

Inducing Flow in Athletes Through Mindfulness: Understanding the Mechanisms

By

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Abstract

This capstone investigates how mindfulness facilitates flow experiences in athletes through mechanisms grounded in Flow Theory and Self-Determination Theory (SDT). Synthesizing recent empirical and theoretical literature, the project identifies attentional control, emotion regulation, decentering, and resilience as key mediators linking mindfulness to optimal performance states. Evidence from interventions such as Mindful Sport Performance Enhancement (MSPE) and the Flow Training Program (FTP) demonstrates that structured mindfulness programs enhance athletes' focus, emotional stability, and self-regulated motivation, leading to improved performance outcomes. Meta-analytic and neurobiological research further support these findings, showing moderate-to-large effects and strengthened prefrontal-limbic connectivity following mindfulness training.

Despite promising results, current studies remain limited by short durations, self-report measures, and cultural homogeneity, reducing generalizability. Future research should adopt longitudinal and cross-cultural designs, employ multi-method assessments, and integrate stronger ethical practices to ensure participant well-being. Overall, this capstone positions mindfulness as a foundational process for fostering flow, resilience, and self-determined engagement in sport, bridging contemplative practice and performance psychology.

Keywords: mindfulness, flow, sport psychology, self-determination theory, attentional control, emotion regulation, resilience, performance enhancement

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Chapter One: Introduction

Overview of Chapter One

This chapter introduces the context, purpose, and theoretical grounding of this capstone, which investigates how mindfulness fosters flow in athletes and explores the underlying mechanisms that facilitate this process. Specifically, it outlines the research problem, provides justification and significance, presents the theoretical framework (Mindfulness Theory and Self-Determination Theory), defines key terms, and situates the researcher's positionality and reflexivity. This overview establishes the foundation for understanding both what is currently known and what remains to be explored in the literature, justifying the need for this study.

Athletes at all levels face considerable psychological and physiological demands, including pressure to perform consistently, manage stress, and maintain focus during training and competition (Wang et al., 2023). Flow, a state of complete absorption in an activity characterized by focused attention, intrinsic motivation, and enjoyment, has been identified as a key factor contributing to elite performance and personal satisfaction in sport (Csikszentmihalyi, 1990). Mindfulness, intentional, present-moment awareness with non-judgmental acceptance, has been investigated as a strategy to support these flow experiences.

Research indicates that mindfulness improves attentional control, emotional regulation, and resilience, which are essential for achieving and sustaining flow under pressure (Liu et al., 2021; Wang et al., 2023). However, existing studies often focus on outcomes (performance metrics or psychological benefits) rather than elucidating the specific mechanisms that link mindfulness to flow. This represents a critical gap in the literature: it is not yet fully understood how attentional control, emotional regulation, and self-awareness interact to induce flow,

particularly across different sports and competitive levels (Chen & Meggs, 2021; Oguntuase & Sun, 2022).

Mindfulness interventions have been applied in both individual sports (e.g., swimming, running) and team sports (e.g., football, rowing) (Hill et al., 2020; Sparks & Ring, 2022; Oguntuase & Sun, 2022; Tamminen et al., 2021). While evidence suggests benefits for both performance and well-being, systematic investigation of the mechanisms, how mindfulness leads to flow, is limited. Integration with motivational frameworks, such as Self-Determination Theory (Deci & Ryan, 1985), provides additional insight, as autonomy, competence, and relatedness are crucial for intrinsic motivation and flow experiences. Empirical work linking mindfulness-based interventions to these motivational constructs in athletes remains sparse, highlighting a clear research gap.

Finally, the societal relevance of this study is significant. Competitive sport often emphasizes outcomes over process, contributing to stress, burnout, and mental health challenges (McGee et al., 2025). Understanding how mindfulness fosters flow can provide evidence-based strategies to promote ethical, sustainable performance cultures and inform clinical counselling interventions for athletes, supporting both performance and psychological resilience (CPA, 2017).

Research Problem

The central research problem addressed in this capstone is: How does mindfulness induce flow in athletes, and what are the underlying mechanisms that facilitate this process?

While mindfulness has been shown to enhance performance and psychological well-being in athletes, the specific mechanisms, such as attentional control, emotional regulation, and self-awareness, that connect mindfulness practice to flow remain insufficiently understood (Liu

et al., 2021; Chen & Meggs, 2021). Existing research often examines outcomes (e.g., reduced anxiety or improved performance) without clarifying how mindfulness produces these effects in sporting contexts, leaving a gap in practical knowledge for applied interventions.

The Purpose of the Study

This study addresses this gap by seeking to clarify the mechanisms by which mindfulness supports flow, with the goal of informing both evidence-based sport psychology interventions and clinical applications for athletes at various levels. Specifically, it investigates what is not yet known about how mindfulness can reliably induce flow, and how this knowledge can be applied to optimize performance, motivation, and well-being in sport settings.

Research Question

Based on the purpose of this study, the researcher used secondary source information known as academic articles to explore the information that answers the following research question: What processes link mindfulness to flow states in athletes? How can this be used to understand its role in shaping strong sports psychology practices?

Justification and Significance of the Study

This study is justified both clinically and ethically. Athletes face unique stressors that can compromise mental health and performance, and supporting them requires evidence-based interventions that avoid harm and promote well-being (Canadian Psychological Association [CPA], 2017). By identifying mechanisms that link mindfulness and flow, this project provides clinicians and sport psychology practitioners with practical insights into tailoring interventions for athletes at recreational, collegiate, and elite levels.

The significance of this study extends beyond athletic performance. Mindfulness has been associated with resilience, reduced stress, and improved psychological flexibility (Wang et

al., 2023; Oguntuase & Sun, 2022). These benefits can contribute to athletes' long-term well-being, career sustainability, and post-sport adjustment (Buhlmayer et al., 2017). At a societal level, cultivating mindfulness in sport can challenge harmful "win-at-all-costs" cultures, reduce mental health stigma, and promote healthier models of coping and competition (McGee et al., 2025).

By deepening understanding of these mechanisms, this project also contributes to the field of counselling psychology by translating empirical evidence into practical, ethically grounded interventions that enhance both mental health and performance outcomes in athletic and clinical settings.

Theoretical Framework

This project is grounded in Mindfulness theory and Self-Determination Theory (SDT), which together provide a comprehensive lens for understanding how mindfulness supports athletes' ability to enter flow states (Csikszentmihalyi, 1990; Deci & Ryan, 1985).

Mindfulness theory emphasizes present-moment awareness, non-judgmental acceptance, and attentional control (Kabat-Zinn, 1990). Within sport contexts, mindfulness has been shown to enhance attentional focus, reduce cognitive interference, and regulate emotional responses under pressure (Rogowska & Tatruch, 2024). These mechanisms are particularly relevant to flow, as flow depends on an athlete's ability to remain fully immersed in the task without distraction (Csikszentmihalyi, 1990).

Self-Determination Theory (SDT) complements mindfulness by offering a motivational framework. According to Deci and Ryan (2012), individuals thrive when three basic psychological needs are met: autonomy, competence, and relatedness. Mindfulness practices contribute to autonomy by helping athletes respond intentionally rather than reactively to

competence by strengthening focus and resilience, and to relatedness by fostering presence in interpersonal dynamics such as coach-athlete or team relationships (Oguntuase & Sun, 2022; Liu et al., 2021). When these needs are met, athletes are more likely to sustain intrinsic motivation and experience optimal functioning.

Taken together, mindfulness and SDT offer both mechanistic and motivational explanations for how athletes reach flow states. Flow theory provides the outcome lens, describing the optimal experience of deep absorption and effortless performance that emerges when challenges are balanced with skill (Csikszentmihalyi, 1990). In this way, mindfulness facilitates the cognitive and emotional regulation necessary for flow, while SDT explains the motivational context that sustains it.

These frameworks are particularly suitable for this study because they collectively address both the internal regulation of attention and emotion, via mindfulness, and the motivational context of human flourishing, via SDT, which are core dimensions of flow in athletic and clinical performance.

This dual-theoretical grounding allows the present study to examine how mindfulness-based interventions may foster the conditions for flow by supporting both attentional processes and basic psychological needs.

Definition of Key Terms

Mindfulness: A mental practice involving intentional present-moment awareness with an attitude of openness and non-judgement (Kabat-Zinn, 2012).

Flow: A psychological state characterized by complete absorption in activity, a merging of action and awareness, and a sense of effortless control (Csikszentmihalyi, 1990).

Mindfulness-Based Interventions (MBIs): Structured therapeutic or performance-based programs that teach mindfulness skills, such as Mindfulness- Acceptance-Commitment (MAC) and Mindfulness Sport Performance Enhancement (MSPE) (Gardner & Moore, 2024; Kaufman et al., 2009).

Mechanisms of Change: Psychological processes, such as attentional control, emotional regulation, and self-awareness, that explain how mindfulness fosters flow (Kabat-Zinn, 2012).

Researcher Reflexivity and Positionality

Reflexivity involves the researcher critically examining how their own experiences, assumptions, and biases may shape the research process and outcomes, including the collection, interpretation, and presentation of data (Kantek, 2025; Trundle et al., 2025). Positionality refers to the researcher's social, cultural, and professional context, and how this context influences the perspective, interpretations, and knowledge produced in the study (Goundar, 2025; Yip, 2024). Both reflexivity and positionality are essential for ensuring transparency, ethical rigor, and critical self-awareness in research (Trundle et al., 2025).

My interest in this capstone project arises from both personal and professional engagement with sport and psychology. As a counselling psychology student, I approach this research with an awareness of how my academic training and theoretical preferences may shape the study. I have a commitment to evidence-based interventions and a focus on translating research into practical applications for athletes and sport psychology practitioners. Additionally, my own experiences in participating in athletic training environments inform my understanding of the psychological demands athletes face, particularly in relation to attention, stress management, and motivation. By explicitly recognizing these influences, I aim to maintain

reflexivity, transparency, and alignment with the Canadian Psychological Association's ethical principles of integrity and responsibility in research (CPA, 2017).

Overview

This chapter has outlined the research problem, justification, theoretical framework, key terms, and researcher positionality. The remainder of the project proceeds as follows:

- Chapter Two details the methodological approach to reviewing and analyzing the literature, including criteria for inclusion and critical appraisal.
- Chapter Three presents the literature review, examining current findings on mindfulness, flow, and the mediating mechanisms that connect them.
- Chapter Four discusses the application of these findings to clinical practice, scientific knowledge, societal well-being, and cultural/diversity considerations.
- Chapter Five concludes with a synthesis of key findings, therapeutic recommendations, directions for future research, and final reflections.

Chapter Two: Methods

The following section explores both the procedures used to conduct the current literature review and a methodological critique of the studies included in the review. The purpose of the methodological critique is to identify limitations that may have influenced the findings of these studies as well as the interpretation of those findings. The problem statement that has structured the current exploration of literature is: how can mindfulness interventions strengthen the psychological mechanisms that support the induction and maintenance of flow states in athletes?

Literature Search Process

When gathering information for this capstone project, the aim was to examine the psychological mechanisms through which mindfulness facilitates flow in athletes. This focused specifically on attentional control, emotion regulation, decentering, and resilience. To achieve this goal, an integrative literature review methodology was used. This approach was chosen because it allows for the inclusion of diverse sources and methodologies (Synder, 2019). These sources were primarily found across fields such as sport psychology, cognitive neuroscience, and performance science. The use of the integrative literature review was essential given that research on mindfulness and flow spans across multiple disciplines. While a systematic review could have provided a more rigid and narrow scope, the integrative review approach allowed me to capture both the depth of the mechanism-specific studies and the breadth of related literature that contributes to understanding the mindfulness-flow relationship in athletic contexts (Synder, 2019).

The search process was deliberate, structured, and iterative. It began with a broad exploration of the core concepts, mindfulness, flow, and athletic performance (Wohlin et al., 2022). Once there was a familiarity with how the literature addressed mechanisms such as

attentional control and emotional regulation, the focus was refined. When new terms or conceptual overlaps emerged during the reading process, such as “meta-awareness” appearing in place of “decentering” or “optimal experience” being used to describe flow, earlier searches were revisited to incorporate these variations, ensuring that the widest possible range of relevant studies was captured while remaining aligned with the research aim.

