (e.g., eating, brushing teeth). The session concluded with the Brief Centering Exercise.

**Session 3: Introducing values and values-driven behavior.** In Session 3, to illustrate how values can guide meaningful behavior (like a compass), the instructors introduced values-driven behavior. Values-driven behaviors are actions that are in line with one’s values (e.g., doing 30 min of cardio training to improve conditioning despite fatigue), whereas emotion-driven behaviors are actions in response to emotions and may not be in line with one’s values (e.g., avoiding training because the athlete finds it difficult). Participants identified a situation, the emotions it triggered, what they did to try control the emotions, and the short- and long-term effects of trying to control the emotions. The session concluded with the Mindfulness of the Breath Exercise, an extension of the Brief Centering Exercise, in which individuals continuously focus on their breath while noticing the flow

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Table 1  
*Mindfulness-Acceptance-Commitment Intervention Session Content*

Session theme	Session goals	Psychoeducation	Experiential exercises	Suggested homework
Session 1: Introduction	Develop rapport, introduce foundational concepts	Rationale of mindfulness, acceptance, and commitment; acknowledging negative thoughts—feelings	Brief centering exercise	Mindfulness of breath practice, what I have learned about performance and myself
Session 2: Mindfulness	Introduce concept of cognitive defusion, discuss perceived stressors	Having vs. believing a thought	Progressive muscle relaxation; visualize thoughts, emotions, and reactions to past event	Mindful walking, self-monitoring of mindfulness practice
Session 3: Goals and values	Differentiate values from goals, clarify individual and group values and goals	Value-driven vs. emotion-driven behavior	Reflective writing, discussion in pairs, mindfulness of breath	Mindful athletic activity, given up for emotions form
Session 4: Experiential acceptance	Introduce concept of experiential acceptance	Function of anxiety	Recall stressful event with awareness of bodily reaction, mindfulness of breath	Emotion and performance interference form
Session 5: Commitment	Introduce commitment as ongoing process	Commitment as a process	Seeing exercise commitment to values, exercise mindfulness of breath	Mindfulness practice relevant to performance goals
Session 6: Behavioral flexibility	Introduce concept of behavioral flexibility	Tolerance of negative affect	Task-focused attention	Use mindfulness in high-intensity situation, task-focused attention exercise outside of class
Session 7: Skill consolidation	Identify different responses to challenges	Fixed vs. growth mindset	Exercise body scan	
Session 8: Skill maintenance	Integrate learned concepts	How to apply mindfulness to novel activities	Brief centering exercise task-focused attention exercise	Task-focused attention activity during athletic practice
	Encourage athletes to apply skills in athletic performance and everyday situations	Benefits of practicing mindfulness	Mindfulness of breath	Post-MAC practice plan form

of air going in and out of the body and the abdomen rising and falling. Suggested homework was to use mindfulness during a specific athletic activity (e.g., throwing, catching).

**Session 4: Costs of avoidance and benefits of acceptance.** Session 4 began with the Mindfulness of the Breath Exercise. The instructors then introduced the concepts of experiential avoidance and acceptance. They explained that experiential avoidance is the effortful attempt to control or eliminate unwanted negative thoughts and emotions, whereas experiential acceptance is the willingness to experience (i.e., not try to change) unwanted private events in the pursuit of one's values and goals. An imagery exercise was used to relate these concepts to athletic performance. Participants were invited to recall a situation in which they found it difficult or stressful to perform well, and to use personally relevant imagery to increase awareness and acceptance of bodily reactions to negative experiences. For homework, participants received the Emotion and Performance Interference Form and were encouraged to record performance situations and assess how their emotions interfered with performance. The session concluded with Mindfulness of the Breath Exercise.

