Mindfulness and Sport Participation in College Students

A Senior Honors Thesis

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Abstract:

Mindfulness is the increased ability to be aware and attentive to what is happening in the moment. The concept of mindfulness embodies being conscious of the present and not being in an automatic mode. Mindfulness training could have a positive impact on athletic performance, injury prevention, and recovery time in athletes, but differences among mindfulness levels in athletes is currently not well understood. The purpose of this study was to examine levels of mindfulness among athletes versus non athletes as well as examine whether differences in mindfulness exist between individual sport athletes and team sport athletes. Undergraduate student volunteers (n= 398) completed questionnaires to assess mindfulness and sport participation. Data analysis was conducted to determine whether differences in mindfulness exist between athletes and non-athletes and between individual versus team sport athletes. No significant differences in mindfulness were found based on athletic status. A significant difference was found based on gender, however; males in the sample reported higher levels of mindfulness than females. Further research should focus on self identified athlete status compared to researcher identified athlete status. Researchers should continue and look at these paradigms of mindfulness and athlete status to understand the potential for mindfulness-based interventions to enhance recovery and performance among athletes.

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Introduction:

The purpose of this study was to examine the levels of mindfulness among athletes versus non athletes. This study also examined whether differences in mindfulness exist between individual sport athletes and team sport athletes. The independent variables studied were: type of sport, participation status in the sport, total years in the sports, and level of participation in the sport. Type of sport referred to a list of approximately 20 sports that the subject may have participated in. Participation status simply asked if the subject is still participating in that particular sport or not. Total years in the sport refers to how many years the participant has participated in that particular sport. The level of participating in the sport referred to whether the subject participated in varsity, club, intramural, high school or just a "fun" level of the sport. The dependent variable in this study was the level of mindfulness in each type of athlete as determined by the score on the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003).

Mindfulness

Mindfulness is the increased ability to be aware and attentive to what is happening in the moment and not functioning in an automatic mode. The concept of mindfulness embodies being conscious of the present and being aware of your surrounding in a non-judgmental fashion. Current research on mindfulness has focused on clinical populations such as stress reductions, but very little research has been done on non clinical populations such as athletes. Mindfulness based training could have a positive impact on athletic performance, injury prevention, and recovery time in athletes, but differences among mindfulness levels in athletes is currently not well understood.

Shapiro and colleagues (2006) reported a theoretical study evaluating the exact mechanisms of mindfulness which actually cause internal change. These researchers proposed a model to explain how mindfulness interventions work. Mechanisms of intention, attention and attitude occur simultaneously. Intention or "purpose" refers to the motives involved. Attention refers to the observation of internal and external moment to moment experiences (Shapiro et al., 2006). The third axiom is attitude. Attitude refers to the quality in which we bring to attention (Shapiro et al., 2006). The theory that this

article proposed is that the three axioms of mindfulness (intention, attention, and attitude) lead to a change in perspective or "re-perceiving". This shift in perspective leads to an additional four ways in which mindfulness may be obtained through various interventions. The four additional mechanisms include self regulation, values clarification, emotional and behavioral flexibility, and also exposure. The shift in perspective is also described as a usual occurrence in the developmental process which means that mindfulness training is enhancing a naturally occurring process within all of us.

There is significant importance in understanding how mindfulness training works. It is important to have an idea of how levels of mindfulness vary among subgroups of the population before examining how mindfulness training could be an effective strategy for athletic performance enhancement. It is important to study mindfulness in the athletic population in order to obtain baseline values in regards to mindfulness levels among different types of athletes compared to non athletes. Once mindfulness among athletes has been evaluated interventions can be developed to target athletic performance and injury prevention. This study is providing a basis of information as to how mindfulness may affect athletes versus non athletes or how different axioms of mindfulness will affect athletes versus non-athletes.

Literature Review

Based on a review of the literature, no research to date has been conducted to evaluate mindfulness among athletes, and little research is present in regards to mindfulness based interventions for athletes. I evaluated two articles with significant relevance to this study and mindfulness. The first article describes a meta-analysis on the health benefits of mindfulness on stress reduction (Grossman. P., Niemann, L., Schmidt, S., & Walach, H., 2003). The second article by Gardner and Moore (2003) evaluated a mindfulness based intervention for athletic enhancement, but no baseline data on the athletic population's mindfulness levels were examined. Gardner and Moore tested an approach called the Mindfulness Acceptance and Commitment on several case study participants to evaluate the effectiveness of mindfulness training on athletes of various levels.