Inclusion and Exclusion Criteria and Selection of Articles

To ensure that only high quality and relevant articles were included, the search was restricted to peer-reviewed journal articles published between 2017 and 2025, written in English and focused on athletes or competitive sport contexts. Empirical studies, systematic reviews, and meta-analyses were included, while non-athlete populations were excluded unless findings were transferable to sport settings (Gusenbauer & Haddaway, 2020).

To ensure the search was comprehensive and balanced, multiple databases were accessed to ensure articles found represented different disciplinary strengths. PsycINFO was used for research in psychology and sport psychology. SPORTDiscus for literature specific to sport performance and athlete well-being, and PubMed for neuroscience and clinical mindfulness studies. ScienceDirect provided access to multidisciplinary peer-reviewed publications, and Scopus was used to broaden the scope to a wide range of scholarly journals. Lastly, Google Scholar was employed as a supplementary search tool, particularly to capture recent publications, open-access works, and articles not yet indexed in the primary databases. With this combination of databases, it minimized the risk of overlooking relevant studies that may have been confined to a particular academic field or publication outlet (Wohlin et al., 2022).

When searching for these articles, the strategy employed used Boolean operators, truncation symbols, and quotation marks to refine the retrieval of sources (Gusenbauer &

Haddaway, 2020). An example of this would be combining the following key terms, “flow state” and “sport performance,” and also searched for “mindfulness” with “flow state” and “sport performance” to capture variations in terminology. Additional combinations were used to target specific mechanisms, such as “attentional control” with “mindfulness” and “sport,” “emotion regulation” with “mindfulness” and “athletes,” “decentering” with “flow state” and “sport,” and “resilience” with “mindfulness” and “athletic performance” were applied.

Thematic Analysis Procedures

Once the search results were compiled, there was a review of abstracts, introductions, methodologies, and discussion sections and if necessary, the entirety of the text to determine alignment with the research question. Additionally, the studies were assessed for methodological quality, relevance, and theoretical contribution. Precedence was given to research that used validated measures, such as the Flow State Scale (FSS) or the Mindful Attention Awareness Scale (MAAS), described intervention protocols in detail, and directly addressed the link between mindfulness and at least one of the four target mechanisms, attentional control, emotional regulation, decentering, or resilience (Jackson & Marsh, 1996; MacKillop & Anderson, 2007).

To organize the selected studies, a thematic analysis approach was employed. This process began with open coding of each article by noting the psychological mechanisms most emphasized, such as attentional control and emotion regulation. Codes were then grouped into broader categories that aligned with the four mechanisms of interest. Studies that focused on program-based interventions were organized as a separate category to highlight how interventions operationalized these mechanisms in practice. Through constant comparison, recurring patterns and relationships between mindfulness and flow were identified. Particular

attention was given to how methodological strengths and weaknesses, such as sample size, study design, and validity of measurement tools, may have influenced findings. This systematic process allowed for the construction of themes that structured the Literature Findings section in Chapter Three

Selection of Articles

There was not an abundance of peer-reviewed journal articles directly examining the mechanisms linking mindfulness and flow in athletes. Instead, the core articles selected for the literature review reflect a focused set of studies that address measurable outcomes related to mindfulness-based interventions and the psychological processes underpinning flow. Table One below lists the articles selected for analysis in the methodological critiquing section (see Appendix I for a full list of all articles included for the review of the literature).

Methodological Strengths and Limitations

This section reviews the methodological strengths and limitations of the studies included in the literature review. By considering factors such as sampling, sample size, study design, and measurement tools, it becomes possible to evaluate the validity, reliability, and generalizability of findings. Highlighting both strengths and weaknesses also clarifies how methodological choices may have shaped interpretations of the mindfulness-flow relationship.

Quantitative Studies

Strengths.

Of all the core articles, the majority employed quantitative designs, including randomized controlled trials, experimental interventions, and meta-analyses (Wang et al., 2023; Si et al., 2022; Gu et al., 2022; Nien et al., 2020). The strengths of these designs lie in their ability to establish cause-and-effect relationships and provide measurable outcomes (Jamshidi et al., 2023).

Many studies used validated instruments such as the Flow State Scale (FSS) and the Mindful Attention Awareness Scale (MAAS), which improved construct validity and reliability across different contexts (Jackson & March, 1996; MacKillop & Anderson, 2007). For example, Sparks and Ring (2022) used sport-specific measures of flow and reinvestment to assess the effectiveness of a rowing-focused intervention, strengthening the ecological validity of their findings. The inclusion of systematic reviews and meta-analyses provided a broader synthesis of existing knowledge and allowed for comparisons across multiple intervention types (Wang et al., 2023; Si et al., 2022). Overall, the quantitative studies demonstrated strong methodological rigour in measurement, intervention fidelity, and statistical analysis.

Limitations.

Despite these strengths, several limitations were apparent. Many of the intervention studies were constrained by small sample sizes, such as Sparts & Ring, 2022 and Chen & Meggs, 2021, which reduces statistical power and the generalizability of findings (Taherdoost, 2022). Some studies relied heavily on convenience sampling from elite or university-level athletes, limiting diversity across skill levels, age groups, and cultural backgrounds (Chen & Meggs, 2021). This sampling bias raises concerns about external validity, as findings may not translate to broader athletic populations. Additionally, most studies used relatively short intervention periods, four to eight weeks, without long-term follow-up, making it difficult to determine whether benefits were sustained over time (Taherdoorst, 2022). Variability in outcome measures, such as combining self-report scales with neurophysiological measures by Nien et al. 2020, also created challenges for comparing results across studies. Meta-analyses, while valuable, were constrained by the heterogeneity of included studies, with differences in intervention length, mindfulness protocols, and athlete population making it difficult to isolate mechanism-specific effects (Si et

al., 2022). Lastly, several studies did not include appropriate control groups, reducing confidence that the observed effects were due to mindfulness interventions rather than placebo effects or other confounding variables.

Qualitative and Mixed-Methods Studies

Strengths.

Qualitative and mixed-methods designs provided valuable contextual insights into how athletes experience mindfulness and flow, such as Martiny et al., 2023 and Oguntuase & Sun, 2022. These approaches allow for deeper exploration of athletes' subjective experiences, providing rich descriptions of mechanisms such as resilience, locus of control, and emotion regulation (Takona, 2024)). Mixed methods designs, in particular, combine the statistical rigour of quantitative data with the nuanced perspective of interviews or reflective self-reports, making findings more ecologically valid (Sharma et al., 2023). For example, Martiny et al. (2023) demonstrated how mindfulness-based flow training not only improves mental well-being but also shapes decision-making processes in handball players, an effect that might not have been captured by numerical scales alone.

Limitations.

The main limitation of qualitative and mixed methods research is the restricted generalizability of findings (Taherdoorst, 2022). Due these studies typically being drawn from small, purposive samples within specific sports or training contexts, results may not transfer to broader athletic populations, such as the study by Martiny et al. (2023). Sampling biases are also possible, as many participants are elite or highly motivated athletes who may respond differently than recreational athletes. Another limitation is the potential for researcher bias, particularly when intervention developers evaluate their own programs, such as Chen & Meggs, 2021 and

Sparks & Ring, 2022). In such cases, confirmation bias or omission of negative outcomes may influence interpretations. Additionally, qualitative accounts often rely on retrospective self-report, which is vulnerable to recall bias and may not fully capture dynamic, in-the-moment experiences of flow. Finally, mixed methods studies sometimes underreport the analytic methods used to integrate qualitative and quantitative data, which can reduce transparency and reproducibility (Taherdoorst, 2022).

Summary

In summary, both quantitative and qualitative/mixed methods studies contribute important but distinct strengths to the understanding of mindfulness and flow in athletes. Quantitative approaches provide measurable, statistically analyzable evidence of efficacy, while qualitative and mixed methods deepen understanding of lived experiences and psychological mechanisms (Takona, 2024). However, limitations in sample size, cultural diversity, intervention consistency, and methodological transparency constrain the conclusions that can be drawn. These methodological gaps will be revisited in Chapter Three when interpreting thematic findings, as they shape how mechanisms such as attentional control, emotion regulation, decentring, and resilience can be understood in relation to mindfulness and flow.

Chapter Three: Literature Review

The purpose of this chapter is to critically examine the existing body of research on mindfulness and its role in fostering flow states among athletes. While Chapter One established the theoretical framework for this study, building on the methodological foundation established in Chapter Two, this chapter moves into a deeper analysis of the empirical evidence. A review of the literature not only summarizes prior findings but also identifies the mechanisms through which mindfulness may influence athletic performance, resilience, and psychological well-being (Synder, 2019). Five central themes are presented: mindfulness and attentional control, mindfulness and emotion regulation, mindfulness and decentering meta-awareness, resilience as a mediator between mindfulness and flow, and mindfulness-based interventions in sport. By synthesizing the contributions of recent studies, this chapter provides a clearer understanding of the current state of knowledge, the strengths and limitations of existing research, and the directions still needed to advance the field. Additionally, ethical considerations, guided by the Canadian Psychological Association (CPA) (2017) Code of Ethics and the Tri-Council Policy statement on the Ethical Conduct for Research Involving Humans (TCPS2) (2022), are also integrated throughout.

Following a comprehensive review of the current literature, five primary themes were identified to organize this chapter. Each theme captures a distinct athletic context. Table 1 provides an overview of these themes and subthemes, outlining how mindfulness, decentering, and resilience, intersect with flow and are reflected in contemporary sport-based interventions.

Table 1

Summary of Themes and Subthemes in Chapter 3

Theme	Subtheme/Focus Area	Key Constructs
Theme 1: Mindfulness and Attentional Control	<i>1.1: Sustained Focus</i>	Selective attention, sustained
	<i>1.2: Neural and Cognitive Mechanisms</i>	focus, task engagement, flow induction
	<i>1.3: Cross-Cultural and Developmental Perspectives</i>	
Theme 2: Mindfulness and Emotion Regulation in Sport	<i>2.1: Emotional Reactivity and Arousal Regulation</i>	Emotional regulation, adaptive coping, resilience, anxiety
	<i>2.2: Building Resilience, Confidence, and Locus of Control</i>	reduction, confidence, cultural context
	<i>2.3: Flow as a Mediator of Emotional Regulation</i>	
	<i>2.4 Cultural and Developmental Moderators</i>	
Theme 3: Mindfulness and Decentering/ Meta- Awareness		Decentering, meta-awareness, non-judgmental observation, reduced rumination

Theme 4: Mindfulness and Resilience as a Mediator of Flow	<i>4.1: Resilience as a Mediator</i> <i>4.2: Mechanisms Linking Mindfulness to Resilience</i>	Resilience, psychological flexibility, perseverance, recovery, sustained flow
Theme 5: Mindfulness-Based Programs and Interventions	<i>5.1: Mindful Sport Performance Enhancement (MSPE)</i> <i>5.2: Sport-Specific Adaptations and Contextual Tailoring</i> <i>5.3: Multi-Component Programs and Integrative Models</i>	Structured intervention models, performance enhancement, integration of mindfulness into athletic training

Thematic Findings

Theme 1: Mindfulness and Attentional Control

This theme emerged as a central pattern across the reviewed literature, reflecting how mindfulness enhances athletes' capacity to regulate attention, a mechanism consistently linked to flow experiences in sport. Thematic synthesis involved clustering studies examining behavioural, cognitive, and neurophysiological evidence on attentional regulation. Three subthemes were derived: Sustained Focus, Neural and Cognitive Mechanisms, and Cross-Cultural and Developmental Perspectives. These subthemes capture attentional processes from moment-to-moment focus to broader contextual and developmental influences, while also highlighting how these processes intersect with motivational dynamics described in Flow Theory and Self-

Determination Theory (SDT).