**Session 5: Enhancing commitment.** Session 5 began with the Brief Centering Exercise. To initiate a discussion about commitment, participants received a handout about *growth* mindset versus *fixed* mindset.<sup>2</sup> The handout explained that a growth mindset is an orientation toward embracing challenges, persisting through setbacks, and learning from experiences. A fixed mindset, in contrast, is an orientation toward avoiding challenges, easily giving up, and ignoring feedback. Instructors used open-ended questions to prompt reflection, including, "What progress have I made today?" and "Am I standing in the way of my potential or trying to avoid difficult emotions?" Participants completed the Committing to Values exercise, in which they identified a performance value, short-term and long-term goals associated with that value, and a behavioral change to achieve desired performance. The suggested homework was to apply mindfulness practices relevant to identified performance goals. The session concluded with the Mindfulness of the Breath Exercise.

**Session 6: Enhancing flexibility.** Session 6 began with the Brief Centering Exercise. Participants then paired up and completed the Task-Focused Attention Exercise, in which they learned how to redirect their attention from internal processes (emotions or thoughts) to an external task. For the Task-Focused Attention Exercise, one partner shared a story while the other listened but made no eye contact. Then, the listening partner recalled the story in as much detail as possible, while simultaneously identifying what additional internal or external stimuli in which he or she was simultaneously aware. Pairs repeated this process until the listening partner correctly identified at least 50% of the story's details. Participants then created opposite action plans in which they identified what they were avoiding (e.g., lifting weights), then created plans to actively pursue them (e.g., schedule an even longer period of time to lift weights). The suggested homework was to use mindfulness in high-intensity performance situations (e.g., athletic games) and to complete a Task-Focused Attention Exercise outside of session. The session concluded with the Body Scan Exercise, in which participants attended to their breath then progressively moved their attention from one area of the body to another.

**Session 7: Attention and reinforcing mindfulness.** Session 7 began with the Brief Centering Exercise. Participants then completed a Task-Focused Attention Exercise in pairs. One person counted backward from 100 by 7s (serial 7s) while they simultaneously listened to their partner tell a story. The goal was to improve attention to a specific task despite increases in cognitive demand. Participants were asked to envision a sporting situation and explain how they could best direct their attention. They discussed the different types of attention necessary in sports (e.g., broad, external attention such as sizing up the whole court, and narrow, external attention such as focusing on catching the ball). The suggested homework was to engage in a Task-Focused Attention Exercise during an upcoming athletic practice.

**Session 8: Maintaining and enhancing mindfulness, acceptance, and commitment.** Session 8 began with the Mindfulness of Breath

<sup>2</sup> Instructors included this supplemental handout. It is not included in Gardner and Moore's (2007) original protocol.

Exercise. The group then discussed a final review of the intervention. Participants paired up to discuss how they planned to achieve their individual performance goals, which was followed by a group discussion on how to achieve team goals. Participants completed the Post-MAC Practice Plan Form to assess performance values, goals, obstacles, and avoidant behaviors. They were encouraged to use the form to monitor progress, identify areas for improvement, and use their teammates for support. The final session concluded with Mindfulness of the Breath.

**Yoga.** After each mindfulness session, participants attended a 60-min group yoga session. An instructor certified at the 225-hr level led Hatha yoga sessions. *Hatha* yoga refers to a series of physical exercises known as *asanas* or bodily postures that are designed to build physical and mental strength. The word *hatha* means willful or forceful, which refers to the goal of increasing stamina, strength, and flexibility through long *asanas*. Each yoga session began with a brief welcome during which participants shared their overall mood and stress. They warmed up with breathing exercises and low intensity stretches and then completed a series of rhythmic exercises, balancing and focus poses, groin stretches, and restorative poses. Session closed with a 2-min meditation in a comfortable pose.<sup>3</sup>

## Measures

**Mindfulness.** The Mindful Attention and Awareness Scale (MAAS; Brown & Ryan, 2003) was used to assess the frequency of mindful states in everyday life. The MAAS consists of 15 items (e.g., “I find it difficult to stay focused on what’s happening in the present”) that assess dispositional mindfulness and are rated on a scale ranging from 1 (*almost always*) to 6 (*almost never*). The psychometric validity of the MAAS is well-supported (Brown & Ryan, 2003; MacKillop & Anderson, 2007) and demonstrates incremental validity in uniquely predicting enhanced self-awareness and psychological well-being above related constructs. Construct validity has been demonstrated in predicting changes in mindfulness levels following mindfulness training (Chambers, Lo, & Allen, 2008) and reductions in stress and rumi-

nation (Shapiro, Oman, Thoresen, Plante, & Flinders, 2008).