   The first of relevant literature by Grossman and colleagues (2003) was a meta-analysis of several previous studies of mindfulness conducted to determine how effective MBSR (Mindfulness-based stress reduction) is in contributing to the ability to cope with various mental and physical disabilities as well as the ability to cope with stressful situations of everyday life. This meta-analysis also determined the effects of mindfulness intervention on health status (Grossman et al., 2004). Studies used in this meta-analysis were from a large range of clinical populations. These populations included cancer patients, cardiovascular disease sufferers, patients with chronic pain, as well as depressed patients. Mindfulness is characterized by an immediate, non-automatic awareness of what is going on around you. The idea of the MBSR intervention is that enhanced awareness as to what is going on around you will allow a more fulfilling and rich life. This meta-analysis concluded that the MBSR intervention had positive effects as a treatment intervention for several diseases as well as everyday life (Grossman et al., 2004).

   The meta-analysis is relevant to my research because it validates the effectiveness of mindfulness intervention for stress reduction and everyday coping mechanisms. This meta-analysis provides a baseline of information that explains in what population(s) mindfulness interventions have been effective. This study demonstrated that Mindfulness based stress reduction interventions can help treat various individuals and enhance coping skills in patients with numerous clinical and non clinical issues (Grossman et al., 2004). This study leads us to believe that other populations, such as athletes, could also be evaluated and potentially benefit from this type of mindfulness intervention.

   Gardner and Moore (2004) tested a Mindfulness-Acceptance-Commitment Based Approach to Athletic Performance Enhancement. The basic dimension of cognitive based training for athletic enhancement was thought to be the elimination or control of negative thoughts, but recent research proved contrary. Gardner and Moore (2004) demonstrate mindfulness, because it is closely related to acceptance, can lead to optimal athletic performance through present moment, non judgmental acceptance of feelings and physical sensations in addition to being aware of internal experiences. Mindfulness techniques encourage individuals to form non judgmental and non

evaluative reactions to external stimuli. Noticing stimuli is encouraged, but the stimuli surrounding the individual should not be evaluated.

The Mindfulness-Acceptance-Commitment based approach (MAC) developed by Gardner and Moore (2004) is expected to promote self regulation in the moment for competition and in long term situations such as improving the quality of practice sessions and commitment. Self regulation and athletic enhancement are strongly connected. The development of mindfulness in athletes is intended to replace task irrelevant thoughts and decrease internal self control and behavioral restrictions which are evident in athletes affected by performance dysfunction (2004). These researchers hypothesized that athletes receiving this intervention will improve awareness, non judgment skills, and show greater behavioral flexibility.

The MAC protocol was divided into five distinct phases: psycho education, mindfulness, value identification and commitment, acceptance, and integration and practice. During the mindfulness stage, the intervention focuses on the self management of attentional processes. Two case studies demonstrate the effectiveness of MAC. Post MAC training the first case study subject, a collegiate male swimmer, had his best season, winning competitions and achieving personal bests. He had long been a worrier and could never give his best performance when stakes were high. The second case study was done on a masters level female power lifter whose performance and weight training has been deteriorating. Through the development of mindfulness skills, she began to accept her thoughts and emotions during training and her training benefited significantly (Gardner & Moore, 2004).

Gardner and Moore's case study research using the MAC may be the most important research pertaining to mindfulness and athletes to date. This study vividly demonstrated the potential for mindfulness interventions to aid in athletic enhancement and potentially injury prevention by teaching dimensions of mindfulness such as awareness. Overall, the literature demonstrates the ability of mindfulness interventions to positively enhance well being and performance in clinical populations as well as non clinical populations. The current study, determining if there is a connection between different types of athletes and mindfulness, will allow future mindfulness research to

develop interventions tailored to individual needs of athletes depending upon baseline values of mindfulness.

Research Questions/Hypothesis

The goal of this study was to compare levels of mindfulness between athletes and non-athletes, and to compare levels of mindfulness among athletes of different sports. This study's aim is also to compare and contrast the levels of mindfulness among those who currently participate in team sports versus individual sports. I hypothesized that individual sport participants would be more mindful than team sport participants and that athletes would be more mindful than non athletes.

