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A Systematic Review of Mindfulness Interventions' Impact on Athlete Emotional Distress & Wellbeing

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A SYSTEMATIC REVIEW OF MINDFULNESS INTERVENTIONS' IMPACT ON ATHLETE EMOTIONAL DISTRESS & WELLBEING

THESIS

A thesis submitted in partial fulfillment of the

requirements for the degree of Master of Science in the

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By

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2020

ABSTRACT

A SYSTEMATIC REVIEW OF MINDFULNESS INTERVENTIONS' IMPACT ON ATHLETE EMOTIONAL DISTRESS & WELLBEING

Mindfulness-based interventions' (MBIs) effectiveness for improving wellbeing and reducing emotional distress is well-documented in both clinical and non-clinical sections of the general population (McAlarnen & Longshore, 2017). Although mindfulness has been shown to be effective with these populations, less is known about the specific effects for athletes. The effects of MBI's for athletes may be different given that the intention for MBIs in the sport context is typically to improve performance, where in most other contexts it is not (Gardner & Moore, 2012). Furthermore, athletes are a distinct population who possess unique factors on which their wellbeing and mental health depend, therefore MBIs may affect them differently. Given this potential difference in impact, the current systematic review sought to determine how MBIs affect athletes' emotional distress and wellbeing outcomes (positive, negative, or no significant effect), whether there is a difference between athletes and non-athletes in terms of these outcomes, and finally whether there is a difference between sport-specific versus non-sport-specific MBIs in terms of these outcomes. Results from the systematic review revealed that the impact MBIs have on athletes' wellbeing and emotional distress outcomes do not yet have evidence to support their effectiveness. Potential explanations for the findings are discussed.

KEYWORDS: mindfulness, athlete mental health, sport psychology, MBI, wellbeing, systematic review

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DEDICATION

For my grandmother, Patricia Tierney.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION & REVIEW OF LITERATURE

Approximately 33% of Americans will meet criteria for an anxiety disorder in their lifetime, and 20% will meet criteria for depression (Bandelow & Michaelis, 2015; Hasin, Sarvet, Meyers, Saha, Ruan, Stohl, & Grant, 2018). While these statistics demonstrate that emotional distress issues are prevalent in the general population, athletes are sometimes thought of as being different than the average person. A common notion regarding high-achieving athletes is that they have it easy: they work hard physically, but also enjoy fame and fortune associated with such a highly valued identity. However, peak performances, championships, media spotlights, fan support, and various other perks that come with being an athlete only tell one side of the story. More specifically, athletes face unique challenges to their psychological health and are not immune to mental illness and struggles, as some may suggest. In fact, a systematic review of the mental health of elite professional athletes found that the prevalence of common emotional distress issues (e.g., anxiety & depression) were comparable to rates of the general population, refuting the notion that they are impervious to mental health struggles (Rice, Purcell, Silva, Mawren, McGorry, & Parker, 2016). Interestingly, Rice and colleagues' review also revealed significantly higher rates of alcohol abuse due to binge drinking patterns in both males and females, as well as body dysmorphia and eating disorders in female athletes as compared to the general population. In terms of lifespan development, this is no surprise as the age for the greatest risk of mental illness onset and engagement in risk taking behavior coincides with competitive periods of elite athletes (Hughes & Leavey, 2012). Clearly, even athletes at the highest levels face challenges to their healthy psychological functioning, but these issues are not limited to only the most exceptional performers.

A plethora of research on athletes' mental health has focused on collegiate student-athletes, most commonly Division 1 NCAA. Similar to professional athletes, student-athletes exhibit prevalence rates of anxiety and depression comparable to the general population (Maniar, Chamberlain & Moore, 2005). In fact, the NCAA Sport Science Institute (2016) reported that 21% of male and 28% of female collegiate student-athletes had experienced depression to the point of impaired functioning in the previous 12 months. Furthermore, 31% of male athletes indicated feeling excessive anxiety, as did 48% of female athletes. Other studies have shown student-athletes to be even more at risk. For example, Watson and Kissinger (2007) found that non-athletes reported higher levels of wellness than did student-athletes, partially due to the demanding nature of balancing academic and athletic stressors. Not only is it evident that athletes deal with psychological challenges just like non-athletes, but the contextual factors of athletics may in fact be partially responsible for fostering mental anguish.

Unique Athletic Factors

While every sport and team are different, common themes exist among all athletes which reveal how athletics that can negatively impact mental health. Gulliver, Griffiths, and Christensen (2012) found that young elite athletes sought mental health services most frequently due to poor athletic performance, identity conflict, social isolation, injury, and weight control. Factors including, but not limited to overtraining, burnout, injury and/or rehabilitation, suboptimal performance, fatigue, organizational factors, group dynamics, and motivational climate have also been shown to affect the healthy psychological functioning of athletes (Rice, et al., 2016). The power of these factors to negatively influence mental health is especially salient when considering that exercise, an inherent part of athletics, can effectively treat and prevent a host of mental illnesses (Physical Activity Guidelines Advisory Committee, 2008; Rosenbaum,

Tiedemann, Sherrington, Curtis, & Ward, 2014). Although there is no clear hierarchy in terms of which of these factors most significantly affects athletes' mental health, a closer look at some can illustrate the complexity of matter.

For athletes who hold their athletic identity as paramount over who they are outside of their sport, things like the negative outcome of a competition, coach or teammate disapproval, and other sport identity-related factors can have deleterious effects on mental health (Hughes & Leavey, 2012). For example, Miller and Hoffman (2009) found that a "jock" athletic identity was associated with an increased risk of suicidality. Furthermore, evidence suggests that those with more prominent athletic identities face increased risk of emotional distress after significant injury and during career transition (Hughes & Leavey, 2012). External to the identity of the athlete, unique environmental stressors such as the "win at all costs" mentality that is present within sport culture may also cause athletes to experience pressure from coaches, parents, administrators, and fans to perform at a consistently high level (Kihl, 2007). Each level of sport participation also brings its own specific obstacles, such as job security and geographic relocation at the elite level, and academic stress and issues in adjustment to campus lifestyle at the collegiate level (Etzel, 2009; Rice et al., 2016). Failure to navigate these and other obstacles effectively may negatively impact the mental health and wellbeing of these athletes (Etzel, Ferrante & Pinkney, 2002).