**Tolerance of negative affect.** The 25-item Tolerance of Negative Affect States Scale (TNASS; Bernstein & Brantz, 2012) was used to assess the capacity to experience and withstand specific negative psychological states. Items are rated on a scale ranging from 1 (*very intolerant*) to 5 (*very tolerant*). The TNASS contains 6 state-specific subscales: tolerance of fear/distress, tolerance of sadness/depression, tolerance of anger, tolerance of disgust, tolerance of anxiety/apprehension, and tolerance of negative social emotional emotions. Factor analyses have validated the use of these subscale scores, and the full scale had demonstrated acceptable convergent and discriminant validity (Bernstein & Brantz, 2012).

**Experiential avoidance.** The 17-item Acceptance and Action Questionnaire Version-II (AAQ-II; Bond et al., 2011) was used to assess psychological inflexibility (i.e., experiential avoidance). The AAQ-II assesses the degree to which one is able and likely to tolerate unwanted internal experiences (e.g., “My painful memories prevent me from having a fulfilling life”). Items are rated on a scale ranging from 1 (*never true*) to 7 (*always true*). Construct validity has been demonstrated in studies predicting coping with chronic pain (McCracken & Zhao-O’Brien, 2010) and problematic alcohol use (Levin et al., 2012). Additional analyses have concluded that the AAQ-II is a valid and reliable measure of psychology inflexibility (Fledderus, Oude Voshaar, ten Klooster, & Bohlmeijer, 2012).

**Goal motivation.** The Adult Hope Scale (AHS; Snyder et al., 1991) was used to assess hope, defined as a positive motivational state

<sup>3</sup> Detailed description of yoga sessions: (a) Welcome: Each participant shared overall mood and stress. (b) Warm-up: centering activity (seated breathing or mountain pose), cat-cow poses, side stretches, three-part breathing exercises, sun salutations (with chair pose). (c) Warrior series flow: Warrior I, Warrior II, variations of extended side angle pose, variations of prayer pose. (d) Balancing-focus-confidence building poses: Crane, Tree, Warrior III, Eagle pose, Boat pose. (e) Groin stretches: lunges, garland pose, goddess pose. (f) Restorative poses: spinal twists, child’s pose, choice of legs up the wall pose or corpse pose with guided meditations (5–10 min). (f) Closing: easy pose or half lotus pose with 2-min meditation, appreciations (Namaste).



oriented toward achieving goals. The AHS consists of two four-item subscales: Agency, or goal-directed energy (e.g., “I energetically pursue my goals”) and Pathway, or goal planning (e.g., “I can think of many ways to get the things in life that are important to me”). Items are rated on a scale ranging from 1 (*definitely false*) to 8 (*definitely true*). Good construct validity and reliability have been demonstrated in studies predicting coping strategies for individuals diagnosed with breast cancer (Sears, Stanton, & Danoff-Burg, 2003) and college students’ athletic performance (Curry, Snyder, Cook, Ruby, & Rehm, 1997).

**Perceived stress.** The Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983) was used to assess the amount of perceived stress an individual has felt in the past month. The PSS consists of 14 items (e.g., “In the last month, how often have you been upset because of something that happened unexpectedly?”), rated on a scale ranging from 0 (*never*) to 4 (*very often*). Predictive validity of the PSS has been demonstrated with depression, engagement in healthy behavior, and use of health services (Cohen & Williamson, 1988).

