

# The Relationship between Mindfulness and Flow State in Athletes

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**Abstract.** Mindfulness has long been known for its positive health benefits for the human body and mind. The introspective, non-judgmental aspects of mindfulness exercises make it especially beneficial for elite athletic performance, where it is critical for athletes to enter a specific state of concentration and awareness where peak performance is observed—the flow state. In the past, certain mindfulness programs such as the Mindfulness Sport Performance Enhancement (MSPE) program were designed to improve athletes' mindfulness abilities. Since the broader focus in research was to independently evaluate mindfulness and flow in athletes, it is important to see the bridge between the two areas of study. Most reviewed articles showed significant correlation between mindfulness abilities and levels of flow in elite athletes. It was also shown that mindfulness training is an effective approach to increase emotional regulation and attentional control, which are related to levels of flow in athletes. Further investigation is necessary to understand how mindfulness can contribute to the level of flow experienced by athletes.

**Keywords:** Mindfulness; Flow State; Elite Athletes; Mindfulness Intervention; Athletic Performance.

## 1. Introduction

In recent decades, there has been growing interest in the enhancement of human focus and performance in all forms of activities, such as studying or sports [1]. Specifically in sports, playing strategies and accommodating technology have evolved to help athletes boost their performance. For instance, new knowledge of training methods and development in equipment has made it easier for athletes to improve their physique and consequently, boost their scores in their respective sports. However, an equally important aspect of athletic performance—the psychological state of athletes—has been much slower in progression and research. This is in part due to the overall expectation that athletes must already be mentally tough, and the stigma associated with sports psychology training. Although it has been long known by experts that high-performing athletes often possess specific psychological traits that allow them to better engage in competition and focus, there remain many questions on what these traits are, and which conditions can elicit positive psychological responses. Thus, further investigation into this area in sports psychology could greatly aid elite athletes in achieving better performance results as well as improve their overall experience in their sport by developing long term mental intervention strategies to aid their physical training. More concrete research on the effectiveness of psychological intervention in sports could also help eradicate the negative perception athletes have towards it.

Currently, researchers have investigated the effects of mindfulness and “flow state” on athletes' experience and performance. The “flow state,” first coined by Mihaly Csikszentmihalyi, is a distinct mental state that individuals subconsciously enter as they are completing a task [1]. When individuals enter their flow state, they often feel as though they have entered a different reality and lose track of time and their surroundings. During flow, individuals can experience significantly higher levels of concentration and reach optimal levels of performance in their task compared to when they are not in flow. Individuals in all disciplines and varying levels of involvement have reported the feeling of being “in the zone.” For instance, many musicians report this experience of flow and being fully absorbed in their musical playing. Given the high concentration elicited by the flow state, there has been growing interest in researching the applications of flow. For example, a current area of research related to flow investigates the traits, experiences, and graphics of certain videogames that enable

users to better enter their flow states and remain attracted in the game. Research on the relationship between flow states and sports can also be useful, since flow has been correlated with enhanced performance. Generally, flow-inducing activities consist of tasks that strike a clear balance between eliciting boredom and anxiety in individuals: the task cannot be too easy or too challenging. Through research, it has been found that there are certain conditions that can preemptively facilitate the experience of flow that are within the individual's control, such as having a positive perception towards the task [1].

On the other hand, mindfulness is the process where an individual draws their focus from internal, intangible thoughts to their awareness of the present moment and being in touch with their present experiences. Some researchers have also proposed that mindfulness entails an openness to accept situations and events as they are. Through increased media attention, mindfulness has been promoted as having positive effects on people's mental and physical wellbeing. Indeed, much of the existing mindfulness research focuses on groups that have concerns in mental and physical health. Current mindfulness interventions involve techniques that guide individuals to experience the present, such as observing specific bodily sensations or noting characteristics in their environment. These interventions operate on the basis that humans are naturally distracted by external thoughts that are often negative, and that higher proficiency in these intervention exercises improves the abilities to focus on the more neutral present. Prominent programs developed based on mindfulness include the Mindfulness-Based Stress Reduction (MBSR) program or the Mindfulness-Based Cognitive Therapy (MBCT). So far, mindfulness intervention programs have been correlated with significant benefits in physical and mental health, especially in people who struggle in these categories. For instance, participation in intervention programs has been shown to reduce chronic pain and improve health-related behaviors. Moreover, these programs have also been correlated with improvements in depression and anxiety relapse, and addiction control. It has been hypothesized that the decentralized nature of mindfulness gives individuals opportunities to neutrally reflect on their experiences, contributing to psychological mechanisms that drive change in behavior. Beyond its medical use, the practice of mindfulness has been shown to improve individuals' overall satisfaction and quality of life; people who frequently practice mindfulness report better engagement in their daily activities, which accumulates to higher overall contentment [2].