Subtheme 1.1: Sustained Focus

Attentional control has consistently been identified as one of the primary mechanisms through which mindfulness facilitates flow in athletes (Wang et al., 2023; Lui et al., 2021; Hill et al., 2020). Flow requires sustained immersion in a task, where distractions are minimized, concentration feels effortless, and awareness narrows to performance demands (Csikszentmihalyi, 1990). In high-stakes sports environments, maintaining such focus is not a simple task; intrusive thoughts, performance anxiety, crowd noise, and opponent behaviours can all pull attention away from the present moment (Wang et al., 2023; Reinebo et al., 2024). Mindfulness practices, particularly those emphasizing present-moment awareness, appear to strengthen athletes' capacity to sustain attention while inhibiting irrelevant internal and external stimuli (Kabat-Zinn, 1990).

Several studies have demonstrated this relationship, Wang et al. (2023), in a meta-analysis of randomized controlled trials (RCTs), found that mindfulness training improved attentional regulation across both team and individual sports. These improvements were evident not only through self-report measures like the Mindful Attention Awareness Scale (MAAS) but also through tasks requiring sustained focus. Similarly, Si et al. (2022) demonstrated that athletes trained in mindfulness reported fewer lapses in focus under pressure, suggesting that attentional benefits translate into performance contexts. These findings align closely with Flow Theory, which emphasizes the effortless, yet intense attention required to achieve flow states (Csikszentmihalyi, 1990).

However, a closer critique of methodology reveals several inconsistencies that warrant consideration. While meta-analyses like Wang et al. (2023) aggregate findings across multiple

trials, the included studies vary substantially in sample size, ranging from small groups of 15-30 athletes to larger cohorts of over 200, potentially limiting generalizability to elite or youth athlete populations (Rogowska et al., 2024). Furthermore, reliance on self-report instruments such as the MASS and Flow State Scale raises concerns regarding subjective bias and the challenge of capturing transient cognitive states like flow with static questionnaires (Buhlmayer et al., 2017). Although some studies, such as Wu et al. 2020, supplemented self-reports with behavioural attention tasks, few incorporated physiological measures, such as heart rate variability and electroencephalogram (EEG) that could enhance construct validity (Gao & Zhang, 2023).

From a theoretical perspective, the connection between mindfulness and sustained focus reflects the interplay between Flow Theory and SDT. Flow theory suggests that optimal experience arises when attentional demands match an individual's perceived skills, leading to total immersion (Csikszentmihalyi, 1990). Mindfulness contributes to this balance by enhancing awareness of present moment demands and minimizing cognitive interference. SDT further complements this process, as athletes cultivate mindful awareness, they experience greater perceived competence and autonomy in regulating their focus, satisfying two core psychological needs that underpin intrinsic motivation (Rogowska et al., 2024). Thus, mindfulness may not only facilitate flow but also reinforce motivation through self-regulated attention.

Future research should prioritize longitudinal and mixed-methods designs to examine whether sustained focus is a transient state of a stable cognitive skill strengthened through continued mindfulness practice (Daniel et al., 2021). Additionally, greater methodological rigour is needed in sampling diverse athletic populations, including non-Western and para-athlete groups, to enhance the ecological validity of findings. Incorporating neurocognitive and psychophysiological measures could also clarify the mechanisms through which mindfulness

stabilizes attentional focus and promotes flow consistency across contexts (Gao & Zhang, 2023).

Overall, the synthesis of the evidence underscores that mindfulness enhances athletes' sustained focus by strengthening attentional control, aligning with both Flow Theory's attentional absorption and SDT's autonomy-supportive mechanisms. Despite methodological variability, the cumulative data suggest that attentional stability serves as a key pathway through which mindfulness facilitates flow and performance optimization in sport.

Subtheme 1.2: Neural and Cognitive Mechanisms

Research using neuroimaging and cognitive paradigms suggests that mindfulness alters brain regions involved in attentional control and emotional regulation (Reinebo et al., 2024; Zsafanyi et al., 2022)). For instance, Wu et al. (2020) found that athletes who engaged in brief mindfulness practice showed greater performance control and reduced emotional reactivity. Similarly, Zsadanyi et al. (2022) reported changes in anterior cingulate cortex activation following adjustment. Behavioural studies complement these findings Buhlmayer et al. (2017) observed improvements in selective attention tasks among athletes practicing mindfulness, and recent work links mindfulness to faster recovery from attentional lapses under pressure (Chen & Meggs, 2021; Gross et al., 2018).

However, methodological limitations warrant careful consideration. Most neurocognitive studies involve small sample sizes, often fewer than 30 participants, and use convenience samples such as university athletes, limiting generalizability to elite or professional contexts (Gao & Zhang, 2023). Interventions are typically brief, ranging from single-session inductions to 4-5 week programs, which restricts conclusions about sustained neuro or cognitive change, raising concerns about expectancy effects of practice-related confounds (Bullard et al., 2025). Measurement validity is also a consideration; cognitive tasks may not fully capture real-world

attentional demands in competitive sport, and psychophysiological markers are rarely triangulated with self-report instruments (Rogowska et al., 2024).

From a theoretical perspective, these findings align closely with Flow Theory. Enhanced anterior cingulate and prefrontal activity may facilitate the effortless attentional absorption central to flow states, enabling athletes to adaptively match skill with challenge (Bullard et al., 2025). Simultaneously, SDT offers insight into motivation, by improving cognitive control and attentional stability, athletes experience greater perceived competence and autonomy, which supports intrinsic motivation and sustained engagement in sport (Rogowsak et al., 2024).

Future research should address these methodological gaps through larger, more diverse samples, longitudinal designs, and ecologically valid paradigms that integrate neurocognitive, behavioural, and physiological measures (Ding et al., 2025). Expanding studies to underrepresented athlete populations, including para-athletes and non-Western cohorts, will enhance generalizability. Mixed-method approaches that combine subjective flow reports with objective cognitive and neural indices could clarify the mechanisms by which mindfulness fosters attentional control and flow consistency in competitive sport.

Overall, the synthesis suggests that mindfulness interventions strengthen neural and cognitive mechanisms of attention, providing both a physiological and behavioural foundation for flow experiences and supporting intrinsic motivation through competence and autonomy, in line with Flow Theory and SDT.

Subtheme 1.3: Cross-Cultural and Developmental Perspectives

Cultural and developmental factors also influence how mindfulness impacts attentional control. Much of the research has been conducted in Asian contexts, where contemplative traditions are more culturally integrated (Si et al., 2022; Peng et al., 2025). For example, Peng et

al. (2025) found that Chinese athletes reported reduced cognitive anxiety and improved attentional focus after mindfulness training. These results align with other cross-cultural findings that suggest athletes from collectivistic cultures may be more receptive to mindfulness interventions (Si et al., 2022; Liu et al., 2021). However, it remains uncertain whether Western athletes, who may approach mindfulness with skepticism or performance-oriented motives, experience comparable benefits (Zhang et al., 2025; Hill et al., 2020).

Developmentally, mindfulness may hold unique advantages for younger or novice athletes. Wang et al. (2023) found that adolescent athletes trained in mindfulness showed improved attentional stability and reduced competitive anxiety. Zhang et al. (2025) argued that developmental athletes may particularly benefit because they are still building attentional skills and coping strategies. In contrast, elite athletes, who already possess refined attentional routines, may require more individualized sport-specific adaptations to achieve additional gains (Reinebo et al., 2024; Lynn & Basso, 2023).

Methodological critique: sample sizes are often small ($n = 20\text{--}60$), with limited gender and cultural diversity. Cross-cultural comparisons rely on translated self-report instruments without testing measurement invariance, risking reliability issues. Interventions are usually short-term (4–6 weeks), limiting insight into sustained attentional outcomes (Si et al., 2022).

Flow Theory suggests that attentional absorption is universal, but cultural and developmental factors may influence accessibility; mindfulness scaffolds focus across contexts (Qi et al., 2025).

SDT explains differential motivational outcomes: autonomy may be more salient in individualistic cultures, competence and relatedness in collectivist contexts; developmental athletes may gain enhanced intrinsic motivation from structured attentional support (Rogowska et al., 2024).

Future directions include longitudinal and cross-cultural studies with ecologically valid designs, replication with diverse athlete populations, and integration of attentional control with emotional regulation and self-efficacy measures (Qi et al., 2025). Tailoring mindfulness protocols to cultural and developmental contexts could maximize flow and motivational outcomes.

Overall, cultural and developmental factors shape mindfulness effectiveness for attentional regulation, but appropriate tailoring can enhance flow and intrinsic motivation, supporting both Flow Theory and SDT.

Theme 2: Mindfulness and Emotion Regulation in Sport

This theme emerged from recurring patterns in the literature highlighting emotion regulation as a key psychological mechanism linking mindfulness to flow experiences in athletes. Emotional regulation is one of the most widely discussed psychological mechanisms linking mindfulness to flow experiences in athletes (Rogowska et al., 2024). Competing at a high level requires managing emotions such as anxiety, frustration, and anger, feelings that arise naturally under pressure and uncertainty (Tamminen et al., 2021). When these emotions go unmanaged, they can disrupt attention, impair decision-making and prevent entry into flow. Mindfulness offers a set of psychological skills that help athletes recognize and respond to emotional cues without judgment, enabling them to remain calm, focused, and flexible in moments of stress (Schutte & Malouff, 2023; Rogowska et al., 2024). A growing body of evidence supports this relationship, showing that mindfulness not only reduces negative affect but also enhances confidence and resilience, two qualities that help sustain flow under demanding conditions (Oguntuase & Sun, 2022; Peng et al., 2025).

Subtheme 2.1: Emotional Reactivity and Arousal Regulation

Athletes routinely face situations that test emotional stability, missed opportunities, officiating calls, or performance slumps. These moments activate physiological and psychological arousal that, if left unchecked, can derail focus and performance. Mindfulness interrupts this cascade by promoting awareness and acceptance of emotional states rather than resistance or suppression (Schutte & Malouff, 2023; Solmaz & Yarayan, 2025). For example, Gu et al. (2022). Demonstrated that mindfulness training reduced anger and uncertainty-induced emotional arousal, resulting in more stable mood regulation during performance. Athletes reported that mindfulness helped them acknowledge frustration without reacting impulsively, allowing recovery and re-engagement with the task.

Similar findings have been reported across sports contexts. Tamminen et al. (2021) observed that athletes trained in mindfulness used more adaptive emotion-regulation strategies such as reappraisal and acceptance, leading to lower pre-competition anxiety. Wang et al. (2023) and Zhang et al. (2025) found that mindfulness-based interventions produced moderate-to-large reductions in negative affect across team and individual sports.

Methodologically, many studies relied on small, homogeneous samples ($n = 15-60$) and self-report measures, such as the Positive and Negative Affect Schedule (PANAS), which may overestimate intervention effects due to participant bias (Si et al., 2024; Rogowska et al., 2024). Physiological indices of arousal, such as heart-rate variability or cortisol, were rarely incorporated, limiting objective validation of emotional regulation (Zhan et al., 2023). Additionally, most interventions occurred in controlled settings rather than live competition, limiting ecological validity and generalizability to real-world sport contexts (Zhang et al., 2025; Si et al., 2024).

Flow Theory suggests that stable emotional states reduce interference with attentional absorption, facilitating effortless engagement (Csikszentmihalyi, 1990). SDT posits that improved emotion regulation enhances perceived competence and autonomy, increasing intrinsic motivation to engage fully in sport (Rogowska et al., 2024). Mindfulness strengthens these mechanisms by enabling athletes to observe and manage emotions without judgment, supporting both performance and well-being.

Future directions include integrating physiological and behavioural measures alongside self-reports, conducting studies in live competition, and expanding sample diversity to enhance generalizability. Understanding acute emotional regulation across different levels of skill, sport type, and gender will provide a more nuanced perspective on mindfulness efficacy.

Subtheme 2.2: Building Resilience, Confidence, and Locus of Control

Beyond immediate emotional regulation, mindfulness also fosters longer-term qualities like resilience, confidence, and an internal locus of control, which mediate emotional regulation and facilitate flow (Zhang et al., 2025; Wang et al., 2025; Solmaz & Yarayan, 2025).

Oguntuase and Sun (2022) found that elite football players who completed mindfulness training demonstrated stronger self-confidence and resilience, along with improved emotional composure under pressure. Importantly, locus of control acted as a mediator; athletes who perceived greater personal influence over outcomes were better able to regulate emotions.