In addition to these unique stress factors, other key components which might differentiate athletes from non-athletes regarding mental health are attitudes, stigma, and help seeking behavior. Even though athletes and non-athletes demonstrate similar prevalence of mental health difficulties, the way they think about and behave regarding mental health can be quite different.

For example, stigma against mental health and seeking help for mental illness has been shown to be higher for athletes compared to non-athletes (Kaier, Cromer, Johnson, Strunk, & Davis, 2015). It is possible that mental health issues go unattended in athletes due to this stigma, as stigma and attitudes towards mental health services can influence athletes' likelihood of seeking help. For example, Goodwin (2017) found that student-athletes were more likely to seek mental health services if they had positive attitudes toward seeking help, as well as low levels of self-stigma. Negative perceptions and behaviors toward mental health may be the result of an athletic culture, which holds the minimization of perceived weakness as paramount (Reardon & Factor, 2010). For some athletes, the idea that they could benefit from psychological services means they are not mentally tough (Birky, 2007). This idea was well-articulated by Bauman (2016), who posited the idea that "Mental toughness and mental health are seen as contradictory terms in the world of elite performance" (p. 1).

Wellbeing

When considering the holistic athlete, one's mental health is a small piece of a much larger puzzle. The lack of significant mental illness or emotional distress such as anxiety or depression does not necessarily indicate that a person is thriving or experiencing the quality of life they desire; this falls in the domain of wellbeing. Wellbeing is a somewhat abstract concept, and researchers have struggled to come to a consensus on a standard definition, though many components have been identified (Dodge, Daly, Huyton, & Sanders, 2012). Wellbeing can also have different meanings in different contexts (e.g., social, financial, spiritual, athletic, etc.), which is partly the reason for the lack of consensus. When examining wellbeing in the broadest sense, however, two distinct perspectives exist within the research literature: hedonic and eudaimonic. The presence of happiness along with a lack of negative affect characterizes hedonic

wellbeing (Diener, 2000). Individuals are considered "well" hedonically when they experience pleasure and satisfaction. Alternatively, the purposeful fulfillment of basic psychological needs and human development is considered eudaimonic wellbeing (Ryff, 1989). Individuals are considered "well" in the eudaimonic sense when they are realizing their potential or achieving positive personal growth. In the case of athletes, sport wellbeing can be a mixture of these two concepts and is another area that can affect their overall sense of wellness. For example, Foster (2017) found a moderate, positive correlation (r = .674) between sport wellbeing and global wellbeing. Similar to athletes' mental health, sport wellbeing can be influenced by overtraining, injury, burnout, coach-athlete relationships, team cohesion, motivational climate, and several other factors (Foster, 2017). This indicates that the athletic environment plays a critical role in determining not only the presence or absence of emotional distress, but also of athletes' experience of happiness, fulfillment, and personal growth.

Considering the potential stressors and threats to psychological health involved in athletics, there is an effort to recognize, address, and prevent mental health concerns in the athletic population. For example, the NCAA recently mandated that all schools within power five conferences (i.e. ACC, Big Ten, Big 12, PAC-12, SEC) make mental health services readily available within athletics departments and/or through university counseling centers, in addition to the distribution of psychoeducational materials and directions to access services (Hosick, 2019). At the elite level, NBA players like Kevin Love and Royce White have recently made their struggles with mental health public via mass-media (Hagen, 2018; Love, 2018). As more attention shifts toward the psychological health of athletes, evidence-based interventions aimed at addressing these issues are becoming increasingly valuable and coveted. One such intervention is mindfulness. The International Society of Sport Psychology's position stand

(2017) states "currently, mindfulness-based interventions and resilience training are at the forefront to increase athletes' resistance to stress, improve stress-coping related to sport and life, bolster general well-being, reduce subclinical and clinical conditions, and optimize performance efforts" (p.12). Given that mindfulness-based interventions (MBIs) are being tasked with addressing this myriad of performance and mental health-based objectives, it is critical that their efficacy for doing so is well documented in the literature. A closer look at some select interpretations of the definition and goals of mindfulness training may suggest why MBIs are considered by some to be a viable option to improve athletes' mental health and performance simultaneously.

Mindfulness

Mindfulness has been defined as "paying attention in a particular way, on purpose, to the present moment, and nonjudgmentally" (Kabat-Zinn,1994, p.4). The overarching goal of mindfulness interventions has been described as the development of a mindset in which a person is able to more consistently live in the present moment, with all of the thoughts, emotions, and sensations that accompany it (Zizzi & Andersen, 2017). This is purported to be accomplished by first practicing the skills of channeling, sustaining and regaining attention, and then by modifying the relationship that a person has with their internal experiences, rather than attempting to change the content, intensity, or frequency of the internal experiences themselves (Gardner & Moore, 2007). Mindfulness is commonly introduced, explained, and practiced through meditation (Baer, 2003), and like many psychological constructs, is thought to exist at both the state and the trait level (Medvedev, Krägeloh, Narayanan, & Siegert, 2017). Many mindfulness-based interventions (MBIs) attempt to induce state mindfulness, while

simultaneously increasing trait mindfulness through repeated practice (Kabat-Zinn, 1990; Gardner & Moore, 2012; Segal, Williams, & Teasdale, 2002).