**Commitment to values.** The Valued Living Questionnaire (VLQ; Wilson et al., 2011) was used to assess commitment to values across 10 life domains (e.g., family, friendships, recreation, employment, spirituality). The VLQ consists of two 10-item subscales that measure the importance and consistency an individual places on each life domain. Items are rated on a scale ranging from 1 (*not at all important or not at all consistent*) to 10 (*extremely important or extremely consistent*). A composite score (Importance  $\times$  Consistency) can also be computed, which helps quantify the extent to which one is living out particular values. Construct validity and acceptable reliability have been demonstrated in studies predicting quality of life (Michelson, Lee, Orsillo, & Roemer, 2011) and response to ACT-based therapy for anxiety (Hayes, Orsillo, & Roemer, 2010).

**Grit.** The Short Grit Scale (Grit-S; Duckworth & Quinn, 2009) was used to assess psychological grit, a trait-like perseverance and passion for long-term goals. The Grit-S consists of eight items (e.g., “New ideas and projects sometimes distract me from previous

ones”), rated on a scale ranging from 1 (*very much like me*) to 5 (*not like me at all*). The Grit-S has demonstrated construct validity in studies predicting spelling bee performance (Duckworth, Kirby, Tsukayama, Berstein, & Ericsson, 2011), military cadets’ performance (Eskreis-Winkler, Duckworth, Shulman, & Beal, 2014), and teacher effectiveness (Duckworth, Quinn, & Seligman, 2009).

**Cognitive defusion.** The Drexel Defusion Scale (DDS; Forman et al., 2012) was used to assess the ability to achieve psychological distance (i.e., defuse) from thoughts and feelings. The DDS consists of 10 items (e.g., “. . . To what extent would you normally be able to defuse from feelings of anger?”), rated on a scale ranging from 0 (*not at all*) to 5 (*very much*). The DSS has demonstrated good psychometric properties, with a one-factor structure, good internal consistency, and high convergent validity in both clinical and nonclinical samples. Construct validity has been shown in predicting improvements in psychological functioning for individuals seeking psychological treatment (Forman et al., 2012).

**Psychological distress.** The 21-item Depression Anxiety Stress Scale (DASS-21; Henry & Crawford, 2005) was used to assess baseline psychological distress on three dimensions: depression, anxiety, and stress. The DASS-21 prompts individuals to rate the frequency to which statements about psychological distress apply on a scale ranging from 0 (*never*) to 4 (*almost always*). The DASS-21 has demonstrated reliability as a single factor ( $\alpha = .93$ ), and the three subscales also demonstrate acceptable reliability (.88 for Depression, .82 for Anxiety, and .90 for Stress). The DASS-21 has also shown good construct validity (Henry & Crawford, 2005) and good internal consistency in both community and clinical samples and across multiple racial groups (Antony, Bieling, Cox, Enns, & Swinson, 1998; Norton, 2007).

**Written feedback.** We collected written feedback following the intervention to explore which components of the program worked best and what improvements could be made when designing future interventions. Participants responded to two free-response questions: “What part of this training do you think will help you most with your athletic performance?” and “What feedback, if any, would you like to offer the instructors?”

## Results

### Experimental Group

We conducted separate repeated-measures  $t$  tests to examine changes from before and after the intervention (see Table 2).<sup>4</sup> Given the small sample size, we conducted effect-size estimates using Cohen's  $d$ . Following the intervention, participants in the experimental group reported greater mindfulness,  $t(8) = -2.88, p < .05, d = 0.48$  and goal-directed energy,  $t(8) = -3.37, p < .05, d = 0.98$ , than before the intervention. These effects were medium to large and large, respectively. Participants also reported less perceived stress,  $t(8) = 2.57, p < .05, d = 0.26$ , a significant but small effect. We also report findings at trending levels of significance to guide future research endeavors to replicate or extend our findings. We found a trend for tolerance of negative affect, such that participants reported greater tolerance of disgust,  $t(8) = -2.20, p = .06, d = 0.50$ , and states of anxiety and apprehension,  $t(8) = -1.94, p = .09, d = 0.61$ . Although neither of these effects was significant, the analyses yielded medium effect sizes. No statically significant differences were found for the other tolerance of negative affect subscales: fear-distress, sadness-depression, anger and negative social emotions ( $ps > .40$ ). We also found a trend for the importance of valued living, such that following the intervention, participants reported greater importance of valued life domains,  $t(8) = 1.97, p = .09, d = 0.76$ . Consistency of behavior, however, did not change,  $t(8) = 0.43, p = .68, d = 0.18$ . Although we found no significant differences in composite scores,  $t(8) = 0.98, p = .36, d = 1.17$ , analyses yielded a large effect size. No differences in reported grit or experiential avoidance were evident.