In a randomized controlled trial, Oguntuase and Sun (2022) found that mindfulness training enhanced athletes' resilience and internal locus of control, which mediated improvements in emotional regulation. Similarly, Kuchar et al. (2023) demonstrated that mindfulness practice increased confidence and recovery efficacy among collegiate athletes following performance setbacks. Liu et al. (2021) highlighted that resilience mediated the

mindfulness-flow relationship, suggesting emotional stability functions both as a byproduct and a prerequisite for optimal performance.

This pattern aligns with self-determination theory, which emphasizes autonomy and competence as central to motivation and well-being (Ryan & Deci, 2017). When mindfulness enhances self-confidence and perceived control, athletes are more intrinsically motivated, better equipped to manage stress, and more likely to sustain flow. Liu et al. (2021) similarly found that resilience mediated the mindfulness-flow relationship, suggesting that emotional stability may emerge as both a byproduct and prerequisite for optimal performance.

However, most of this research remains cross-sectional, limiting our understanding of how resilience develops over time (Creswell & Poth, 2025). Longitudinal studies tracking athletes across training seasons would provide a clearer picture of how mindfulness shapes enduring emotional patterns.

Most studies relied on cross-sectional or short-term designs, limiting the ability to assess causality and the development of resilience over time. Sample sizes were frequently small and homogeneous, with limited representation across gender, culture, and competitive level. Self-report instruments dominated, with few behavioural or physiological measures corroborating improvements in resilience or locus of control (Si et al., 2024; Almansef & Almaghaslah, 2024; Ragborn et al., 2025; Zhang et al., 2025).

From a Flow Theory perspective, enhanced resilience and confidence facilitate entry into flow by reducing the disruptive impact of negative emotions and self-doubt (Csikszentmihalyi, 1990). SDT suggests that when mindfulness bolsters perceived competence and autonomy, athletes experience greater intrinsic motivation, enabling adaptive responses to setbacks and maintaining engagement in challenging tasks (Rogowska et al., 2024).

Future research should adopt longitudinal designs across competitive seasons to track the development of resilience and confidence, integrate physiological and behavioural indicators of emotional stability, and include more diverse and ecologically valid samples. Exploring the mechanisms through which mindfulness enhances locus of control may further elucidate pathways linking psychological resources to sustained flow.

Subtheme 2.3: Flow as a Mediator of Emotional Regulation

An emerging perspective suggests that the relationship between mindfulness and emotion regulation may be indirect, operating through flow experiences. Peng et al. (2025) proposed a sequential model in which mindfulness facilitates entry into flow, which then reduces anxiety and emotional interference. Furthermore, in a study by Rogowska & Tataruch (2024), when athletes are fully absorbed in the task, they report fewer intrusive thoughts and a greater sense of control, naturally stabilizing their emotional state. In this way, mindfulness does not merely regulate emotion, it creates the mental conditions where regulation occurs automatically.

This framing is particularly relevant for novice athletes, who may lack established coping strategies. Peng et al. (2025) found that mindfulness helped less-experienced athletes reduce cognitive anxiety by increasing their ability to enter flow states. The study suggests a reciprocal loop: mindfulness cultivates flow, and flow in turn reinforces emotional calm. Chen and Meggs (2021) further supported this link, showing that emotion regulation mediated the mindfulness-flow relationship among national-level swimmers.

Methodologically, many studies utilized small, non-random samples, often limited to student-athletes or national-level competitors, restricting generalizability. Cross-sectional designs dominated, precluding causal inference. Instruments used to measure flow and emotion

regulation (e.g., Flow State Scale, self-reported affect) may not capture transient or situationally specific states accurately (Freitag et al., 2023; Ragborn et al., 2025)

Flow Theory frames this mechanism as a feedback loop—mindfulness facilitates attentional absorption, which stabilizes emotions, reinforcing flow (Csikszentmihalyi, 1990). SDT complements this view: as athletes experience greater autonomy and competence in regulating their affect, intrinsic motivation strengthens, promoting continued engagement in mindful practice and performance tasks (Ryan & Deci, 2017).

Future directions include longitudinal studies tracking the mindfulness–flow–emotion regulation loop across training seasons, incorporating elite and novice athlete samples, and employing physiological markers of stress and affect alongside self-reports. Experimental designs could clarify causal pathways and verify whether flow consistently mediates emotional stability across contexts

Subtheme 2.4 Cultural and Developmental Moderators

Cultural and developmental differences influence how mindfulness shapes emotion regulation. Much of the current research has been conducted in Asian contexts, such as Peng et al. (2025), where mindfulness aligns more closely with cultural traditions of contemplation and acceptance (Rogge et al., 2024). Athletes from collectivistic cultures may approach mindfulness with fewer conceptual barriers and greater openness to its principles (Si et al., 2022; Liu et al., 2021). In contrast, Western athletes may emphasize performance outcomes over experiential awareness, which could limit depth of engagement (Hill et al., 2020; Garcia-Campayo et al., 2021).

Developmentally, younger athletes often show larger benefits from mindfulness interventions due to their still-maturing emotional and attentional systems (Su et al., 2024).

Wang et al. (2023) found that adolescents improved in emotional stability and stress recovery after mindfulness training, while elite professionals demonstrated smaller but still meaningful effects. Reinebo et al. (2024) added that mindfulness-based emotional regulation correlated with improved focus and confidence among junior athletes, emphasizing its value in early skill development. These findings highlight the need for sport-specific and developmentally appropriate adaptations to mindfulness programs.

Sample diversity is limited, with most studies focused on specific cultural contexts or age groups. Small sample sizes ($n = 20\text{--}50$) reduce statistical power, and reliance on self-report measures without cultural validation may affect reliability (Schutte & Malouff, 2023). Short intervention durations also limit insight into long-term effects.

Theoretical integration: Flow Theory posits that attentional absorption underlies emotional stability, but cultural and developmental factors modulate access to flow states (Csikszentmihalyi, 1990). SDT indicates that perceived competence and autonomy may be experienced differently across cultural and developmental contexts, influencing the motivational impact of mindfulness (Ryan & Deci, 2017).

Future directions include cross-cultural, longitudinal, and ecologically valid research that considers developmental trajectories, cultural values, and sport type. Tailoring mindfulness programs to specific age groups and cultural contexts could enhance emotional regulation, flow, and intrinsic motivation.

Theme 3: Mindfulness and Decentering/ Meta-Awareness

This theme was derived from studies that identified decentering, or meta-awareness, as a central cognitive mechanism linking mindfulness practice to improved focus, emotion regulation, and flow in athletes (Bernstein et al., 2019; Lange, 2025; Si et al., 2024). Articles addressing

cognitive flexibility, attentional monitoring, rumination, and neural correlates of awareness were clustered together under this theme (Bernstein et al., 2019; Diotaiuti et al., 2023). Decentering and meta-awareness are conceptually overlapping constructs—both refer to the ability to step back from thoughts and emotions, observe them as transient experiences, and maintain awareness of mental processes without immediate identification or reaction (Bernstein et al., 2019; Lange, 2025).

In the context of sport, this capacity enables athletes to detach from intrusive self-criticism, perfectionistic thoughts, or performance anxiety, redirecting focus toward the task at hand. As such, decentering is viewed as a metacognitive process that underpins flow states by reducing self-consciousness and cognitive interference (Lange, 2025; Bernstein et al., 2019; Si et al., 2024). Integrating Flow Theory and SDT throughout this theme illuminates how decentering fosters attentional absorption (a Flow mechanism) and enhances autonomy and competence (SDT constructs), promoting both performance and psychological well-being (Si et al., 2024; Ryan & Deci, 2017).

Decentering represents a shift from identifying with internal experiences to observing them with non-attachment (Lange, 2025; Bernstein et al., 2019). Within mindfulness frameworks, meta-awareness allows athletes to recognize when attention has wandered toward evaluative self-talk and consciously reorient to present moment sensations and performance cues (Moore et al., 2022; Bernstein et al., 2019).

Research in both clinical and performance contexts demonstrates that decentering reduces rumination and emotional reactivity, allowing athletes to interpret mistakes as information rather than as personal failure (Diotaiuti et al., 2023; Gold & Smout, 2024; Parham, 2022). This perspective aligns with Flow Theory, which posits that reduced self-referential thought facilitates

the merging of action and awareness, an essential feature of flow (Si et al., 2014). Similarly, SDT suggests that by fostering autonomy over mental responses, decentering enhances athletes' sense of agency and competence (Ryan & Deci, 2017).

From a methodological standpoint, studies examining decentering often rely on small, convenience samples ($n = 15-60$), which limits generalizability (Bernstein et al., 2019; Diotaiuti et al., 2023). Many employ cross-sectional or short-term pre-post designs, making it difficult to assess sustained effects of mindfulness training on meta-awareness (Schutte & Malouff, 2023; Diotaiuti et al., 2023). Moreover, decentering is frequently inferred through proxy measures such as reduced rumination or improved flow scores, rather than directly assessed using validated instruments like the Decentering Scale for Athletes or the Experiences Questionnaire (Diotaiuti et al., 2023). These methodological gaps restrict the precision and replicability of findings. Future research should employ longitudinal and mixed-method approaches, incorporating neurocognitive, behavioural, and self-report indicators to triangulate decentering outcomes (Hanley et al., 2020).

Evidence from sport-specific mindfulness interventions further illustrates the importance of decentering. The Mindfulness Sport Performance Enhancement (MSPE) program, for instance, explicitly trains nonjudgmental awareness and perspective-taking. Chen and Meggs (2021) found that MSPE significantly increased mindfulness and flow among national-level swimmers, with participants reporting a heightened ability to observe anxiety and self-doubt without disruption to performance. Similarly, Sparks and Ring (2022) implemented a rowing-specific mindfulness intervention that reduced “reinvestment,” the tendency to consciously monitor automated motor skills, and simultaneously increased flow experiences.

Although these outcomes suggest that mindfulness-based decentering helps athletes trust procedural memory and reduce performance anxiety, both studies relied heavily on self-report data, raising concerns about measurement validity and response bias. Additionally, limited demographic diversity and sport-type representation constrain generalizability. Incorporating objective performance indices (e.g., reaction time variability, motor consistency) and physiological measures (e.g., heart rate variability) would provide stronger evidence for the link between decentering and performance regulation (Diotaiuti et al., 2023).

Flow Theory supports these findings by positing that decreased self-conscious monitoring facilitates automaticity and task absorption (Csikszentmihalyi, 1990). SDT complements this by framing decentering as a mechanism that supports autonomy in self-regulation, athletes feel empowered to manage inner experiences, reinforcing intrinsic motivation and competence (Ryan & Deci, 2017). Together, these theoretical lenses explain how mindfulness-based decentering bridges cognitive and motivational processes to sustain optimal functioning.

Decentering also interrupts maladaptive cognitive patterns such as rumination and perfectionism, both of which undermine flow and confidence. Gold and Smout (2024) found that decentering decreased the intensity and persistence of ruminative thinking. Diotaiuti et al. (2023) similarly demonstrated that mindfulness interventions reduced rumination and improved task engagement among competitive athletes. Moore et al. (2022) highlighted that mindfulness trains athletes to perceive thoughts as transient mental events rather than facts, thereby increasing cognitive flexibility and reducing emotional interference.

However, methodological inconsistencies persist. Few studies distinguish between decentering and related constructs such as cognitive defusion or reappraisal, blurring conceptual clarity (Naragon-Gainey et al., 2023). Many interventions also lack long-term follow-up, limiting

insight into the durability of decentering effects. Incorporating longitudinal designs and neurocognitive measures, such as attentional control tasks or neural markers of self-referential activity, would clarify how decentering contributes to sustained performance and emotional regulation (Creswell & Poth, 2025).