There are a few distinct reasons why this study is of value. Mindfulness has been shown to relieve stress, aid in reducing symptoms of depression, and enhance overall wellbeing (Brown & Ryan, 2003). Knowing that, it is reasonable to believe that increased levels of mindfulness can reduce the risk of injury and depression for many athletes. Athletic performance enhancement is a growing field. If research is done on athletes and mindfulness, eventually mindfulness training may be able to be used as a form of performance enhancement and injury prevention.

This research will contribute to research in that baseline data will be obtained regarding different types of athletes' mindfulness levels. With these specific mindfulness levels, researchers then can identified and develop performance enhancement and injury prevention programs tailored to the needs of athletes with different levels of mindfulness. It is important to answer the questions I'm posing because we must first know if there is a difference in mindfulness among different athletes or if the difference in mindfulness is an individual trait separate of any sport participation. Once that is determined, we can then consider the effects that mindfulness may have on different athletes in respect to issues pertaining to performance enhancement and injury prevention.

Methods:

Study Design and Data Collection

The design of this study was cross-sectional. A cross-sectional study allowed me to study different variables at a single point in time. I looked at mindfulness and its prevalence and distribution among a certain population, in this case a population of athletes. I sampled approximately 398 college students from various classes across the university. This is similar to the sample used by Brown and Ryan (2003), where N= 313 college undergraduates were surveyed. Specifically, I sampled several large anatomy labs as well as yoga, table tennis, exercise physiology, kinesiology, first aid, and spectator for the sport, and a student athlete issues course. The majority of the 398 person sample came from anatomy (41%), exercise physiology (14%), and first aid (11%). For the most part, courses within in the school of PAES were used to obtain my sample; however, the largest portion of my sample came from the large anatomy lab sections. By using this method of sampling I was able to include intramural athletes, club athletes, varsity athletes, and non athletes.

Data collection occurred throughout a 30-day time frame during the spring of 2007. Before collecting data, course instructors were contacted for permission to ask volunteering students to complete the study questionnaires during their course classes. After gaining approval from the course instructors, I visited these different classes and asked students to fill out a short survey that would take approximately 15 minutes or less. Most students willingly agreed to help with this study and took the time to fill it out. I had close to an 85% return rate with almost 17 out of every 20 people returning the surveys to me. This study was conducted according to protocol approved by the Office of Responsible Research Practices at The Ohio State University.

Measurement

The dependent variable for the current study was mindfulness. Mindfulness was measured using the Mindfulness Attention and Awareness Scale (MAAS), developed by Brown and Ryan (2003), which results in a single score outcome. Brown & Ryan investigated different facets of mindfulness and how they relate to psychological well-

being. This study demonstrated the reliability and validity of the MAAS when using it with college students or the general adult population.

Mindfulness is said to be an enhanced attention and awareness of what is presently going on. Mindfulness could potentially be important in helping people disengage from automatic thoughts, habits and unhealthy behavior (Brown & Ryan, 2003). We can say a person is mindless when one goes into automatic mode and are not attentive to present reality. The MAAS does not focus on attributes such as trust, empathy, or gratitude, but rather on the presence or absence of awareness and attention to what is occurring in the present. The main purpose of the Brown and Ryan (2003) study was to examine empirical links between mindfulness and well-being. The MAAS started as a 184 item pool, but was significantly cut down after further analysis. Respondents of the MAAS indicate how frequently they experience what is described in the statement using a Likert scale. The Likert scale starts at 1, which indicates almost always and goes to 6, which indicates almost never. The higher the score on this measure the more mindful the individual is said to be (Brown & Ryan, 2003). This was a study with five individual studies within it. The results of this research identified the following properties of the MAAS: how it correlates with other measures, group differences in mindfulness, self concordance through mindfulness, mindfulness as a predictor of day-to-day self-regulation and well-being, and the effects of mindfulness on well-being and self-regulated behavior. In the fifth study, it was shown that higher levels of mindfulness were associated with decreases in mood disturbances and stress.

The independent variables for the current study (type of sport, participation status in the sport, total years in the sports, and level of participation in the sport) were assessed through a chart asking participants to identify the sports they have participated in, their current status in regards to sport participation (yes or no), and how many years they participated in each sport listed. Participants were also asked to categorize their level of sport participation (varsity, club, intramural, high school, or fun). Finally, subjects were asked to answer demographic questions such as age, sex, marital status, major, and year in college, as well as height and weight, which was used to calculate BMI.