### Group Comparisons

Baseline comparisons revealed that the groups did not differ in levels of anxiety, stress, or depression (from DASS subscales), with the experimental group reporting relatively low levels of anxiety ( $M = 0.79, SD = 0.51$ ), stress ( $M = 0.97, SD = 0.49$ ), and depression ( $M = 0.69, SD = 0.51$ ), comparable to the control group: anxiety ( $M = 0.64, SD = 0.36$ ), stress ( $M = 0.83, SD = 0.47$ ), and depression ( $M = 0.65, SD = 0.59$ ); all  $ps > .30$ .

Consistent with expectations for the control group, we found no significant changes from

pre- to postassessment for any measure ( $ps > .05$ ). Repeated-measures analyses of variance (ANOVAs) revealed that compared with the control group, participants in the experimental group reported a greater increase in mindfulness,  $F(1, 19) = 4.55, p < .05$ , and goal-directed energy,  $F(1, 19) = 4.94, p < .05$ .

### Written Feedback

We explored written excerpts from players (see Table 3) to identify directions for future interventions. We used a simple count of subject words to identify themes in responses. In response to the question, "What part of this training do you think will help you most with your athletic performance?" six players wrote "focus," "focusing," or "shift." Statements containing these words pertained to refocusing or shifting attention to the present moment. Two players wrote either "team" or "teammates." In response to the question, "What feedback, if any, would you like to offer the instructors?" Four players wrote "more activity," "more hands on activities," or "mindful activity." Statements containing these words pertained to incorporating more experiential activities into the intervention.

## Discussion

This pilot study provides preliminary support for the utility and feasibility of a brief mindfulness-based and yoga intervention for student athletes. Following the intervention, student athletes from a men's NCAA Division I athletic team reported greater mindfulness, greater goal-

<sup>4</sup> Given our small sample size and missing data, we addressed issues of nonnormally distributed data by conducting nonparametric tests for all research questions. We found identical effects. To examine prepost changes within each group, we conducted Wilcoxon signed-rank tests. Participants from the experimental group reported greater mindfulness ( $z = 2.03, p < .05$ ), greater goal-directed energy ( $z = 2.56, p < .05$ ), less perceived stress ( $z = 2.06, p < .05$ ), and greater tolerance of disgust ( $z = 1.79, p < .05$ ). At trending of levels of significance, participants reported greater tolerance of anxiety and apprehension ( $z = 1.79, p = .07$ ) and greater importance of valued living ( $z = 1.86, p = .06$ ). No significant differences were found for control group participants. To compare changes between the two groups, we conducted Mann-Whitney  $U$  tests. Experimental group participants reported greater increase in mindfulness ( $z = 2.10, p < .05$ ) and goal-directed energy ( $z = 1.95, p = .052$ ).

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Table 2  
Well-Being Indicators for Experimental and Control Groups Before and After the Intervention