Emerging neurophysiological research provides converging evidence for decentering's mechanisms. Studies report reduced activity in the default mode network (DMN), associated with self-referential processing, and enhanced connectivity between the anterior cingulate cortex and prefrontal cortex following mindfulness training (Rahrig et al., 2022; Wang et al., 2022). These changes reflect improved attentional monitoring and decreased self-focus, mirroring the phenomenological shift that defines flow. Physiologically, mindfulness correlates with improved heart rate variability (HRV) and faster recovery from stress, suggesting enhanced self-regulatory capacity (Diotaiuti et al., 2023).

Despite these promising findings, direct evidence connecting neurophysiological markers of decentering to flow experiences remains limited. Few sport-based studies integrate neural or physiological data with behavioural performance measures. Future research should adopt multi-level designs that combine self-reported mindfulness, neural activity, and objective performance metrics to capture the dynamic interplay between awareness, cognition, and embodiment. Such work would also strengthen external validity by testing athletes in real-world competitive contexts.

Synthesizing across these findings, decentering appears to function as a cognitive “bridge” between mindfulness and flow. Whereas attentional regulation stabilizes focus and emotional regulation manages arousal, decentering alters how athletes relate to internal experiences, promoting acceptance and psychological flexibility (Gold & Smout, 2024). This

triadic framework, attention, emotion, and decentering, provides a more comprehensive understanding of how mindfulness fosters optimal performance states.

Methodologically, the literature remains constrained by conceptual overlap, inconsistent measurement, and reliance on self-report proxies. Future research should prioritize validated decentering instruments, longitudinal and ecologically valid designs, and integration of physiological data. From an applied standpoint, mindfulness-based sport programs should explicitly incorporate decentering practices such as thought labelling, meta-cognitive reflection, and sensory grounding. Ethical practice guidelines, such as those outlined by the Canadian Psychological Association (CPA, 2017), should guide implementation to ensure emotional safety, particularly when mindfulness elicits challenging thoughts or memories.

Theoretically, Flow Theory and SDT converge to explain why decentering is pivotal: by reducing self-referential thought and enhancing autonomy in managing internal states, athletes experience greater attentional absorption, intrinsic motivation, and emotional balance (Csikszentmihalyi, 1990; Ryan & Deci, 2017; Wang & Demerin, 2023).

Overall, mindfulness fosters decentering by training athletes to step back from intrusive cognitions and engage in a nonjudgmental, present-centred mode of awareness. This metacognitive capacity reduces cognitive interference, stabilizes attention, and creates the psychological conditions for flow to emerge. While empirical evidence is still developing, decentering represents a promising and underexplored mechanism through which mindfulness optimizes both performance and well-being (Diotaiuti et al., 2023; Rogowska et al., 2024).

Theme 4: Mindfulness and Resilience as a Mediator of Flow

This theme was derived from a synthesis of empirical studies examining how mindfulness enhances psychological resilience, which in turn facilitates athletes' capacity to

achieve and sustain flow states. Across the reviewed literature, resilience consistently emerged as both a product of mindfulness training and a mediating pathway linking mindfulness to optimal performance. The synthesis process drew on recurrent conceptual linkages identified in studies utilizing cross-sectional, quasi-experimental, and longitudinal designs, where resilience repeatedly appeared as the psychological bridge connecting mindfulness and flow.

Although the studies varied in design—primarily cross-sectional and quasi-experimental, with sample sizes ranging from 45 to 300 competitive athletes across diverse sports (Liu et al., 2021; Martiny et al., 2023), many exhibited sampling limitations that constrained generalizability, including overrepresentation of university-level and Western athletes. Future research should broaden recruitment to include athletes from diverse cultural and socioeconomic contexts, particularly Indigenous and collectivist sport systems, to explore whether resilience manifests differently across cultural frameworks.

While most studies relied on self-report measures such as the Connor–Davidson Resilience Scale and the Flow State Scale, internal consistency was generally strong ($\alpha > .80$). However, self-report bias and lack of triangulation with behavioural or physiological markers limit construct validity, suggesting that future investigations incorporate mixed-methods designs or objective flow indices (e.g., performance analytics, heart-rate variability) (Schutte & Malouff, 2023).

Resilience, broadly defined as the capacity to adapt and recover from stressors, has emerged as a critical psychological resource for athletes navigating the challenges of competitive sport (Grygorenko & Naydonova, 2023). Unlike momentary attentional or emotional shifts cultivated by mindfulness, resilience reflects a more enduring psychological capacity that allows athletes to sustain balance and maintain motivation under pressure (Liu et al., 2021). Within the

mindfulness–flow literature, this enduring stability aligns with Self-Determination Theory (SDT), particularly the need for competence and autonomy, as mindfulness fosters the psychological safety necessary for athletes to persist and grow from setbacks (Peng et al., 2025).

Recent integrative models conceptualize resilience as a mediating bridge between mindfulness and flow, suggesting that resilient athletes sustain the consistent effort and emotional regulation required for deep task absorption (Liu et al., 2021; Stoyanova et al., 2025).

Subtheme 4.1: Resilience as a Mediator

Empirical research directly testing resilience as a mediator between mindfulness and flow is growing. Liu et al (2021) provided one of the clearest demonstrations of this mechanism. In their study of competitive athletes, resilience significantly explained the relationship between mindfulness training and increased flow frequency. While this finding is robust, the sample was limited to 85 collegiate athletes, primarily male, which constrains transferability to female and non-binary athletes or to non-Western contexts. Moreover, the cross-sectional design precludes causal inference, underscoring the need for longitudinal replication (Ding et al., 2025).

Similarly, Oguntuase and Sun (2022) found that elite football players who underwent an eight-week mindfulness intervention demonstrated greater resilience, emotional stability, and confidence. The study also identified locus of control as a mediating factor; athletes who believed they could influence outcomes through effort and focus exhibited stronger resilience and higher flow experiences. While locus of control and resilience are related, they are distinct constructs. Locus of control refers to an individual's belief about the degree to which they can control events affecting their performance, whether outcomes are internally driven, by effort and skill or externally determined by luck or circumstance (Rotter, 1966). Resilience, in contrast, reflects the capacity to recover, adapt, and persist in the face of adversity (Liu et al., 2021). In

sport contexts, an internal locus of control may strengthen resilience by fostering perceptions of agency and responsibility, yet resilience also encompasses emotional and cognitive flexibility that extends beyond control beliefs alone (Amar et al., 2023). However, the absence of an active control condition limits attribution of effect specifically to mindfulness, as improvements may stem from expectancy or placebo influences. Future research should adopt randomized controlled trials with blinding to strengthen internal validity (Hohnemann et al., 2024).

Supporting evidence from Wu et al. (2021) and Martiny et al. (2023) reinforces the consistency of this relationship across sports. Both studies found that improvements in resilience following mindfulness-based programs predicted enhanced flow and performance outcomes. Collectively, these findings suggest that resilience represents both a product of mindfulness and a precondition for optimal performance. Yet, these studies also relied on self-selection into intervention groups, potentially inflating results through sampling bias. Future studies should use stratified sampling to ensure representation across performance levels and gender identities, particularly within culturally diverse athletic communities (Si et al., 2024).

Subtheme 4.2: Mechanisms Linking Mindfulness to Resilience

The mechanisms through which mindfulness enhances resilience appear multifaceted. Mindfulness promotes acceptance of discomfort, cognitive reappraisal, and self-regulation, each of which contributes to resilient functioning (Tamminen et al., 2021; Stoyanova et al., 2025).

These processes align with Flow Theory's emphasis on balancing challenge and skill, as mindful athletes are better able to regulate anxiety and maintain concentration during demanding tasks

Athletes who practice mindfulness report less emotional volatility and a greater ability to maintain perspective after setbacks, thereby reducing the cognitive and emotional costs of

adversity (Wang et al., 2023; Rogowsak & Tataruch, 2024). However, the majority of these studies use Western conceptualizations of resilience emphasizing individual coping rather than relational or community-based resilience, which are central in collectivist and Indigenous frameworks. Future research should adapt measurement tools to reflect these broader cultural dimensions

Neurobiological findings support these psychological mechanisms. Mindfulness training has been shown to increase activation in the prefrontal cortex, a region associated with executive control and emotion regulation, while reducing reactivity in the amygdala, which is associated with stress responses (Calderone et al., 2024; Rathore et al., 2023). These neural adaptations likely underpin resilience by enhancing top-down regulation and reducing physiological hyperarousal under stress (Nestler & Russon, 2024). Despite the promise of these findings, most neuroimaging samples are small ($n < 30$), raising concerns about statistical power and replicability. Employing larger, multisite collaborations could enhance reliability and generalizability

Furthermore, mindfulness fosters self-compassion, which enhances resilience by reducing self-blame and encouraging persistence (Gold & Smout, 2024; Wei et al., 2023). Athletes high in self-compassion demonstrate more adaptive coping, faster emotional recovery, and greater motivation to improve errors. In this sense, mindfulness cultivates not just toughness but psychological adaptability, a flexible mindset conducive to flow (Wang et al., 2023; Rogowska et al., 2024). SDT, self-compassion can be understood as supporting athletes' relatedness needs, fostering internal motivation and intrinsic satisfaction, core pathways to flow.

Theme 5: Mindfulness-Based Programs and Interventions

This theme was derived from an in-depth synthesis of intervention-based studies examining how structured mindfulness programs enhance flow, emotional regulation, and performance outcomes in athletes. The studies reviewed included randomized controlled trials, quasi-experimental designs, and longitudinal programs with sample sizes ranging from 40 to 350 athletes across various sports such as swimming, football, and rowing (Chen & Meggs, 2021; Martiny et al., 2023; Wang et al., 2023). Reliability indices for instruments such as the Mindful Attention Awareness Scale (MAAS), Five Facet Mindfulness Questionnaire (FFMQ), and Flow State Scale (FSS) were consistently strong ($\alpha > .80$). However, the predominance of self-report measures and limited follow-up periods reduces generalizability, underscoring the need for long-term, multi-method investigations.

Beyond examining isolated psychological mechanisms, researchers have increasingly focused on program-based interventions designed to apply mindfulness principles in sport-specific contexts (Wang et al., 2023; Wong et al., 2022). These programs represent the practical translation of theory into applied training environments and provide structured frameworks for cultivating mindfulness in athletes. They are particularly important because they shift the discussion from conceptual mechanisms to systematic, evidence-based practice, offering insights into how athletes and coaches can integrate mindfulness training into regular performance routines. Among the most well-documented approaches are Mindful Sport Performance Enhancement (MSPE), sport-specific adaptations of mindfulness-based protocols, and multi-component programs such as the Flow Training Program (FTP) (Chen & Meggs, 2021; Martiny et al., 2023).

Subtheme 5.1: Mindful Sport Performance Enhancement (MSPE)

The MSPE program is among the most widely implemented sport-specific mindfulness interventions. Developed as an adaptation of Mindfulness-Based Stress Reduction (MBSR), MSPE integrates formal mindfulness practices, such as mindful breathing, body scans, and open monitoring, with sport-specific applications such as breath awareness during competition and mindful recovery routines (Gardner & Moore, 2012).

Chen and Meggs (2021) examined the effects of MSPE in national-level swimmers, finding significant improvements in both state mindfulness and flow after eight weeks of training. Athletes reported increased present-moment awareness, reduced cognitive interference during competition, and greater perceived control during performance, key components of both Flow Theory, absorption, merging of action, and awareness, and SDT, competence and self-regulation.

From a methodological standpoint, Chen and Meggs' study employed a moderate sample ($n = 60$) with a pre–post design and validated psychometric tools (MAAS, FSS), enhancing internal consistency. However, its reliance on self-reported performance outcomes and lack of physiological data (e.g., heart rate variability, cortisol) limit ecological validity. Future MSPE studies should integrate objective performance metrics to triangulate findings (Creswell & Poth, 2025).

Meta-analytic evidence reinforces the efficacy of MSPE-like interventions. Wang et al. (2023) synthesized 35 randomized controlled trials and reported moderate-to-large pooled effects ($d = .60-.75$) for mindfulness-based programs on flow, attentional regulation, and performance outcomes. Similarly, Si et al. (2022) identified attentional mechanisms as the key mediating pathway linking mindfulness to flow, corroborating the attentional absorption mechanisms

central to Flow Theory. However, methodological discrepancies—including variation in program duration (1–12 weeks), delivery format (facilitator-led vs. self-guided), and measurement instruments (MAAS, FFMQ, FSS)—reduce precision and highlight the need for standardized implementation protocols (Ronkainen et al., 2024).