Shapiro, Carlson, Astin, and Freedman (2006) identified three core axioms of mindfulness: intention, attention and attitude. Intention represents the "why", or reason for engaging in mindfulness; something that can evolve over time and influence the outcomes of the practice. Attention is described as the focus on one's conscious experience in the present moment, both internally and externally. Finally, attitude refers to how someone attends to the present moment. The two necessary attitudinal qualities for mindfulness are non-judgement; the decision not to assign a positive or negative valence to one's experiences, and acceptance; the choice to embrace one's experience (no matter how comfortable or uncomfortable) and not strive to change it in any way. Together, Shapiro and colleagues (2006) posit that these three fundamental components act as the mechanisms by which mindfulness creates positive change; for example, by altering the way a person relates to emotional distress.

When considering mindfulness as a potential tool to address and prevent mental health issues in athletes, there is room for optimism as MBIs have garnered strong support in related fields. MBIs have proven to be impactful in treating emotional distress issues, as well as improving overall wellbeing. For example, in their broadly scoped review of MBI meta-analyses, McAlarnen and Longshore (2017) found that MBIs demonstrated effectiveness in reducing anxiety and depression in both clinical and nonclinical populations. MBIs have also demonstrated effectiveness in improving both hedonic and eudaimonic wellbeing in a wide variety of populations, such as teachers and cancer patients (Aghaie, Roshan, Shaeeri, Mohamadkhani, & Gholami-Fesharaki, 2018; Lomas, Medina, Ivtzan, Rupprecht, & Eiroa-Orosa). One can assume that athletes may experience the same benefits of MBIs on wellbeing

and emotional distress factors, though the contextual factors that make athletes different from the general population, as well as differences in the aims of MBIs when utilized in the sport context may have the potential to alter these effects.

MBIs in Sport

The key distinction between MBIs in sport versus those outside of sport is the intention to improve athletic performance. The original goal of mindfulness, to live in the present moment with acceptance in a non-judgmental manner, remains the same when utilized with athletes, however, theorists of MBIs in sport posit that the achievement of this goal in a performance context will result in performance gains (Gardner & Moore, 2004). Mindfulness is theorized to improve performance by promoting greater attentional focus and control, emotion regulation, and meta-cognitive awareness during competition (Birrer, Röthlin, & Morgan, 2012; Gardner & Moore, 2012; Kaufman, Glass & Arkenov, 2009). Researchers have also found that MBIs in sport can improve targets that can indirectly improve performance such as flow, sport anxiety, and physiological outcomes like heart-rate variability (Bühlmayer, Birrer, Rothlin, Faude, & Donath, 2017). This fundamental intention in sport psychology research and practice to employ mindfulness primarily as a method to enhance performance and performance-relevant variables is further evidenced by the juxtaposition to and comparison of MBIs with traditional mental skills interventions like imagery, positive self-talk techniques, pre-performance routines, and arousal regulation techniques (Gross, Gardner, Mark, & Wolanin, 2015). Although the foundational philosophical components (presence, non-judgment, acceptance) are still incorporated in these MBIs, differentiating them from many traditional mental skills techniques, they are directed at improving athletes' performance. Outcomes outside of the performance context are generally considered a more secondary target.

MBIs in sport have taken many forms, though protocols such as the Mindfulness-Acceptance-Commitment (MAC) approach (Gardner & Moore, 2004), Mindful Sport Performance Enhancement (MSPE) (Kaufman, Glass & Arnkoff, 2008), and Mindfulness meditation training for sport (MMTS) (Baltzell & Akhtar, 2014) have been developed specifically for use with athletes. These MBIs have been administered to youth sport, high school, collegiate, and professional athletes, and are specifically designed to help them translate and apply the principals of mindfulness to competition. Despite strong correlational relationships with several performance-relevant variables, however, MBIs have demonstrated equivocal effectiveness in enhancing sport performance (Sappington & Longshore, 2015). Given the relative novelty of mindfulness research in sport psychology, however, a lack of quantity and methodological rigor of studies has limited this line of inquiry. Some believe this lack of support may be because the field of sport psychology has 'put the cart before the horse', selling mindfulness as a tool for performance enhancement even though this was never an intended target in its roots outside of sport (Zizzi & Anderson, 2017).

When thinking of the mental health and wellbeing of athletes, the primary intention of MBIs in sport may have important implications for the outcomes of these interventions. As previously mentioned, Shapiro and colleagues (2006) posited that mindfulness functions chiefly through intention, attention and attitude. In Kabat Zinn's (1992) definition of mindfulness as "paying attention, in a particular way, on purpose" the intentional component is reflected in the words "on purpose". The potential significance of the "why" behind mindfulness practice is clearly demonstrated in Shapiro's (1992) study examining the intentions of meditators. Here, Shapiro revealed that intentions were strongly associated with outcomes. Those intending to improve self-regulation did so more than other participants with different intentions. Similarly,

those intending to improve self-exploration demonstrated enhanced self-exploration outcomes compared to meditators with different intentions. This lends evidence to the possibility that the intention to enhance performance, generally the most salient goal when MBIs are utilized with athletes, may result in different emotional distress and wellbeing outcomes for athletes when compared with non-athletes.

CHAPTER II

As the issue of athlete mental health becomes more prominent, it is imperative that the interventions used to address this problem, like mindfulness, are well supported with solid empirical evidence. Furthermore, focusing solely on the alleviation of emotional distress and mental health issues does not necessarily indicate that athletes are "well". In parting from this problem-focused biomedical approach, a more comprehensive understanding of MBIs' impact on athletes' psychological health, which includes both hedonic and eudaimonic aspects of wellbeing, is necessary. While MBIs have the potential to positively impact all of these domains, and have done so effectively in other populations, a review of the existing evidence in the sport psychology literature will help inform practitioners, researchers, decision makers, and athletes as to what they can expect from MBIs in sport.