Variable	Experimental group					Control group				
	Pre <i>M</i> ( <i>SD</i> )	Post <i>M</i> ( <i>SD</i> )	<i>t</i>	<i>d</i>	CI for <i>d</i>	Pre <i>M</i> ( <i>SD</i> )	Post <i>M</i> ( <i>SD</i> )	<i>t</i>	<i>d</i>	CI for <i>d</i>
Mindfulness	3.60 (1.13)	4.08 (0.85)	-2.88*	0.48	[0.03, 0.93]	4.08 (0.90)	3.88 (1.07)	-0.88	0.20	[-0.30, 0.70]
DT Fear-distress	3.34 (0.83)	3.53 (0.49)	-0.78	0.23	[-0.55, 1.01]	3.57 (0.67)	3.58 (1.06)	0.03	-0.01	[-0.57, 0.55]
DT Sadness-depression	3.12 (1.11)	3.46 (0.50)	-0.73	0.38	[-0.91, 1.67]	3.38 (1.00)	3.36 (1.10)	-0.1	0.02	[-0.51, 0.55]
DT Anger	3.30 (0.81)	3.58 (0.71)	-0.70	0.32	[-1.01, 1.65]	3.64 (1.13)	3.62 (1.27)	-0.13	0.02	[-0.33, 0.37]
DT Disgust	3.38 (0.79)	3.83 (0.80)	-2.20*	0.50	[-0.20, 1.20]	3.49 (0.88)	3.59 (1.09)	0.37	-0.10	[-0.70, 0.50]
DT Anxiety-apprehension	3.12 (1.10)	3.69 (0.65)	-1.94*	0.61	[-0.18, 1.40]	3.50 (0.89)	3.62 (1.08)	0.32	-0.12	[-0.92, 0.68]
DT Negative social emotions	3.31 (0.76)	3.25 (0.68)	0.34	.07	[-0.53, 0.67]	3.21 (0.92)	3.38 (1.13)	.84	-0.17	[-0.60, 0.26]
Experiential avoidance	2.91 (1.02)	2.48 (1.23)	1.08	0.41	[-0.45, 1.27]	2.12 (0.67)	2.26 (1.11)	0.47	-0.15	[-0.85, 0.55]
Goal directed energy	6.63 (0.58)	7.34 (0.46)	-3.37*	0.98	[-0.16, 2.12]	6.77 (0.63)	6.83 (0.96)	0.30	-0.07	[-0.53, 0.39]
Goal planning	6.81 (0.83)	6.81 (1.26)	0	0	[-1.10, 1.10]	6.73 (0.66)	6.75 (0.96)	0.11	-0.02	[-0.42, 0.38]
Perceived stress	1.79 (0.62)	1.57 (0.76)	2.57*	0.26	[-0.01, 0.53]	1.59 (0.53)	1.67 (0.49)	0.36	-0.11	[-0.71, 0.49]
VL Importance	7.11 (1.95)	8.09 (1.4)	1.97*	0.76	[-0.06, 1.58]	7.09 (1.64)	7.75 (1.52)	1.24	0.53	[-0.24, 1.30]
VL Consistency	6.97 (2.12)	7.23 (2.09)	0.43	.18	[-0.53, 0.89]	7.50 (1.73)	7.88 (1.49)	0.88	0.30	[-0.29, 0.89]
VL Composite	58.20 (28.39)	64.30 (25.67)	0.98	1.17	[0.26, 2.08]	58.19 (21.75)	66.42 (19.24)	1.23	1.82	[0.74, 2.90]
Grit	3.84 (0.68)	3.95 (0.56)	-1.18	0.14	[-0.20, 0.48]	3.42 (0.59)	3.48 (0.67)	0.49	-0.08	[-0.48, 0.32]
Cognitive defusion	3.03 (0.72)	3.21 (1.03)	-0.64	0.19	[-0.57, 0.95]	2.79 (0.69)	3.01 (0.92)	1.46	-0.25	[-0.63, 0.13]

Note. Pre = before the intervention; Post = after the intervention; CI for *d* = confidence interval for effect size; DT = distress tolerance; VL = valued living.  
\*  $p < .10$ . \*  $p < .05$ .