Calderone et al. (2024) further provide neurobiological validation through systematic review evidence showing enhanced functional connectivity between the prefrontal cortex and limbic regions following mindfulness training. This finding supports the neural basis for improved cognitive flexibility and emotional regulation—both critical for sustained flow states in MSPE-trained athletes.

Subsequent replications (Reinebo et al., 2024; Ronkainen et al., 2024) confirm MSPE's adaptability across both elite and developmental athletes, supporting its cross-sport applicability. Nonetheless, sample diversity remains limited, with few studies addressing gender or cultural variations in mindfulness receptivity, an important consideration given mindfulness's cultural origins and varying interpretations of focus and control.

Subtheme 5.2: Sport-Specific Adaptations and Contextual Tailoring

One of the defining characteristics of mindfulness interventions in sport is their contextual adaptability. Sparks and Ring (2022) designed a rowing-specific mindfulness intervention to address the unique attentional and motor coordination challenges of the sport. Results demonstrated significant increases in mindfulness, flow, and performance, alongside reductions in reinvestment, which is the tendency to overthink or consciously control motor movements under pressure.

The reduction in reinvestment illustrates how mindfulness supports decentering, the ability to observe one's internal state without over-identification (Diotaiuti et al., 2023). Athletes

who trained in mindfulness demonstrated greater ease in letting go of intrusive self-monitoring, allowing for smoother execution of learned skills.

Other sport-specific adaptations have been trialled in basketball, soccer, and endurance sports, each emphasizing environmental integration (Ronkainen et al., 2024; Liu et al., 2021). Across these studies, interventions embedded into regular training sessions yielded greater ecological validity than isolated classroom-style sessions. This suggests that the situated delivery of mindfulness enhances transferability to competitive performance contexts.

Supporting these findings, meta-analytic data (Wang et al., 2023) revealed that sport-integrated mindfulness interventions—those embedded in daily training rather than classroom-only settings—produced stronger effect sizes ($d = .60-.75$) for flow and performance outcomes. These results reinforce the ecological value of contextual tailoring, as situational immersion facilitates the automaticity and attentional absorption required for flow.

Methodologically, these studies used small to moderate samples ($n = 40-80$) and quasi-experimental designs, limiting statistical generalizability. However, embedding mindfulness training into regular practice sessions enhanced ecological validity, suggesting that integrated delivery within sport environments may yield stronger transfer effects (Ronkainen et al., 2024).

Meta-analytic and systematic review evidence also highlight methodological diversity in these interventions. Si et al. (2022) found that shorter interventions (<8 weeks) still produced moderate improvements in attentional control and emotion regulation, though sustainability beyond 3 months remains unclear. Calderone et al. (2024) provided converging neurobiological evidence that these attentional benefits correspond with enhanced prefrontal-limbic coordination, supporting both cognitive stability and emotional composure during competitive events.

Subtheme 5.3: Multi-Component Programs and Integrative Models

Recent interventions have moved toward multi-component approaches that combine mindfulness with complementary psychological skills training. Martiny et al. (2023) developed the Flow Training Program (FTP), which integrates mindfulness practices with decision-making and emotional regulation strategies. Results showed significant improvements in resilience, self-regulation, and flow frequency, emphasizing that mindfulness provides a foundational skill upon which other psychological tools can build.

Similarly, Wu et al. (2024) found that mindfulness training improved both mental toughness and psychological skill acquisition among collegiate athletes. These findings align with emerging evidence suggesting that multi-skill interventions may yield synergistic effects, improving both psychological flexibility and performance outcomes (Stoyanova et al., 2024).

However, while integration enhances ecological validity, it complicates attribution. It remains difficult to isolate the unique contribution of mindfulness when combined with overlapping constructs such as cognitive reframing or goal setting (Creswell & Poth, 2025).

Programmatic approaches such as the Flow Training Program (Martiny et al., 2023) and Mindfulness-Based Cognitive Resilience Training (MBCRT) (Lange, 2025) exemplify how mindfulness principles are operationalized to enhance both resilience and flow. Martiny et al. (2023) found that integrating mindfulness with self-regulation and decision-making strategies led to measurable increases in resilience and flow frequency among athletes, suggesting that mindfulness-based interventions foster a dual pathway of emotional stability and attentional absorption. Similarly, MBCRT—adapted from Mindfulness-Based Cognitive Therapy (MBCT)—emphasizes cognitive defusion and acceptance to strengthen resilience under stress. Early findings indicate that MBCRT participants experience fewer stress-related symptoms and

more consistent flow experiences (Reinebo et al., 2024). Despite encouraging results, methodological heterogeneity—such as small samples, mixed components, and reliance on self-report measures—limits causal inference, reinforcing the need for dismantling designs to isolate mindfulness-specific effects (Creswell & Poth, 2025).

Meta-analytic and systematic review data provide important corroboration for these integrated frameworks. Wang et al. (2023) and Si et al. (2022) reported consistent moderate-to-large pooled effects across studies employing hybrid mindfulness–skills models, indicating that combining mindfulness with emotional regulation or cognitive restructuring enhances performance outcomes beyond mindfulness alone. However, heterogeneity in intervention structure and assessment methods complicates interpretation and underscores the need for factorial study designs to isolate mindfulness-specific contributions.

Calderone et al. (2024) extend this evidence with neurobiological data linking mindfulness-based integrative training to increased connectivity between prefrontal control regions and emotion-processing networks—mechanisms aligned with SDT’s emphasis on self-regulation and competence satisfaction.

Despite encouraging evidence, methodological heterogeneity complicates interpretation. Studies often combine mindfulness with overlapping constructs (e.g., goal setting, cognitive reframing), making it difficult to isolate mindfulness-specific effects (Creswell & Poth, 2025).

Meta-analytic and systematic review findings further validate these results. Wang et al. (2023) and Si et al. (2022) reported moderate-to-large, pooled effects of mindfulness-based interventions on flow, attentional control, and emotional regulation across 35 randomized controlled trials. However, methodological discrepancies—such as intervention length (1–12 weeks), facilitator expertise, and diverse assessment tools (MAAS, FFMQ, FSS)—introduce

variability that reduces replication precision (Ronkainen et al., 2024). A more recent systematic review by Calderone et al. (2024) identified neurobiological corroboration, revealing increased functional connectivity between the prefrontal cortex and limbic regions following mindfulness training, a mechanism supporting both cognitive flexibility and emotional stability, core precursors of flow.

Integrating Flow Theory and SDT, these results suggest that mindfulness-based interventions simultaneously enhance attentional absorption (flow) and satisfy psychological needs for competence and autonomy (SDT), creating durable motivational and cognitive conditions for peak performance.

Across these programs, several limitations persist. Most studies employ short-term interventions with small, homogenous samples, limiting generalizability to diverse cultural and developmental contexts. The majority rely on self-report data, which may inflate perceived mindfulness gains due to social desirability bias. Future research should integrate behavioral and physiological indicators (e.g., gaze tracking, heart rate variability) alongside validated scales to strengthen construct validity. Additionally, cross-cultural investigations should examine how cultural conceptualizations of focus, effort, and self-regulation influence program effectiveness (Si et al., 2022).

Overall, meta-analytic and systematic reviews converge in affirming that mindfulness-based interventions—whether MSPE, sport-specific, or multi-component—enhance flow, attentional control, and emotional stability through mechanisms consistent with Flow Theory and SDT. By addressing attentional absorption (flow) and satisfying competence and autonomy needs (SDT), these interventions create durable cognitive-emotional states conducive to peak performance.

Altogether, mindfulness-based interventions provide a robust empirical and theoretical foundation for enhancing flow and self-determined performance in athletes. By combining structured practice, contextual adaptation, and psychological integration, these programs bridge the gap between theory and application—positioning mindfulness as a cornerstone of evidence-based sport psychology.

Identified Gaps in the Literature

Although the body of research on mindfulness and flow in athletes has grown considerably over the past decade, several gaps and limitations remain evident across the literature. These gaps restrict the ability to draw firm conclusions about the mechanisms through which mindfulness enhances athletic performance and highlight critical directions for future research.

One of the most consistent gaps in the literature is the lack of longitudinal studies. Most interventions examined in the reviewed studies, including MSPE, the rowing-specific mindfulness program, and the Flow Training Program, were conducted over relatively short durations, typically ranging from several weeks to a few months (Chen & Meggs, 2021; Sparks & Ring, 2022; Martiny et al., 2023). While these studies demonstrated encouraging improvements in mindfulness, flow, and related psychological skills, it remains unclear whether such benefits persist over the course of an athletic season, multiple years or an athlete's career (Rohrer & Murayama, 2023). Long-term follow-ups are particularly important for understanding whether mindfulness training can support resilience and performance sustainability in the face of ongoing competitive pressures, injuries, and career transitions. Without longitudinal evidence, conclusions about the durability of mindfulness effects remain tentative.

Another significant gap concerns the cultural diversity of research participants. A number of interventions have been carried out in Asian and European contexts, with relatively fewer studies based in North America or involving athletes from culturally diverse backgrounds. This uneven distribution raises questions about the cultural transferability of findings (Shea et al., 2022). Mindfulness has roots in Eastern contemplative traditions, and its integration into Western sport psychology may require cultural adaptation (Garcia-Campayo et al., 2021). Athletes' interpretations of mindfulness practices, as well as their receptivity to interventions, may differ across cultural contexts. Without a more global representation of participants, it is difficult to determine whether existing programs are equally effective across cultures or whether cultural tailoring is required.

The literature also reveals an over-reliance on elite or highly competitive athletes, with less attention paid to youth, developmental, or recreational populations. For example, Chen and Meggs (2021) studied national-level swimmers, while Sparks and Ring (2022) focused on competitive rowers, and Martiny et al. (2023) examined elite handball players. While these populations provide insight into how mindfulness supports performance under high-stakes conditions, they may not reflect the broader population of athletes who could also benefit from mindfulness training. Given that many athletes encounter stress, anxiety, and performance pressures at varying levels of competition, it is important to examine whether mindfulness interventions are effective for athletes at earlier stages of development for those engaged in sport primarily for health and recreation.

Mechanism-specific research also remains underdeveloped. While studies consistently demonstrate that mindfulness is associated with improvements in flow, fewer studies explicitly test the mediating mechanisms of attentional control, emotion regulation, decentering, and

resilience (Wang et al., 2023; Si et al., 2022). For instance, Gu et al. (2022) provided some evidence for emotion regulation pathways, and Liu et al. (2021) identified resilience as a mediator of the mindfulness-flow link, but decentering and meta-awareness have received comparatively less attention. Sparks and Ring (2022) indirectly addressed decentering through reductions in reinvestment, yet few studies have examined this construct explicitly. This imbalance limits the ability to fully understand how different psychological processes contribute to athletes' capacity to achieve and sustain flow.

Methodological variability across studies presents another limitation. The reviewed literature employed diverse intervention protocols, ranging from brief mindfulness inductions to multi-week programs (Wu et al., 2022; Chen & Meggs, 2021; Martiny et al., 2023). The frequency and duration of sessions, the inclusion of home practice, and the use of guided versus self-directed formats varied considerably. Similarly, outcome measures were inconsistent, with some studies relying on self-report questionnaires and others including behavioural or performance metrics. While meta-analyses by Wang et al. (2023) and Si et al. (2022) consolidated findings, they also highlight that methodological heterogeneity complicates direct comparisons across studies and limits the identification of best practices for intervention, design and delivery.

Finally, ethical considerations in research design are often under-discussed in the literature. Few studies provided detailed accounts of how they addressed issues such as informed consent, withdrawal, or participant well-being during interventions (Canadian Psychological Association [CPA], 2017). An example of this is that while mindfulness programs are generally considered low-risk, they may surface emotional distress or heightened awareness or internal

states, which could be challenging for some athletes. Explicitly addressing how researchers manage these risks would strengthen the ethical integrity of mindfulness intervention research.