Purpose

MBIs' effectiveness for improving wellbeing and reducing emotional distress is well-documented in both clinical and non-clinical populations. Although mindfulness has been shown to be effective with these populations, less is known about the specific effects for athletes. The effects of MBIs for athletes may be different given that the intention for MBIs in the sport context is typically to improve performance, whereas in most non-athletic contexts it is not. Furthermore, athletes are a distinct population who possess unique factors on which their

wellbeing and mental health can depend, therefore MBIs may affect them differently. At this time, there appears to be no evidence of a review of the literature or compilation of evidence regarding MBIs and their impact on wellbeing or emotional distress in the athletic population, therefore, this study sought to conduct a systematic review of the literature to fill an important gap in knowledge. Given that wellbeing is a multidimensional construct, this review also sought to include both hedonic and eudaimonic outcomes to capture the most thorough perspective on athlete wellbeing as possible.

Research Questions

The proposed systematic review was driven by the following research questions: 1) What impact do mindfulness-based interventions have on athletes' wellbeing and emotional distress outcomes? 2) Is there a difference between athletes and non-athletes in terms of these emotional distress and wellbeing outcomes? 3) Do sport-specific MBIs yield different results on the outcomes of interest compared to non-sport specific MBIs?

CHAPTER III

METHODS

Literature Search

Methods for this study were primarily based off Lomas and colleagues' (2017) systematic review of the impact of mindfulness on the wellbeing and performance of educators. In order to obtain a broad understanding of the impact of mindfulness interventions on athlete wellbeing and mental health, a systematic review was conducted. This review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher, Liberati, Tetzlaff, & Altman, 2009). In order to find and review relevant studies, a search strategy was formulated based off the guidelines presented by Aromataris and Riitano (2014). A search of

relevant literature was conducted using the University of Kentucky Libraries InfoKat platform. PsycINFO and SPORTDiscus were the specific electronic databases searched. Grey literature was searched for using the Google Scholar platform. Keywords included mindful OR mindfulness OR MBI OR mindfulness-based intervention OR MAC OR MSPE AND wellbeing, OR mental-health, OR anxiety, OR stress, OR depression. Studies from the beginning of records to 12/28/19 were eligible for review.

Eligibility Criteria

One researcher independently assessed the eligibility of each retrieved study based on the title and abstract. If the information was unclear, the full-text article was screened. The included studies were required to meet the following inclusion criteria: 1) the study must have been empirical in nature: randomized control trials, non-randomized control trials, quasi-experimental studies, intervention comparison studies (i.e. mindfulness vs PST), case studies, and pilot studies were considered for this review. 2) Due to the developing nature of empirical mindfulness studies in sport, reviewing studies with only a targeted population of athletes would limit the potential for an effective review; therefore, athletes of all ages, skill levels, and sport types were eligible for inclusion in this study. 3) Interventions must have been considered a valid representation of mindfulness. Any structured mindfulness-based intervention designed for sport performance enhancement or otherwise was eligible. Studies with purely meditation-based interventions which do not emphasize the philosophical components of mindfulness (acceptance, non-judgment) were not eligible. 4) Outcomes must have included any measure of wellbeing (hedonic or eudaimonic), mental health, depression, or anxiety. 5) Studies must have been published in the English language. Exclusion criteria were theoretical articles, non-intervention studies, or commentaries without statistical or quantitative analyses.

Data Extraction

Data was extracted following a standardized template. The following elements were extracted from each included study: study author and date, study type and design, objective of the study, sample/control group size and characteristics, nature of control (if applicable), type of MBI, sport specificity of MBI, length of MBI, sport type of participants, competitive level of participants, wellbeing and/or mental-health outcomes studied, significance levels of outcomes, and effect size (if presented). Mindfulness, mental health (e.g., anger, anxiety, burnout, depression, distress, stress) and wellbeing (life satisfaction, burnout) were the primary outcomes of interest extracted. In order to compare the outcomes of interest in this review to the emotional distress outcomes in the non-athlete population, data from McAlarnen and Longshore's (2017) meta-analysis of MBI meta-analyses was utilized.

Quality Appraisal

To assess the quality and bias of the included studies, the McMaster Quantitative Appraisal Tools was utilized (Kahn, Kunz, Kleijnen, & Antes, 2003). This tool consists of 15 domains which are allocated a score (1 = Yes; 0 = No or not addressed). Categories for the domains were: study purpose, literature review, study design, sampling, data collection, data analysis, overall rigor, and conclusions and implications. Scores were totaled to compile a critical appraisal score for each included study, with potential scores ranging from 1 to 15.

CHAPTER IV

RESULTS

Search results

The search of the literature yielded 358 potentially relevant studies. After assessment according to inclusion criteria, 345 articles were excluded. See Figure 1 for an overview of the

search process. Several correlational studies examined the relationship between mental health outcomes and dispositional mindfulness with no mindfulness intervention taking place. Other studies conducted an MBI but were excluded as they only examined sport performance outcomes and none relating to emotional distress or wellbeing. A total of 13 studies were identified as being eligible for review. Table 1 provides an overview of the included studies and their characteristics. The following sections will be categorized using the PICO method.