Table 3  
*Student Athletes' Written Feedback About the Intervention*

Prompt	Response
What part of this training do you think will help you most with your athletic performance?	<p>The part that would help me the most is the mental exercises where we close our eyes and concentrate. Also learning how to shift our attention to the task at hand.</p> <p>I think that learning how to control my thoughts will help me the most as far as my athletic performance goes. The way of noticing what I'm doing and being able to shift at the moment will be a lifesaver.</p> <p>I think that the meditation and refocusing will keep improving my performance. A big part of why I may not perform as well as I want to is that I am beating myself up or anxious. Just accepting the anxiety and refocusing to the task at hand and being confident in my abilities.</p> <p>The mindfulness-acceptance-commitment training was very helpful. I think it will help me during the season. Now when I make mistakes I will not focus on the mistake, I will let it go. This program helped me focus on the bigger picture. When I make a mistake I will tune out the negative and focus more on to the next play.</p> <p>I think that having a team sit together and talk to each other and get to learn more about the individual is what allows the team to come closer. Also being able to hear everybody individual goals and team goals.</p> <p>Knowing what my teammates goals are so I can help them accomplish them. Also being able to control my breathing.</p> <p>Focusing on the present moment. Being able to recognize my thoughts/acceptance/avoidance.</p> <p>I think what will help me most is being able to refocus my attention. Not only in [specific sport], but being able to focus on everyday tasks. When and if I find myself wandering, I will challenge myself to focus on the task at hand.</p>
What feedback, if any, would you like to offer the instructors?	<p>No feedback in particular. I think they did a great job and tried to understand the mindset of every person in the room. I enjoy the class and they weren't judgmental of any of the information we shared.</p> <p>I don't have anything negative to say, but keep up the wonderful work.</p> <p>This program was very boring at times. I think the centering exercises need to be shorter because I tend to lose focus fast. I think that there needs to be more activity instead of all just talking.</p> <p>I think that the instructors did a great job and helped us stay positive and also made it fun for us.</p> <p>As far as what could be changed I think that more hands on activities would be great. Maybe some "mindful" games that will help us to focus our attention or center ourselves. Maybe more videos on particular studies done of different mindfulness practices.</p> <p>More hands on activities for the players to do so we can stay engaged</p> <p>I would love to continue this program. I think this will help me and my teammates out.</p> <p>I enjoyed the idea of the program but the actual sessions were not as interactive as I expected it to be. There was a lot of discussion about what "mindfulness" is, but not much mindful activity besides the opening and closing. It would be cool if the training sessions were conducted somehow incorporated the actual sport.</p>

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directed energy, and less perceived stress than before the intervention. Participants also reported greater tolerance of negative experiences (at trending levels of significance), such that participants reported greater comfort with disgust and anxiety after the intervention. To ensure any effects found were because of the intervention, as a control comparison group, athletes

from various club sports teams from the same university completed the same questionnaires at the pre- and postintervals. Student athletes who completed the intervention reported greater increases in goal-directed energy and mindfulness than did student athletes in the control group. In written feedback following the intervention, several players wrote that the mindfulness activities



were the most helpful part of the intervention and suggested that incorporating more hands-on exercises would improve the intervention.

Consistent with expectations, participants reported greater levels of mindfulness following the intervention and compared with a control group. Participants learned foundations of mindfulness and practiced skills during each session. The efficacy of mindfulness interventions is well supported (Roemer & Orsillo, 2009), and participants have reported increased levels of mindfulness in a short period of time (e.g., Erisman, & Roemer, 2010; Zeidan et al., 2010). We also found that participants were better able to tolerate negative experiences (specifically, negative affect and disgust) following the intervention, although this effect did not reach statistical significance. A primary feature of mindfulness is to allow experiences to occur without judgment and accept them as they naturally unfold. More specifically, an open and receptive attitude promotes acceptance of negative internal states (Kabat-Zinn, 1990; Shapiro, Carlson, Astin, & Freedman, 2006; Teasdale, 1999). Such openness is important for athletes, as the hallmark of competitive sporting environments is fluctuating demands and opportunities to fall short of such demands and experience failure (e.g., missing a shot, receiving a penalty). In a related way, participants reported lower perceived stress following the intervention, which might point to an increased ability to cope with negative events.