Taken together, these gaps indicate that while the evidence base for mindfulness in sport is promising, it is not yet comprehensive. Addressing these limitations will require studies that adopt longitudinal designs to examine the robustness of effects, expand participant samples to include culturally diverse, youth, and recreational athletes, focus on mechanism-specific hypotheses, standardize intervention protocols and outcome measures where possible, and integrate stronger ethical reporting practices. By advancing research in these areas, future studies will provide a more nuanced understanding of how mindfulness facilitates flow and how these practices can be responsibly and effectively implemented in sport contexts.

In sum, advancing this field will require longitudinal designs to test the durability of effects, culturally diverse and developmentally varied samples, mechanism-specific hypotheses with validated measures, and stronger ethical reporting.

Ethical Considerations

This section outlines the ethical principles and safeguards relevant to mindfulness-based interventions in sport psychology. It examines how informed consent, confidentiality, risk assessment, transference and countertransference, boundary management, and ongoing monitoring are addressed to ensure interventions are conducted with integrity and respect for athlete well-being. The discussion emphasizes ethical responsibilities of therapists delivering interventions, rather than general research design considerations.

Informed Consent and Withdrawal

A core principle of ethical research involving human participants is the requirement of informed consent. According to the Tri-Council Policy statement: Ethical Conduct for Research

Involving Humans (TCPS2), informed consent must be understood as both a process and a continuing obligation rather than a one-time agreement (TCPS2, 2022). Within the context of mindfulness interventions in sport, informed consent entails ensuring that athletes understand the purpose of the study, the nature of mindfulness training, potential risks and benefits, and their right to decline or withdraw without penalty. Several studies explicitly report these procedures, including Chen & Meggs (2021) and Sparks & Ring (2022), who reminded participants of their rights throughout the intervention. Researchers should particularly emphasize voluntariness when working in high-performance sport contexts, where implicit pressures from coaches or organizations may compromise genuine choice (TCPS2, 2022). Martiny et al. (2023) highlight strategies for minimizing undue influence, such as independent recruitment and private consent procedures.

Withdrawal is a particularly relevant consideration in mindfulness-based research. Some athletes may experience discomfort, heightened emotional awareness, or frustration during mindfulness exercises (Oguntuase & Sun, 2022; Sparks & Ring, 2022). It is critical that participants are reminded throughout the study that they may stop participating at any point, without any negative impact on their athletic career or relationship with coaches, teammates, or researchers (CPA, 2017). Studies like Spark & Ring (2022) describe protocols where withdrawal reminders were integrated at multiple stages, ensuring participants retained autonomy. Clear communication of these rights upholds the ethical principles of free and informed choice while reducing the risk of coercion. By implementing these safeguards, researchers align with TCPS2 (2022) and CPA (2017) recommendations, ensuring consent reflects genuine participant choice.

Confidentiality

Confidentiality is another central obligation in psychological research and practice. The CPA Code of Ethics (2017) highlights the duty to safeguard personal information and only disclose data under conditions of informed consent, legal requirement, or significant risk of harm. In sport-related mindfulness interventions, confidentiality must be addressed with particular sensitivity because athletes often operate in small, close-knit teams of organizations where anonymity can be difficult to maintain. For instance, in group-based interventions such as the Flow Training Program with handball athletes, there is a risk that personal disclosures made during mindfulness sessions could unintentionally be shared outside the group context (Martiny et al., 2023). Additional examples include MSPE interventions where data was anonymized and ground rules for confidentiality were explicitly communicated to participants (Chen & Meggs, 2021).

To uphold confidentiality, researchers and practitioners must implement safeguards such as anonymized data, securely storing records, and emphasizing ground rules in group interventions (CPA, 2017). The TCPS2 (2022) further stresses that researchers have a responsibility to clearly communicate how data will be collected, used, stored, and destroyed. Athletes must also be informed about the limits of confidentiality, such as situations involving risk of harm to self or others. These measures help protect participant privacy and maintain trust in the intervention process.

Deception

Deception in psychological research refers to the intentional withholding or misrepresentation of information provided to participants (CPA, 2017). The TCPS2 (2022) states that deception should only be used when absolutely necessary to answer the research question

and when no alternative methodology is available. Within the literature on mindfulness and flow, deception is rarely employed because interventions are generally transparent about their aims, practices, and expected outcomes (Chen & Meggs, 2021; Sparks & Ring, 2022).

However, subtle forms of deception can still occur. For example, athletes might not be fully informed of the hypotheses being tested, such as whether flow is expected to improve through a specific psychological mechanism, to minimize expectancy effects. Wang et al. (2023) report strategies for minimizing expectancy effects without resorting to full concealment of hypotheses.

The CPA Code of Ethics (2017) emphasizes the importance of honesty and transparency wherever possible, recommending that researchers avoid deception unless the scientific value of the study is compelling and the potential harms are minimal. Given that athletes may already be navigating complex performance pressures, additional deception risks undermine trust in both the research process and the therapeutic potential of mindfulness interventions. For this reason, Wang et al. (2023) have recommended that mindfulness and sport psychology studies avoid unnecessary concealment of study purposes and instead mitigate expectancy effects through careful design and appropriate statistical controls.

Debriefing

When deception is employed, or when participants are unclear about the full purpose of the intervention, debriefing is a critical ethical safeguard (CPA, 2017). The TCPS2 (2022) requires that participants be provided with a full explanation of the study's aims, procedures, and findings as soon as possible after participation. In the case of mindfulness and flow studies, debriefing also provides an opportunity to reinforce key skills, offer psychoeducation, and clarify how the research contributes to broader sport psychology. Chen & Meggs (2021) and Peng et al.

(2025) describe structured debriefing sessions where participants were guided to consolidate skills, ask questions, and access additional support.

Best practice involves structured debriefs that not only clarify study aims but also reinforce mindfulness skills and provide athletes with psychoeducational resources for continued independence (CPA, 2017). Some participants may experience increased awareness of stress, frustration with performance, or vulnerability from self-disclosure in group settings (Peng et al., 2025). Debriefing provides a safe opportunity for reflection, addressing these experiences while preventing lasting distress.

Providing structures opportunities to process these experiences, ask questions, and access additional resources, such as mental health support, helps ensure that participation leaves no lasting harm (TCPS2, 2022). The CPA (2017) further notes that debriefing should restore autonomy, clarify misconceptions, and allow participants to withdraw their data if uncomfortable.

Ethics in Interventions

Ethical considerations extended beyond research design and into the delivery of mindfulness-based interventions with athletes. Due to interventions involving the direct application of psychological techniques, they require heightened attention to clinical ethics, including risk assessment, managing relational dynamics, and monitoring unintended consequences (TCPS2, 2022).

Risk Assessment

Although mindfulness is generally considered a low-risk intervention, it is not without potential psychological challenges. Some athletes may initially experience heightened awareness of stress, frustration, or intrusive thoughts as a result of increased attention to internal states

(Oguntuase & Sun, 2022). In highly competitive environments, this heightened sensitivity could temporarily impair confidence or performance. According to the CPA Code of Ethics (2017), psychologists should therefore implement ongoing risk assessment, including regular check-ins, monitoring for adverse effects, and providing access to additional psychological support if needed. These practices align with the TCPS2 (2022), which requires that foreseeable risks be clearly identified, disclosed, and managed. Therapists should ensure athletes have access to support if heightened awareness of distress occurs.

Transference and Countertransference

Interventions that involve repeated mindfulness training sessions may create relational dynamics similar to those encountered in therapeutic practice (CPA, 2017). Transference occurs when athletes project feelings associated with other relationships, such as with coaches or authority figures, onto the facilitator (Prasko et al., 2022). Countertransference, the facilitator's emotional response to the athlete, is also possible. These processes are more likely when interventions are longitudinal and relational, such as MSPE or Flow Training. An example of this would be if a therapist overly identifies with an athlete's competitive stress or minimizes disclosures of vulnerability due to personal bias. Both processes, if left unexamined, can distort the intervention relationship and compromise ethical practice. The CPA Code of Ethics (2017) emphasizes the principles of integrity in relationships, requiring practitioners to remain self-aware, seek supervision if necessary, and prioritize the well-being of participants over personal reactions. Facilitators must actively monitor their own reactions, seek supervision, and maintain self-reflective practice to avoid enmeshment or bias (CPA, 2017).

Boundary Management

In sport contexts, boundary management presents unique ethical challenges. Athletes may view facilitators as both researchers and potential performance enhancers, leading to blurred expectations about confidentiality or role boundaries (Martiny et al., 2023). To mitigate these risks, facilitators must clarify their role at the outset, establish firm boundaries around the nature of intervention, and ensure that athletes understand the distinction between participation in research and therapeutic or coaching services (TCPS2, 2022). This distinction supports the TCPS2 (2022) requirement that participants not be misled about the nature of their involvement and helps avoid conflicts of interest. Maintaining clear distinctions between research, performance coaching, and therapy is essential for avoiding role confusion and potential conflicts of interest.

Ongoing Monitoring and Feedback

Therapists facilitating mindfulness-based interventions must engage in ongoing monitoring and provide transparent feedback throughout the program (CPA, 2017). Athletes should have opportunities to share their experiences, express concerns, and process emotional responses during sessions. This practice reflects the CPA's emphasis on respect for participants' dignity and autonomy and supports ethical therapeutic care. Debriefings and in-session reflections should reinforce skills taught in mindfulness exercises, enabling athletes to apply these strategies independently while maintaining emotional safety. Regular feedback also helps therapists identify and respond to emerging distress, strengthen the therapeutic alliance, and ensure that interventions remain supportive and responsive to each athlete's needs (Ronkainen et al., 2025)

Chapter Four: Application to Clinical Practice

The objective of this study was to explore the mechanisms through which mindfulness fosters flow in athletes and to consider how these findings can inform clinical practice. This chapter builds on the literature reviewed in Chapter Two and framed in Chapter Three, extending the discussion to practical, scientific, and societal applications. Specifically, it addresses clinical/therapeutic applications, contributions to scientific knowledge, contributions to the well-being of society, and cultural/diversity considerations.

Clinical/Therapeutic Applications

The findings from the literature highlight several mechanisms by which mindfulness can be applied to clinical and sport psychology practice with athletes (Wang et al., 2023; Chen & Meggs, 2021). Emotional regulation, attentional control, and self-awareness consistently emerged as mediators linking mindfulness practice to the experience of flow (Buhlmayer et al., 2017). Understanding these mechanisms has practical utility for clinicians and sport psychology practitioners in designing interventions that enhance athletic performance and psychological well-being.

Integrating Common Factors in Athlete Development

Mindfulness in sport highlights transferable skills such as present-moment awareness, non-judgmental acceptance, and emotional stability. These are not bound to a single intervention but represent broad psychological resources that can be intentionally developed across diverse sport contexts (Rogowska & Tataruch, 2024). Clinicians can integrate mindfulness principles alongside existing performance strategies, such as goal-setting or pre-performance routines, to create comprehensive and individualized plans for athletes (Sparks & Ring, 2022).

Programming and Ecological Approaches

Intervention studies suggest that sport-specific tailoring enhances ecological validity (Hill et al., 2020). Embedding mindfulness within the broader setting of training, such as team warm-ups, recovery sessions, or coach-led discussions, promotes consistency and reinforces the transfer of skills beyond isolated practice sessions (Oguntuase & Sun, 2022). This ecological integration mirrors the systematic approaches emphasized in therapeutic residential care and underscores the importance of creating an overall environment supportive of mindfulness.

Therapeutic Interventions for Performance and Well-being

Evidence supports the clinical utility of mindfulness-based programs such as MAC and MSPE. These interventions reduce performance anxiety, foster attentional stability, and increase flow states in both elite and recreational athletes (Chen & Meggs, 2021). Clinicians working with athletes can adapt these protocols or draw on their principles in one-on-one counselling, group workshops, or integrated performance programs. The clinical implication is clear: mindfulness-based interventions are efficient in sport contexts and can be implemented flexibly to meet the needs of athletes across competitive levels (Parham, 2022).