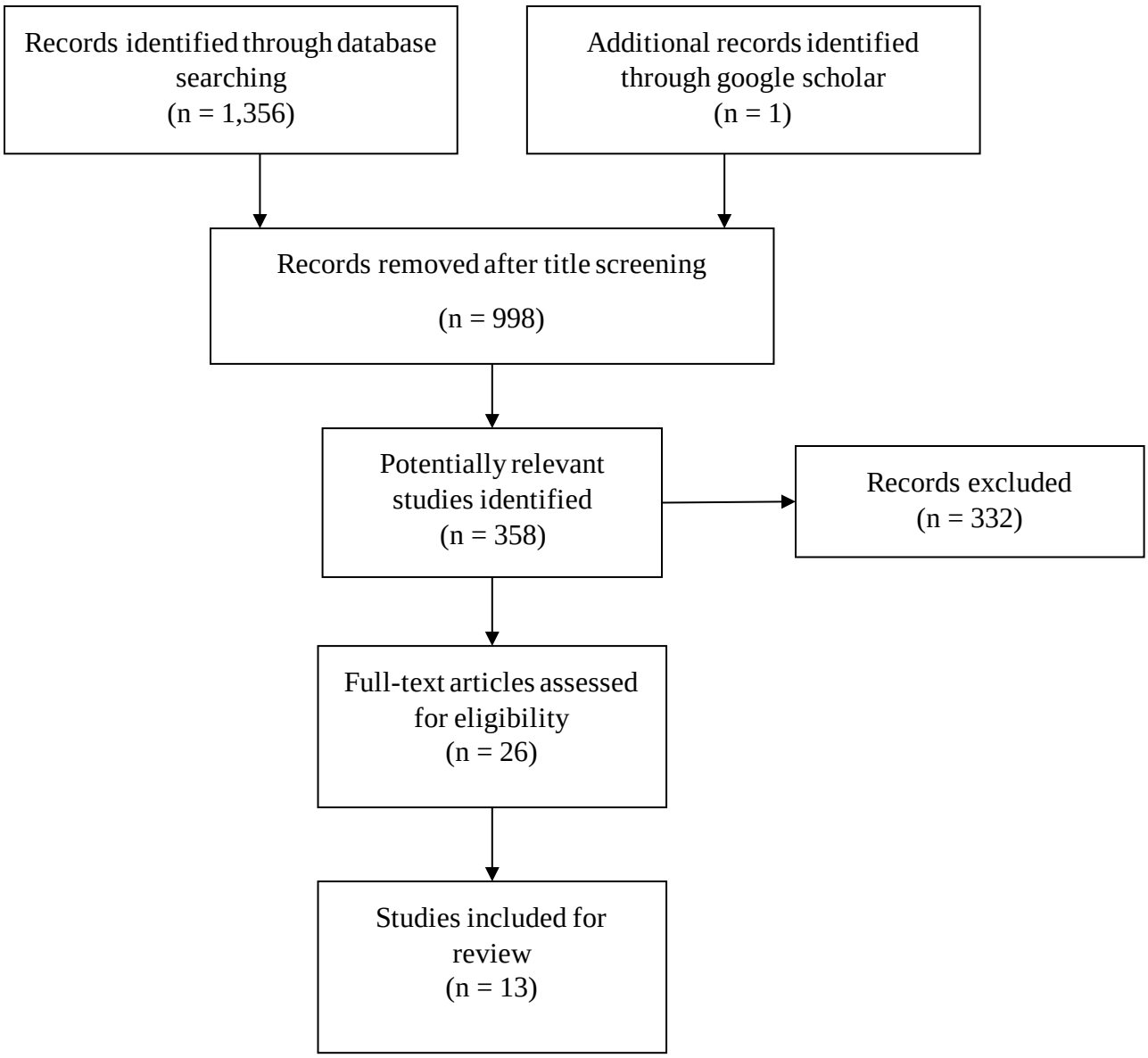

Figure 1.

Population

The overall sample size for all included studies was (n = 387). Participants were athletes from a variety of sports, with basketball being the most common across studies. Competitive level of participants also varied from recreational (De Petrillo et al., 2009) to the national level (Mehrsafar et al., 2019). Three studies (Baltzell & Akhtar, 2014; Goodman et al., 2014; Vidic,St.

Martin, & Oxhandler, 2017) examined outcomes for NCAA D1 student-athletes, and three studies (Glass et al., 2019; Gross et al., 2018,; Vidic, St. Martin, & Oxhandler. 2018) examined outcomes for NCAA D3 student-athletes. Athletes from a diverse set of countries including the United States, China, Iran, and Norway were participants in the reviewed studies.

Intervention

A variety of mindfulness-based interventions were employed across studies. Mindful Sport Performance Enhancement (MSPE) and the Mindful Acceptance Commitment (MAC) approach were the most common and second most common MBIs used respectively. Several studies utilized yoga or other supplemental practices in addition to mindfulness training. Length and quantity of training sessions varied, with some models taking a more brief approach (MMTS; Baltzell & Akhtar; 2014) with 30 minute sessions to accommodate athletes' busy schedules, while others took a more in-depth approach and opted for sessions up to two hours in length.

Comparison/Control

Nine studies utilized control groups. Control conditions varied from waitlist, to training as usual, and one study (Gross et al., 2018) compared a mindfulness experimental group to a control group who underwent traditional psychological skills training.

Outcomes

Data on the effect of MBI's on outcomes of interest are presented in Table 2. This table depicts whether outcomes either showed significant improvement as a result of the MBI or did not significantly change as a result of the MBI. An outcome was considered to have significantly

improved if $p < .05$. Only one study (Kaufman, Glass, & Arnkoff, 2009) resulted in a worsened outcome (increased perfectionism).

Table 1. Overview of included studies

Author(s)	Design	Expt. group	Control group	Nature of control	Type of MBI	Sport specific MBI?	Length of MBI	Sport type	Primary outcome(s)
Baltzell & Akhtar (2014)	RCT	19	23	non-active	MMTS	Yes	6 weeks	Soccer	PI > mindfulness ($p < .01$). PI >< psychological wellbeing, satisfaction with life, and positive/negative affect.
Chen et al. (2019)	Pilot	23	n/a	n/a	MSPE	Yes	4 weeks	Baseball	PI >< anxiety, depression, & mindfulness. PI > cognitive anxiety in competitive anxiety (P=0.056), global eating disorder (P=0.009), and flow state (P=0.001).
De Petrillo et al. (2009)	Open Trial	13	12	waitlist	MSPE	Yes	4 weeks	Long distance runners	PI < worry (subscale of sport anxiety), personal standards & parental criticism (perfectionism subscale). PI > Act with awareness (mindfulness subscale). PI >< global sport anxiety, global perfectionism, global mindfulness.
Glass et al. (2019)	RCT	23	29	waitlist	MSPE	Yes	6 weeks	Multiple sports	PI < cnt. depression ($p = .016$, $d = .49$), sport-related worry ($p < .05$, $d = -.47$). PI > satisfaction with life ($p < .05$, $d = .60$), observing & describing (mindfulness subscales), and flow subscales. PI >< anxiety, depression, stress, global mindfulness, psychological flexibility & global sport anxiety.
Goodman et al. (2014)	Pilot	8	13	non-active	Modified MAC	Yes	5 weeks	Basketball	PI < stress ($p < .05$, $d = 0.26$). PI > mindfulness ($p < .05$, $d = 0.48$), goal directed energy ($p < .05$, $d = 0.98$) importance of valued living ($p = .09$, $d = 0.76$.), PI >< depression & anxiety.
Gross et al. (2018)	RCT	11	11	PST protocol	MAC	Yes	7 weeks	Basketball	PI < distress ($p = .01$), generalized anxiety ($p = .00$), substance use ($p = .01$), eating concerns ($p = .01$) & hostility ($p = .01$). PI > psychological flexibility ($p = .04$). PI >< depression, social anxiety, mindfulness & academic distress.
Kaufman et al. (2009)	Open Trial	32	n/a	n/a	MSPE	Yes	4 weeks	Archers and Golfers	PI >< sport anxiety & global perfectionism. PI > dispositional optimism (sport confidence subscale ($p < .05$) & mindfulness ($p < .01$). PI < parental expectations (perfectionism subscale)! ($p < .05$).