The established research of individuals' flow states and mindfulness has shown that engagement in these areas results in positive outcomes and changes for participants. However, there is still limited research on the relationship between mindfulness and flow, and whether mindfulness interventions are effective in eliciting higher levels of flow in athletes. This review paper will specifically investigate the relationship between mindfulness and flow in elite athletes of different types of sports and whether certain demographic traits influence this relationship.

## **2. The Association between Mindfulness and Flow State**

An increasing body of literature in sports psychology has found correlations between mindfulness ability, mindfulness intervention, and flow levels in athletes. In their paper, Cathcart et al. administered the Five-Facet Mindfulness Questionnaire (FFMQ), and the Dispositional Flow Scale (DFS) to 96 Australian athletes across different sports to assess whether mindfulness and flow differed between gender and sport type (individual vs. team sports or pacing vs. non-pacing sports). The researchers found that the initial total mindfulness and flow levels had no significant difference between demographic data, which suggested that mindfulness and flow are acquired through meditative practice and experience in competition instead of being correlated with a specific demographic trait like gender. Interestingly, however, the study found that there were correlations between higher mindfulness ability and increased experience of flow. This correlation makes sense, since flow and mindfulness conceptually share the same necessity for individuals to be present-aware and concentrate on the experience of the task, and thus competence in mindfulness techniques simultaneously improves the tendency of individuals to experience flow. This positive relationship

indicates the possibility that mindfulness training can boost athletes' flow in training and competition and consequently improve their performance [3].

### **3. The Positive Effects of Mindfulness Intervention on Flow State**

#### **3.1. The Effectiveness of Mindfulness Training**

Most mindfulness interventions in the researched articles are based on or extended upon the Mindfulness Based Stress Reduction (MBSR) program or the Mindful Sport Performance Enhancement (MSPE) program, which is itself an extension of MBSR. MSPE is a 4-week long workshop where athletes learn about the importance of mindfulness and practice mindfulness strategies such as body scan, breathing exercises, meditation, and yoga. Previous research has established ways to measure the level of mindfulness and flow through the form of questionnaires. Prominent measures of mindfulness include the Mindful Attention Awareness Scale (MAAS), which measures the general tendency of individuals to experience mindfulness, and the Five-Facet Mindfulness Questionnaire (FFMQ), which evaluates mindfulness through five distinct facets: Observing, Describing, and Acting with Awareness, Nonjudging of Inner Experience, and Nonreactivity to Inner Experience. Key measures of flow that were used in the articles consist of the Flow State Scale-2 (FSS-2), which measures the level of flow individuals experience while performing an activity, and the Dispositional Flow Scale-2 (DFS-2), which measures the long-term tendency of individuals to enter their respective flow states. These flow measurements were created based on the 9 aspects that define the flow experience, which are referred to as "subscales" within the measure.

In their research paper, Chen and Meggs investigated whether MSPE training improved flow levels for 16 national-level, competitive adolescent swimmers. The researchers separated the swimmers into two non-randomized groups—the target MSPE training group and the control Relaxation Training (RT) group. MSPE training was extended to 8 weeks, and the final session featured a swimming-focused mindfulness exercise. Both groups completed the same exercises, but the RT group was given instructions that emphasized awareness on the tension and relaxation of the muscles, whereas the MSPE group was given instructions that emphasized mindfulness concepts. In addition to FSS-2, DFS-2, and MAAS, the researchers used the additional measure of the Toronto Mindfulness Scale (TMS), which measures the mindfulness levels proximately after mindfulness training. Between pre and post-tests, researchers found a significant increase in global state flow within the MSPE group, with the subscales of loss of consciousness and challenge-skill balance having especially significant changes. Between MSPE and RT, MSPE participants were found to have higher global trait flow, meaning they were better predisposed to experience flow than the RT group. Additionally, the MSPE group scored higher on the action and awareness merging MAAS subscale compared to the RT group. Overall, the MSPE swimmers were more in touch with task-related cues and their personal athletic experience compared to the RT group, a clear indicator that the mindfulness training positively correlated with high flow levels in the swimmers [4].