We found encouraging support for the importance of incorporating values work into interventions. Following the intervention, participants reported increased levels of importance of valued life domains, which failed to reach statistical significance yet are suggestive in terms of directing future research and program development. Greater awareness and clarification of values would be expected to increase salience of their importance. Because individuals have a finite amount of resources to devote to multiple life domains, particularly time-burdened college student athletes, it might be helpful to clarify and identify which are most personally meaningful. In terms of goals, participants reported greater goal-directed energy following the intervention and compared with the control group. Research suggests that values exploration plays a central role in goal attainment (Sheldon & Elliot, 1999; Sheldon & Houser-Marko, 2001).

In fact, a recent study of an ACT-based intervention revealed that values exploration combined with goal setting resulted in improved performance, yet goal setting alone did not predict performance (Chase et al., 2013). Accordingly, clarifying values might motivate goal pursuit.

### Implications for Practitioners

We explored players' written feedback from their exit interviews to identify strengths and areas to build on for future interventions. Several players indicated that the intervention could be improved by including more active, experiential exercises. Long periods of lecturing where participants remained inactive might have resulted in boredom and inattention.

Because athletes are accustomed to intense, frequent exercise, they may prefer to learn through active and experiential methods, as indicated by a recent study with student athletes (Groves, Bowd, & Smith, 2010). Practitioners that conduct interventions with athletes should harness their propensity toward physical movement. This might provide additional support for the benefit a complementary mind-body exercise component (e.g., yoga), although this remains to be explicitly tested. Additionally, a group format might be helpful to build team morale and trust.

Two players wrote the words "team" or "teammates" in their response to what they found most helpful. Completing exercises that encourage self-disclosure (e.g., see Method, Session 3: Introducing values and values-driven behavior section) may increase closeness among participants in a group (see Collins & Miller, 1994, for a meta-analytic review). Active participation, especially when directed toward a shared task, may facilitate teamwork and improve group cohesiveness within teams.

### Limitations and Future Directions

Our findings should be interpreted in light of several limitations that preclude definitive conclusions, including a lack of randomization in treatment group assignment and differences in recruitment of the two groups of student athletes. Athletes in the control group represented different teams across diverse sports, as opposed athletes in the experimental group who were members of a single team. Researchers

have emphasized that individualizing athletic intervention programs to each sport is important to their effectiveness (e.g., Martin & Toogood, 1997). The advantages of interventions may differ across sports depending on the unique demands of the sport. For example, one study found differences in observed effects of a mindfulness program between elite golfers and swimmers (Bernier et al., 2009). Another limitation from the vantage point of implementation of the program is that we did not measure athletic performance. Indeed, it is likely that student athletes and coaching personnel would be more likely adopt an intervention that has been shown to improve performance. Future research is needed to determine whether improvements in psychological well-being and mindfulness translate into improvements in physical performance (e.g., Iso-Ahola, 1995; Jowett & Cramer, 2009). We recommend that subsequent studies are more adequately powered to document potential differences across intervention and control groups. A number of potentially interesting findings in the current research emerged at only trending levels of statistical significance and these findings should not be regarded as reliable until confirmed in future investigations. Finally, because we combined psychological training (MAC program) with mind-body exercises (yoga), we are unable to determine which component of the intervention exerted a greater influence on the participants. Nevertheless, the combination of these two approaches may yield the greatest benefit, insofar as psychological training and yoga training reinforce mindfulness in complementary yet distinct ways.

Our study provides insight into how to best conduct mindfulness and acceptance-based interventions with student athletes. We provide preliminary support for the efficacy of a brief psychological intervention that incorporates mind-body exercises. We add to the growing body of support for ACT-based approaches that teach athletes how to be mindful and accepting of negative states rather than trying to eliminate, suppress, or control them. Our examination of players' written feedback highlights the need for practitioners to administer experiential exercises that invite athletes to actively participate. To develop the most effective interventions for student athletes, researchers are encouraged to examine mindfulness and acceptance strategies and continue to explore the

mechanisms of psychological interventions that may benefit not only athletes, but the general population as well.

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