MacDonald & Minahan (2018)	RCT	8	8	waitlist	Smiling Mind (Smartphone Application)	No	8 weeks	Wheelchair Basketball	PI < sCort (stress) ($p < .05$).
Mehrsafar et al. (2019)	Pilot	13	13	waitlist	MBI created for this study	Yes	8 weeks	Wushu	PI < daily sCort (stress), ($p = .001$) & competitive anxiety ($p < .001$). PI > self-confidence ($p < .001$) & mindfulness ($p < .001$).
Moen, Abrahamsen, & Furrer (2015)	RCT	23	27	non-active	MBI created for this study	No	12 weeks	Multiple sports	PI < burnout ($p < .000$, $\eta 2=.24$). PI >< perceived stress, mindfulness, & satisfaction with progress in school/sport.
Scott-Hamilton, Schutte, & Brown (2016)	RCT	27	20	non-active	MBI created for this study	Yes	8 weeks	Cycling	PI < sport anxiety ($p = .004$, $d = .61$). PI > mindfulness ($p < .001$, $d = .75$). PI >< sport pessimism.
Vidic, St. Martin, & Oxandler (2017)	Convenience sample	13	n/a	n/a	MBI created for this study	No	16 weeks	Basketball	PI < perceived stress ($p = .016$, $d = .27$). PI > athletic coping ($p < .00$, $d = .68$).
Vidic, St. Martin, & Oxandler (2018)	Convenience sample	18	n/a	n/a	MBI created for this study	No	9 weeks	Soccer	PI >< perceived stress.

Note. < = decreases in; > = increases in; >< = no change in; expt = experimental group; cnt = control group; PI = post-intervention; MSPE = mindfulness sport performance enhancement; MMTS = mindfulness meditation training for sport; MAC = mindfulness-acceptance-commitment. MM = mindfulness-based intervention; N/A = not applicable; RCT = randomized controlled trial;! = mindfulness associated with worsened outcome.

Table 2. Summary of key outcomes

Outcome	Number of studies	Significant improvement related to MBI	No significant change related to MBI
Anxiety	4	1	3
Anxiety (sport-specific)	6	3	3
Athletic coping/Burnout	2	2	0
Depression	4	0	4
Eating disorder/concerns	2	2	0
Hostility	2	2	0
Mindfulness	10	5	5
Negative and positive affect	1	0	1
Perceived stress/distress	7	3	4
Perfectionism	2	0	2
Psychological well-being	1	0	1
Satisfaction with life	2	1	1
sCort (stress)	2	2	0
Substance use	1	1	0

Note. Significant improvement = $p < .05$

Quality Appraisal

The included studies' scores according to the McMaster critical appraisal tool ranged from 8 (lowest) to 15 (highest), with a mean score of 11.76. Many studies were deducted points due to poor justification of the sample size, insufficient reporting about the avoidance of contamination and co-intervention, and a lack of information pertaining to drop-out participants.

CHAPTER V

DISCUSSION

Results from the systematic review demonstrate that the impact MBIs have on athletes' wellbeing and emotional distress outcomes do not yet have evidence to support their effectiveness. For example, of the four studies which examined the effect of an MBI on depression, none produced a significant improvement on this dimension of mental health. Studies which examined the other primary emotional distress outcome of interest, anxiety, garnered little support with only one out of four studies showing significant improvement (Gross et al., 2018). Furthermore, only two studies examined global measures of wellbeing (Baltzell & Akhtar, 2014; Glass et al., 2019) and just one found improvements in athletes' satisfaction with life (Glass et al., 2019).

These results suggest that there is currently little evidence to support MBIs as being consistently effective in reducing emotional distress and improving psychological wellbeing outcomes in the athlete population. This conclusion, however, is tempered by the fact that the philosophical underpinnings of mindfulness do not promote a change in the quantity or quality of emotional or cognitive phenomena themselves, but rather a change in the relationship an individual has to these experiences (Kabat-Zinn, 1994). Interestingly, relatively few studies employing MBIs with athletes examined mental health or wellbeing outcomes. The majority of studies focused on how MBIs affect performance or performance relevant variables, with mental health variables being a secondary outcome of interest aside from a few select studies. However, all articles reviewed were published from 2009 onward which suggests this line of inquiry is in relatively early stages.