Chen et al. evaluated whether mindfulness training had any impact on the performance, anxiety, and flow state levels in a group of 21 amateur baseball players in Taiwan. Their mindfulness workshop for the athletes was based off the MSPE program. To evaluate the effectiveness of MSPE, the researchers collected responses from participants using a series of questionnaires which included the Mindful Attention Awareness Scale (MAAS) and the Flow State Scale-2 (FSS-2). Specifically, FSS-2 evaluates flow states through 9 separate subscales that make up the flow "experience." Responses were collected before the study, immediately after the study, and one month after the completion of MSPE. It is important to note that there was no control group in this study. The authors concluded that the MSPE training did not create significant changes in the athletes' mindfulness abilities immediately after the workshop but was instead correlated with practice time after the workshop. This resulted in a positive trend of increasing mindfulness ability over a longer period.

There was a significant improvement in the athletes' flow states, and levels of flow were positively correlated with mindfulness ability [5].

Rothlin and colleagues aimed to investigate whether there were significant contrasts in effects resulting from different psychological training techniques for athletes. The authors chose to compare mindfulness training (MT) to psychological-skills training (PST), a prominent technique used in sports psychology. Whereas MT focuses on the relationship between the individual's awareness and the task at hand, PST teaches athletes specific strategies that alter their mental processes, such as through relaxation and self-talk techniques. Participants in the study were divided randomly into three groups: MT, PST, and waiting-list control (WT). The MT and PST groups were given 4 weeks of respective training, whereas the WT group was given no training. Between MT and PST, MT had significant increases in the two mindfulness subscales of nonjudging and nonreactivity, but PST had greater improvements in goal setting and imagery, suggesting that the two techniques were effective in their respective areas. The authors found that compared to the WT group, both the MT and PST groups correlated with higher attentional control, which is the ability for an individual to tune out external distractions and voluntarily shift their attention to a specific stimulus. Additionally, the two target groups each had more pronounced influences on certain subdomains of flow, with the MT group engaging in more inward-looking experiences. Apart from these differences, both the MT and PST group shared similar improvements in the athletes' abilities to handle their emotions and their overall attentional and cognitive control [6].

All articles that used a form of mindfulness intervention found improvements in their participants' mindfulness abilities. Since most articles also founded their training methodologies on MSPE, this improvement in mindfulness ability displays the effectiveness of MSPE as a means for mindfulness training. Indeed, improvements in mindfulness ability are largely relevant to all types of competitive sports, given that high performance is linked to higher concentration, or better attentional control. Athletes who possess these traits can shift their awareness from external pressures to focusing on their personal experiences in performing their sport, thus simultaneously detaching from a critical perspective—an impediment to performance.

### **3.2. Anxiety, Pessimism, Resilience, and Self-Compassion as Relevant Factors**

Sports psychology is an area of study that is holistic, meaning a variety of different factors can play key roles in the process of psychological regulation in sports settings. This paper will specifically examine the identified psychological traits of anxiety, pessimism, resilience, and self-compassion as factors which could have potential influences on the levels of flow and psychological regulation in athletes. Firstly, sports anxiety is generally associated with multiple facets of negativity, which generally alter an individual's cognitive capacity. Athletes with sports anxiety may focus on negative outcomes and consequences of their performance, which is incongruent with the more neutral state of mind that is needed to enter flow. A prevalent way to measure anxiety is the Revised Competitive State Anxiety Inventory-2 (CSAI-R2), a questionnaire which evaluates anxiety under the three categories of somatic anxiety, cognitive anxiety, and self-confidence [7].

Similarly, pessimism is linked with focus on negative concepts that impact subscales of flow that involve feeling total control over the task. For instance, a pessimistic athlete may assign value judgements to their performance by focusing on moments of failure and attributing their success to momentary outcomes. This prevents them from perceiving themselves and their athletic experience neutrally, leading to a decrease in their internal motivation [8-10]. On the other hand, psychological traits such as resilience promote adaptability against negative or traumatic experiences, a necessary trait for athletes to possess, under the intensity of competition. Additionally, self-compassion, another psychological trait, is linked to an openness to accept a variety of outcomes and thus shifts the focus onto the process of doing the task itself. In addition to evaluating flow as a result of mindfulness training, Chen et al. also assessed the impact of mindfulness training on anxiety. Using the Beck Anxiety Inventory and the Revised Competitive State Anxiety Inventory-2 (CSAI-R2), the authors

found a significant improvement in one subscale of sports anxiety. The improvements in flow and sports anxiety are hypothesized to be indicators of better sports performance [5].