Then, it was decided how to identify an athlete versus a non athlete from the data collected. Current sport participation was used to determine athlete versus non athlete and individual versus team sport athletes. Analyzing the history of the athletes was considered; anyone who had ever participated in a sport would be considered an athlete and those who had never participated would be the non-athlete. It was chosen not to analyze this data because the number of "never" athletes was too small to run statistical measures on. There were only 12 subjects, or 3 percent of the entire sample, who categorized themselves as "never" athletes. Before testing the second hypothesis, that individual sport athletes are more mindful than group sport athletes, I needed to determine how to categorize individual sport athletes versus team sport athletes. Using the NCAA bylaws as a guideline, team sports included baseball, basketball, football, ice hockey, lacrosse, cheerleading, rowing, soccer, softball, and volleyball. Individual sports in this study included cross country/running, golf, equestrian, cycling, dance, figure skating, gymnastics, swimming and diving, track and field, tennis, and wrestling (The National Collegiate Athletic Association Constitution and Operating Bylaws, 2006).

Study Sample

The sample studied proved to be similar to that of the university as a whole in some regards. Of our 398 person sample, 41.5% were male and 58.5% were female. Our sample was similar in comparison to The Ohio State University as a whole 52.5% male and 47.5% female (Carter, 2007). The sample obtained had slightly more females in relation to the university in its entirety. The average age of undergraduates at this university is 20.7; the average age of this sample was 21.06. The average height of this sample was 1.7 m, average weight was 70.2 kg, and the average BMI was 23.8.

Other demographics worth noting included race, year in college, marital status, part time/ or full time status, and major. This sample was not racially diverse, 87.6% of participants surveyed were white, 5.3% African American, 3.0% Chinese, and 1.8 % Asian or Pakistani. Ohio State as a whole enrolls (undergraduates) 79% white/ non Hispanics, 5.4% Asian, and 7.5% African Americans. This sample was a little under represented in terms of minority. Our sample included a variety of different students at different points in their education. The proportions are as follows: 22% freshman, 26%

sophomores, 19% juniors, 22% seniors, 7.6% fifth year or more, and 3% graduate students. The marital status of our group was as expected considering the undergraduate population we sampled; 95% single, 3.5% married/partnered, and 1% divorced. There was some diversity found within the majors/colleges of participants: 30% Education/Human Ecology, 15% Nursing, 12% Allied Medical, 5% Engineering, 6% Arts and Sciences, 6% Business, 5% Biological sciences, and 4% Social and Behavioral sciences (Carter, 2007). The sample may have been a little heavy in regards to medically related tracks. As of 2007, Ohio State University students as whole majors were very diverse. Biology, psychology (social and behavioral sciences), Political science, English, Finance and Marketing rounded out the most popular majors at Ohio State, but 4% or less of all students fell into one of the top five. Most of the students sampled were full time students (96%) while the remaining 4% were part time students.

Data Analysis

Once data were collected, responses were entered into a Microsoft Excel spreadsheet, checked several times for outliers, and then transferred to a computer program for analysis. Cronbach's alpha tests were performed on MAAS scores to check for internal consistency, a measure of instrument reliability. Descriptive statistics (means, standard deviations, and frequency distributions) were generated to examine mindfulness and each of the independent variables. Analysis of variance was used to examine whether differences in mindfulness existed between athletes and non athletes and to examine whether differences existed among individual sport athletes, team sport athletes, and combined individual/team sport athletes. All data analysis was done using Statistical Package for the Social Sciences (SPSS) (version 14.0, 2004).

Results:

Results of the Chronbach's alpha test for internal consistency suggested that the MAAS was a reliable measure of mindfulness. A value of .853 was obtained with an $N=$ 398, which fell within the acceptable standards. This corresponded to Brown and Ryan's .84 internal consistency score (2003). Once these measures were established and accepted, some decisions needed to be made in regards to identifying athletes.

Once the definition of an athlete was established, data could be analyzed. Using analysis of variance, the first hypothesis that athletes would be more mindful than non athletes was tested. One hundred fifty four individuals fell into the category of non athlete and 244 individuals were included in the athlete category. The mean MAAS for non athletes was 3.94 and the mean MAAS for current athletes was 3.99. With p= .517 there was no significant difference found between the levels of mindfulness per the MAAS scores in athletes versus non athletes (See Table 1).