Given that MBIs in domains other than sport often target emotional distress and wellbeing outcomes, a primary research question of this systematic review was to examine if these outcomes were different for athletes compared to non-athlete populations. McAlarnen and Longshore (2017) reviewed meta-analyses of MBIs in both clinical and non-clinical sections of the general population and their results formed the basis for this comparison. Findings indicated that MBIs were effective in reducing depression, as 60% of meta-analyses reported effect sizes in the medium range (d = .50). The level of evidence was of medium quality (as defined by the number of RCTs in the review), medium-high quantity (as defined by the number of meta-analyses on the specific outcome measured), and high consistency (as defined by the percentage of meta-analyses in the same effect size range). The review also concluded that MBIs "... appear to be fairly consistent, robust, and effective in the reduction and management of anxiety and stress in both clinical and non-clinical populations" (p. 40). Of the effect sizes reviewed, McAlarnen and Longshore found that 22 of 32 fell in the medium to high range and the overall level of evidence was of medium quality, high-medium quantity, and medium consistency. In comparing these results to those of the current review, it is evident that MBIs for athletes did not garner a similar level of support. According to the standards for evidence used by McAlarnen and Longshore, results from the current study were of low quantity and high consistency as only one of four studies which examined anxiety showed significant improvement, and zero of four studies which examined depression showed significant improvement. Additionally, quality appraisal scores indicated that the studies included in this review were of medium to high-medium quality. This comparison between reviews must be taken with caution, however, as McAlarnen and Longshore's review (2017) had a much larger pool of data from which to draw

conclusions. It is therefore possible that MBIs used with athletes could receive enhanced support in the future if more research is conducted.

An additional line of inquiry in the current systematic review sought to examine if sport-specific MBIs produced different outcomes compared to non-sport-specific MBIs. The majority of studies reviewed (n=9) employed sport-specific MBIs, meaning the MBI was designed specifically for use with athletes. Studies which utilized sport-specific MBIs examined 57 outcomes of interest, and produced significant improvement on 54% of them. Studies which utilized non-sport-specific MBIs examined 8 outcomes of interest and produced significant improvement on 50% of them. Therefore, sport-specific MBIs did exhibit more significant effectiveness compared to non-sport specific MBIs, though studies with sport-specific MBIs examined a sizable proportion of outcomes and the overall difference was not large. The fact that sport-specific MBIs demonstrated more significant improvement on emotional distress and wellbeing outcomes may suggest that tailoring MBIs to the athlete population could be a superior approach as opposed to MBIs which do not target a specific population. Further, that the majority of studies reviewed employed sport-specific MBIs points to a trend in the field which favors this more targeted approach.

Anxiety confined solely to the sport context, or sport-specific anxiety, was an outcome of that was only measured in studies which employed sport-specific MBIs. This suggests that studies employing sport-specific MBIs tend to examine sport-specific outcomes. While results were equivocal in this domain (three studies showed significant improvement and three showed no significant change), sport-specific anxiety garnered more significant improvement than generalized anxiety resulting from MBIs. This finding is interesting when considering Shapiro's (1992) study, which demonstrated that intention of mindfulness practice influences the degree to

which targeted outcomes are affected. It may be that because sport-specific MBIs frame mindfulness practice primarily as a performance enhancing tool, outcomes relevant to the performance domain (like sport-specific anxiety) showed greater improvement compared to outcomes associated with more tertiary intentions (like improving anxiety outside of sport).

A factor similar to anxiety, stress, was the most common outcome measured across studies aside from mindfulness. This is possibly due to the potential for severe stress to negatively impact athletic performance (John et al., 2011). This systematic review revealed that stress garnered strong support compared to other outcomes, with two of two studies examining cortisol showing significant reductions, and three of seven studies examining perceived stress showing significant reductions. It is worth noting that according to the Cognitive Activation Theory of Stress (CATS; Ursin & Eriksen, 2004), stress itself is not necessarily detrimental to wellness. This is important to consider when thinking of how mindfulness promotes coping through acceptance and defusion from cognitive and affective responses like stress, rather than direct control or reduction of them. Stress, however, can become harmful if it is overly intense or if it persists over time without allowing the individual an opportunity to recuperate. Research has shown that student-athletes can experience hyperactive levels of stress in attempting to manage both athletic and academic demands (Watson & Kissinger, 2007), so MBIs may be particularly helpful in providing a stress coping resource for this particular subset of the athletic population.

Although global measures of wellbeing did not demonstrate a wealth of significant improvement, certain variables associated with enhanced wellbeing did show some promise. For example, MBIs were found to significantly impact hedonic factors such as dispositional optimism and sport-related pessimism, as well as eudaimonic factors like goal directed energy, and the importance of valued living. As previously mentioned in the introduction section of this

article, hedonic wellbeing can be considered the presence of positively valent emotions (e.g. happiness) and a lack of negative affect (Diener, 2000). The study by Baltzell and Akhtar (2014) revealed no significant increase in hedonic components of wellbeing such as positive affect, as well as no significant decrease in negative affect. The control group in this study did show a significant increase in negative affect at post-test compared to the mindfulness group, however, so it is possible that mindfulness has a preventative effect. Similarly, in their RCT MacDonald and Minahan (2018) found that both the mindfulness and control groups experienced a rise in cortisol (stress) levels when entering the start of their competitive season, however the mindfulness group's levels rose significantly less than that of the control groups. Therefore, it may be the case that MBIs can serve as a brake for natural declines in hedonic wellbeing and may even improve some aspects of eudaimonic wellbeing.

Similarly, in terms of prevention, at the outset of this study it was noted that athletes exhibit higher rates of binge drinking behavior and eating disorders compared to the general population. Findings from this review indicated that MBIs may be effective in confronting these issues in the athlete population. Two studies (Chen et al., 2019; Gross et al., 2018) found that mindfulness training significantly reduced symptomology of eating disorders. Additionally, although only one study (Gross et al., 2018) examined the effect of an MBI on substance abuse, this outcome was significantly improved. These findings are promising given the particular difficulty athletes have in these domains.