Sanchez and colleagues investigated whether mindfulness on training had effects on the overall anxiety and feelings of competitive athletes at their university. Their intervention was a 10-week program that centered on teaching participants the practice of meditation, along with other mindfulness techniques that focused on acceptance of the present moment. CSAI-R2 was used to evaluate the level of anxiety, post-intervention. The authors found that the mindfulness training program enabled athletes to exert better control over their emotional regulation, cognitive mood, and self-confidence in addition to correlations to higher flow levels. Specifically, they concluded that the intervention group had significant improvements in somatic and cognitive anxiety, indicating that athletes with anxiety may benefit from mindfulness interventions [7].

Scott-Hamilton and colleagues investigated the effects of an 8-week mindfulness intervention workshop program on the flow state of competitive cyclists. Training within the workshops included cycling-specific mindfulness training. Measures that were used to evaluate flow and mindfulness included the DFS-2 and the FFMQ; pessimism was measured using the Sport Attribution Style Scale (SASS), which asked participants to evaluate the role they played themselves as causes of certain hypothetical scenarios that could happen to them. Data analysis showed that the 8-week intervention was effective in improving the mindfulness ability of cyclists. Furthermore, an increase in global flow levels was also observed in cyclists in the intervention group, suggesting a positive correlation between mindfulness ability and experiential flow in athletes. Between the post-test and waiting-list group, the cyclists who received intervention showed fewer qualities of pessimism, although the improvements in pessimism between pre and post-test of the intervention group did not have statistical significance. This indicates that mindfulness training may have altered the way pessimism is experienced by athletes rather than having a diminishing effect on it [8].

In their paper, Liu and colleagues investigated whether a brief mindfulness training of 30 minutes had any effect on athletes' mindfulness, flow, and resilience levels. Comparing the intervention group with the control group, the authors found that the target group had significant increases in overall mindfulness, flow, and resilience levels. Additionally, in data analysis, they found that the level of resilience of athletes had accurate predictive effects on their flow states, suggesting that resilience could potentially be a medium between mindfulness training and overall flow states [9].

Lastly, Lyon and Plisco investigated whether self-compassion and mindfulness levels were statistically significant in the sports anxiety of athletes as well as their flow levels through a series of flow and anxiety-assessing questionnaires. These questionnaires were administered to a group of elite female swimmers in the U.S. The authors found that while the level of mindfulness was an accurate predictor of higher flow levels, self-compassion accounted for a smaller, but additional variance in flow levels. These findings suggest that self-compassion could also be a means of enhancing athletes' flow levels by drawing their attention away from outcome-based thinking and instead giving athletes the opportunity to focus on the experience itself [10].

#### **4. Conclusion**

Across all reviewed articles, the data indicated that mindfulness levels in elite athletes were positively correlated with global flow. Although total flow and mindfulness abilities did not initially differ across socio-demographics, post-mindfulness-intervention showed that demographics and sport types were associated with significant changes in specific mindfulness and flow subscales. Even across mindfulness interventions of different time lengths (30 minutes to 10-weeks), there were still statistically relevant correlations between total mindfulness ability and flow levels, although follow-up testing revealed that regular practice was important in sustaining mindfulness ability. Mindfulness exercises give participants the opportunity to reflect on their present experiences in a nonjudgmental way. Hence, the improvement of mindfulness ability can aid athletes in entering their flow state. Furthermore, mindfulness ability and training have been correlated with other psychological traits,

such as anxiety and resilience, which are both theoretically linked to the flow experience. The presence of this correlation suggests that there may be additional benefits of mindfulness intervention on other psychological factors that influence athletic performance. Until recently, most studies have focused on the investigation of mindfulness and levels of flow in athletes independently. This review article bridges the gap between studies on mindfulness intervention and its corresponding effect on elite athletes' flow. Certain limitations exist in the articles referenced in this paper. Firstly, many of the experimental groups were small, and therefore, may not be as accurate or representative in their findings. Secondly, some researchers did not use randomized experimental design or even create a control group due to limited time and practical resources. Lastly, different studies used different scales to evaluate certain psychological traits, therefore reducing the consistency of overall generalizations based on their claims. Indeed, more research is necessary to better comprehend the types of mindfulness interventions that may be specifically useful to different sports and how these programs can be tailored to fit different demographics.

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