Of those currently active in sport, 75 fell into the category of individual athlete, 120 fell into the category of team sport athlete, and 49 individuals participated in both team and individual sports. In an analysis of individual sport athletes versus group sport athletes versus both, no significant differences were found between levels of mindfulness and the preceding variable (team/individual/ both). Individual sport athletes scored a mean of 3.92 on the MAAS, team athletes a 4.03, and athletes participating in both scored a 3.99 on the MAAS mindfulness assessment, p=.594 (See Table 2).

Although not a primary research question, I examined the gender effects among participants. Using the entire sample originally obtained (N=398), significant values were obtained in reference to gender difference across mindfulness measures. Males scored a mean of 4.08 and females scored a mean of 3.89 on the MAAS, p=.008. It is certain that within this sample men proved to be more mindful than women. (See table 3). When looking for an interaction effect between gender and current athletes versus non athletes, there was no significant effect, p = .538. The same analysis was run to determine if there was an interaction effect between gender versus individual athlete versus team athlete. Again, no significant effect was found, p= .231.

Discussions/Implications:

Although results of this study were not as originally expected, this study provides a wealth of knowledge in addition to present literature regarding a potential connection between mindfulness and athletes. This study found that athletes were no more mindful than non athletes and, surprisingly, individual sport athletes were not more mindful than team sport athletes. There was also no significant effect found between individual and team sport athletes versus those who participate in both. Alternately, this study did find

that males were significantly more mindful than females across the entire sample, not just athletes.

Although this particular study did not show any differences in mindfulness in athletes versus non athletes, or individual athletes versus team sport athletes, research should continue and look at these paradigms in hopes that performance enhancement interventions can be tailored to specific types of athletes. It is necessary to evaluate the effects of a mindfulness based intervention on injury recovery in athletes and in performance enhancement in individuals and team sport athletes. Researchers need to know if there is a difference in mindfulness levels and, if so, how to change levels of mindfulness through mindfulness based interventions to enhance recovery and performance. It is quite possible that different types of intervention programs will work for both individual sport athletes and team athletes, but if we can get a better sense of baseline data on mindfulness, programs may be more successful if they are able to be tailored to specific types of athletes.

A few limitations to this study were found that warrant attention. When separating athletes and non-athletes, as well as individual versus team or combined athletes with the protocol created for this study, we found that we obtained very few people in our entire sample of 400 that had never participated in a sport. Ninety seven percent of the sample reported being some kind of an athlete at some point in their lives. Had participants been asked one simple question to self identify as an athlete or not, the results could have been significantly altered. Because of the definition I set before data were collected and before analysis was run in regards to athlete/ non athlete, I may not have obtained enough strictly non athletes (never athletes) to find significant data. Once data were collected, I could not do anything to go back and ask participants to self identify as an athletes or not.

In the future it may be suggested to have a larger sample of non athletes and a more defined sample of athletes. Potentially sampling varsity or professional sports, intramural sports, and club sports individually would allow a more defined and diverse sample to be analyzed. Because I sampled PAES classes, including exercise physiology and kinesiology, we had many students who fell into many of these categories (current athletes, past athletes, group, individual, and team athletes).

Sampling courses where sport participants are not the majority should be considered for a future study. This was difficult in this study as access to varsity sports teams is not easily obtained at this institution.

Further examination into gender effects should be looked at in regards to mindfulness. It is quite possible that males scored higher on mindfulness because of the non-judgmental dimension of the concept of mindfulness. A closer look should be taken to see if this is in fact the case or if other mechanisms account for the significant gender difference. Future research should examine if this same gender effect is seen across populations. If this is the case, in the future mindfulness intervention programs could be tailored to the mechanisms that account for such difference in females versus males. Properly tailored intervention programs could likely lead to more successful interventions for the athlete.

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Table 1

Current Sport Participation	Mean MAAS score	Standard Deviation	N
Non- Athlete	3.94	.70	154
Athlete	3.99	.71	244
Total	3.97	.71	398

Table 2

Current Sport Participation Status	Mean MAAS score	Standard Deviation	N
Individual	3.92	.71	75
Team	4.03	.68	120
Individual and Team	3.99	.79	49

Table 3

Sex	Mean MAAS score	Standard Deviation	N
Male	4.08	.69	165
Female	3.89	.71	233
Total	3.97	.71	398