It is important to note that not all studies included in this review measured mindfulness (state or trait). This is significant in that it creates ambiguity regarding the validity of the MBI that was used and whether it actually achieved the underlying objective it set out to which is to increase mindfulness. Furthermore, only 5 of 10 studies showed significant improvement in

global measures of mindfulness, though many did show significant increase in specific subscales. A lack of evidence supporting the ability of MBIs to increase mindfulness in some studies could help explain the relative paucity in evidence for the reduction of emotional distress and increase in wellbeing. Shapiro and colleagues (2006) posited that decentering, or the ability gain awareness and distance from one's internal experience, acts as a key mechanism by which mindfulness practice creates change. Therefore, it may be the case that some MBIs in this review did not promote the activation of certain elements of mindfulness necessary to produce significant improvements on outcomes of interest.

Recommendations for Future Research

The overall paucity of studies on the effect of MBIs on athletes' wellbeing and emotional distress levels indicates that more research is needed to make a definitive conclusion regarding their effectiveness for athletes. Future researchers should to continue to examine mental health and wellbeing outcomes, particularly as primary outcomes of interest rather than secondary to performance outcomes. It would be particularly useful to understand how the intention for using MBIs differs from an athlete's perspective depending on whether they see it as a performance enhancing intervention, a tool for mental health, or both. A comparison study which features a sport-specific MBI condition and a non sport-specific MBI condition, measuring mental health outcomes and the athlete's perceived intention for utilizing mindfulness may help determine if tailoring an MBI to athletes truly effects the impact these interventions have on their mental health.

Given that many studies did not reveal significant changes in mindfulness, it may be beneficial for future studies to conduct a manipulation check on state mindfulness. As previously

mentioned in the literature review section, MBIs generally attempt to induce state mindfulness repeatedly through meditation as a means to increase trait mindfulness over time. Future researchers may consider measuring brainwave activity during mindfulness practice using an electroencephalogram (EEG), specifically checking for the presence of increased alpha and theta waves. This type of brainwave activity has been shown to be associated with state mindfulness, and their presence during mindfulness practice would allow researchers to be more confident that their intervention is achieving the desired effect (Lomas, Ivtzan, & Fu, 2015). It is also recommended that more studies investigate the effectiveness off app-based mindfulness intervention delivery compared to the more traditional in-person approach, as only one study reviewed used this methodology. Utilizing technology may increase the number of opportunities athletes have to practice mindfulness on their own time, an especially important factor when thinking of collegiate athletes' busy schedules balancing academic, athletic, and social demands. Furthermore, this review did not examine the impact that the timing of the MBI had on emotional distress and wellbeing outcomes. Future research could compare the effectiveness of MBIs in-season versus during the off-season.

Assuming that future MBIs can successfully induce state mindfulness and increase athletes' dispositional mindfulness, it could be useful to shift the perspective through which MBIs are viewed as "effective" regarding emotional distress. As opposed to using measures which capture athletes' quantitative levels of symptomatology for anxiety and depression, measures which gauge the degree to which an athlete has changed their relationship to uncomfortable thoughts and affective states may be more telling. The Acceptance and Action Questionnaire (AAQ-2; Bond et al., 2011) which measures psychological flexibility may be particularly useful in this regard. This approach would theoretically be better aligned with the

philosophy of mindfulness, which forgoes control over psychological events in favor of acceptance and non-judgment. This notion also has implications for how applied sport psychology practitioners describe the benefits of mindfulness to athletes, as language such as "reduction" or "improvement" may mislead those who would view it in the same vein many traditional PST interventions.

Finally, future research might also do well to focus on the contextual factors specific to athletes that may moderate the effects of MBIs. As mentioned at the outset of this study, several unique factors affect athlete's mental health and wellbeing, so it would be interesting to know how much these variables account for in the difference between MBIs' effect on athletes versus the general population. A comparison study measuring mental health outcomes which employs the same MBI for an athlete group and a non-athlete group may be a more direct way researchers could understand how mindfulness affects these different populations. Studies that investigate athlete identity, help-seeking stigma, and burnout in the context of an MBI may be particularly fruitful avenues of inquiry. Particularly, it could be useful to understand the degree to which stigma athletes have towards sport psychology and mental health interventions plays a role in how effective MBIs can be. Furthermore, the promising results regarding reductions in binge-drinking and eating disorders resulting from MBIs warrant examination of the mechanisms by which this change occurs.

Limitations

Results and interpretations of this study must be taken with caution given the following limitations. Firstly, given the fact that this systematic review was undertaken by one researcher, a large number of databases were not able to be searched. Additionally, one researcher was able to screen for and determine eligible studies, whereas in many other systematic reviews this process

is repeated by a second researcher. Finally, given that this review's inclusion criteria dictated that studies be published, as well as written in the English language, it is possible that valuable data were missed, which could have better informed this study. However, given that publication bias typically selects for studies with significant results, it is likely that excluded studies would have added additional support to this review's findings that MBIs do not often significantly change athletes' emotional distress or wellbeing outcomes.

Conclusion

Overall, findings from this systematic review on the impact of mindfulness-based interventions on athletes' emotional distress and wellbeing outcomes indicate that there is currently a lack of evidence to support their effectiveness in fostering improvement in these domains. The lack of cultivation of dispositional mindfulness as a result of the MBI in some studies suggest that key mechanisms which facilitate change may not have been activated, which could explain their lack of effectiveness. That said, MBIs do show promise in reducing stress and sport-specific anxiety, as well as in improving specific subcomponents of wellbeing. Furthermore, preliminary evidence suggests that MBIs may be a useful tool for addressing substance abuse and symptomology of eating disorders in athletes, which is specifically relevant given the increased rates in this population. A final note of importance in the current study is that while a reduction in emotional distress and improvement in wellbeing for athletes is a desired outcome for many, these goals are somewhat antithetical to the ethos of mindfulness. Given that mindfulness practice is intended to change an individual's relationship with their internal experience rather than to change the internal experience itself, in some ways attempting to find evidence for a reduction or improvement in certain outcomes may be an incompatible approach. In the words of the original pioneer of mindfulness in western psychology, Jon Kabat-Zinn

(1994), “Meditation is the only intentional, systematic human activity which at bottom is about not trying to improve yourself or get anywhere else, but simply to realize where you already are.”

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