Systems Analysis in Sport Settings

Findings also highlight the importance of collaboration between clinicians, coaches, and sport organizations. Athletes' engagement with mindfulness and flow is influenced by team culture, coach attitudes, and organizational support (Ely et al., 2021). A systems-oriented perspective encourages practitioners to work not only with individual athletes but also to advocate for structural supports, such as organizational buy-in, coach education, and consistent program delivery (Oguntuase & Sun, 2022). Failing to address these systemic factors risks reducing intervention efficacy.

Contributions to Scientific Knowledge

The findings of this literature review emphasize the role of mindfulness in facilitating flow in sport contexts. The research reviewed underscores that mindfulness influences athletes' psychological functioning through specific mechanisms, most notably emotion regulation, attentional control, and self-awareness (Rogowska & Tatruch, 2024). Collectively, these findings emphasize nuanced insights into theoretical models of flow by situating mindfulness as both a preventative, by reducing performance anxiety, and promotive, by enhancing optimal experience, factor (Csikszentmihalyi, 1990).

Empirical studies in this area provide converging evidence that mindfulness-based interventions (MBIs) are effective in athletic contexts (Wang et al., 2023). Randomized controlled trials, quasi-experimental designs, and systematic reviews all highlight consistent improvements in flow, reduced cognitive interference, and enhanced psychological flexibility (Liu et al., 2021). However, methodological limitations, such as small sample sizes, heterogeneous measures, and a lack of long-term follow-up, still constrain the generalizability of mindfulness into sport psychology practice (Jamshidi et al., 2023). Consequently, future research should prioritize methodological rigour to support more confident translation of findings into applied settings.

From a scientific perspective, the reviewed literature signals three major contributions. First, it clarifies the mediating role of psychological mechanisms such as emotional regulation in the mindfulness-flow relationship (Tamminen et al., 2021). Second, it highlights the importance of sport-specific adaptations to mindfulness programs, which strengthens ecological validity and theory-practice translation (Hill et al., 2020). Third, it identifies methodological challenges, such as variability in flow measurement and inconsistent intervention protocols, that must be

addressed to advance the field (Ely et al., 2021). These insights provide direction for future studies aiming to strengthen evidence-based sport psychology practice.

Contributions to the Well-being of Society

The thematic findings of this capstone project advocate the integration of mindfulness and flow in athletic contexts which has implications that extend beyond performance outcomes. Improving athletes develop healthier coping strategies, reduce stress, and prevent burnout (Buhlmayer et al., 2017). These benefits are not only relevant to performance but also to athletes' long-term mental health and post-career adjustment. Supporting athletes in this way aligns with broader societal goals of promoting resilience, well-being, and sustainable engagement in sport (Grygorenko & Naydonova, 2023).

At the community level, the thematic findings emphasize that athletes who cultivate mindfulness and demonstrate balanced emotional regulation may serve as positive role models for younger athletes and peers (Tamminen et al., 2021). Their capacity to model adaptive coping strategies and balanced approaches to competition contributes to healthier sport environments. This is particularly significant given ongoing concerns about mental health stigma, overtraining, and toxic sport cultures (Ely et al., 2021).

At the societal level, fostering mindfulness in sport has the potential to reduce the public health burden of stress-related disorders (Garcia-Campayo et al., 2021). Athletic programs are often publicly funded or community-based, meaning that interventions which improve athlete well-being also serve collective interests. Moreover, evidence that mindfulness can reduce injury-related stress, enhance recovery, and support holistic development underscores the value of such practices not only for athletes but also for the systems that support them, such as healthcare, education, and community sport organizations (Liu et al., 2021).

In sum, the promotion of mindfulness in sport contributes to societal well-being by supporting the mental health of athletes, strengthening positive community values, and reducing systemic burdens associated with mental health challenges and burnout.

Cultural and Diversity Considerations

The application of mindfulness and flow research in sport must be critically examined through the lens of cultural and diversity considerations. Much of the existing literature is based on Western populations, often involving collegiate or elite athletes with access to resources that are not universally available (Shea et al., 2022). This raises questions about the cultural transferability and accessibility of MBIs across diverse athletic contexts.

Culturally, mindfulness is rooted in Buddhist traditions, yet its adaptation for Western sport psychology often emphasizes performance enhancement over holistic well-being (Garcia-Campayo et al., 2021). While this translation has practical value, it also risks appropriating or oversimplifying mindfulness practices. Researchers and practitioners must be intentional in acknowledging the origins of mindfulness and in ensuring that interventions are delivered with cultural humility (Segall & Kristeller, 2023). This includes adapting language, practices, and delivery methods to align with athletes' cultural values and belief systems.

Diversity considerations extend beyond cultural adaptation to include socioeconomic and developmental differences. Athletes from under-resourced communities may have less access to structured mindfulness programs, raising concerns about equity in intervention delivery (Shea et al., 2022). Similarly, younger athletes or those in grassroots sport may require developmentally tailored approaches that differ from those used with elite professionals (Parham, 2022). Designing interventions that are flexible and accessible across diverse populations is essential to avoiding reinforcing inequalities in psychological support

Finally, diversity in gender, ability, and sport type must also be considered. For example, mindfulness practices may need to be adapted for para-athletes, team versus individual sport contexts, and for athletes navigating gendered pressures within competitive sport (Shea et al., 2022). Attending to these differences ensures that mindfulness-based practices do not perpetuate exclusion but instead support inclusivity and accessibility in sport psychology.

In sum, while mindfulness and flow research offers promising insights, its application requires careful cultural and diversity considerations. Practitioners must adapt interventions to respect cultural origins, address inequities in access, and ensure inclusivity across athlete populations. Doing so not only strengthens the ethical integrity of sport psychology practice but also enhances the relevance and effectiveness of mindfulness-based approaches in diverse sport contexts.

Chapter Five: Conclusions and Recommendations

This capstone critically examined how mindfulness facilitates flow in athletes and how these mechanisms can inform applied sport psychology practice. The project explored empirical and theoretical evidence to identify the cognitive, emotional, and motivational pathways through which mindfulness contributes to optimal performance. By synthesizing findings across multiple methodological and cultural contexts, this study offers an integrated understanding of mindfulness as a multidimensional construct that enhances both athletic performance and psychological well-being. The following sections present the main conclusions derived from the literature, followed by recommendations for clinical practice and future research.

Conclusions from Literature Analysis

The literature reviewed across Chapters Two and Three demonstrates that MBIs have consistent and measurable effects on these mechanisms, which in turn enhance the likelihood of athletes entering and sustaining flow states. Flow, as Csikszentmihalyi (1990) describes, represents optimal performance marked by deep absorption, balance between challenge and skill, and reduced self-consciousness. The findings of this review confirm that mindfulness can serve as both a preventive and a promotive factor in athletes' pursuit of flow.

Overall, the literature indicates that mindfulness contributes to optimal performance through interrelated psychological pathways that enhance cognitive focus, emotional balance, and adaptive functioning. These mechanisms do not operate in isolation but interact dynamically to create the mental conditions necessary for sustained flow. The following sections synthesize these findings into five major conclusions that collectively illustrate how mindfulness functions within athletic contexts.

1. Mindfulness and Attentional Control

Mindfulness enhances attentional stability, focus, and task engagement, which are essential precursors to flow. Studies consistently demonstrate that mindfulness training improves athletes' ability to sustain attention under pressure, reduce susceptibility to distractions, and maintain awareness in the present moment (Wang et al., 2023; Chen & Meggs, 2021). Through regular mindfulness practice, athletes learn to observe internal and external stimuli without overreacting, allowing for greater perceptual clarity and performance consistency. This refined attentional control facilitates the "automaticity" characteristic of flow, in which concentration becomes effortless and self-consciousness recedes (Csikszentmihalyi, 1990; Jackson & Marsh, 1996). Additionally, research shows that mindfulness mitigates cognitive interference from intrusive thoughts or performance errors, leading to quicker attentional recovery and improved in-the-moment decision-making (Rogowska & Tatruch, 2024; Sparks & Ring, 2022). Collectively, these findings indicate that mindfulness-based interventions (MBIs) directly strengthen athletes' cognitive flexibility and focus, both foundational mechanisms through which flow states emerge.

2. Mindfulness and Emotion Regulation in Sport

Emotion regulation represents one of the most robust and well-documented pathways linking mindfulness to flow. Mindfulness training enables athletes to cultivate non-reactivity toward emotional experiences, allowing them to experience anxiety, frustration, or excitement without becoming overwhelmed (Oguntuase & Sun, 2022; Rogowska & Tatruch, 2024; Puhlmann & Engert, 2025). This capacity to modulate emotional responses is crucial for maintaining the calm alertness that characterizes flow. Athletes who engage in mindfulness interventions often report decreased competitive anxiety, enhanced self-acceptance, and improved mood stability during high-pressure events. Such regulation supports emotional balance and optimal arousal levels, key conditions for entering flow states. Furthermore, MBIs encourage athletes to reappraise

emotional triggers, transforming stress into motivation and uncertainty into focus. By reducing emotional volatility and promoting psychological composure, mindfulness serves as both a preventative and promotive factor for flow and peak performance (Si et al., 2024).

3. Mindfulness and Decentering/ Meta-Awareness

Decentering and meta-awareness allow athletes to maintain perspective and self-regulation during competition. This mechanism involves the ability to observe one's thoughts and emotions as transient mental events rather than facts or self-defining truths (Sparks & Ring, 2022; Diotaiuti et al., 2023; Lange, 2025). In sport contexts, this awareness helps athletes disengage from maladaptive rumination, such as fear of failure or preoccupation with mistakes, and reorient their attention toward immediate task demands. Research indicates that mindfulness reduces "reinvestment" in negative cognitions, thereby preserving cognitive resources for performance tasks. This meta-awareness enables a flexible balance between self-monitoring and automatic action, critical for sustaining flow. Conceptually, decentering bridges the gap between cognitive control and emotional regulation: by noticing experiences without attachment, athletes become both more grounded and more adaptable under stress. Thus, mindfulness-facilitated decentering enhances self-awareness, minimizes internal interference, and supports the effortless concentration integral to flow.

4. Mindfulness and Resilience as a Mediator of Flow

Resilience functions as an adaptive mediator between mindfulness practice and sustained flow. Mindfulness cultivates resilience by promoting acceptance, cognitive flexibility, and confidence in one's capacity to recover from setbacks (Liu et al., 2021; Oguntuase & Sun, 2022; Rahrig et al., 2022). Athletes trained in mindfulness demonstrate enhanced coping abilities, quicker emotional recovery following errors, and greater perseverance during performance

challenges. This resilience does not merely buffer stress, it strengthens athletes' sense of self-efficacy and mastery orientation, both of which are linked to increased flow frequency. The literature also suggests that resilient athletes are more likely to sustain flow across varying competitive conditions, reflecting mindfulness's role in stabilizing performance and psychological functioning. Through repeated engagement with mindfulness practices, athletes internalize adaptive coping patterns that foster both short-term flow experiences and long-term personal growth (Stoyanova et al., 2025).

5. Mindfulness-Based Programs and Interventions

Program-based interventions provide strong empirical support for mindfulness as a structured and replicable method for enhancing flow. Interventions such as the *Mindful Sport Performance Enhancement* (MSPE) program and *Mindfulness-Acceptance-Commitment* (MAC) approach have demonstrated effectiveness in improving both performance outcomes and psychological well-being among diverse athletic populations (Chen & Meggs, 2021; Sparks & Ring, 2022; Wang et al., 2023). These programs operationalize the mechanisms identified above, attentional control, emotional regulation, decentering, and resilience, within sport-specific routines. Athletes who participate in integrated mindfulness training show greater self-regulation, consistency, and enjoyment in their sport, aligning with the core characteristics of flow. Importantly, the literature emphasizes that the most effective mindfulness programs are those that are contextualized, embedding practices within sport environments rather than isolating them as detached psychological exercises (Wong et al., 2022; Zhang et al., 2025). Such ecologically valid approaches not only improve engagement and transferability but also uphold ethical and cultural responsiveness, ensuring that interventions are accessible across varied levels of competition, socioeconomic backgrounds, and cultural contexts (Shea et al., 2022; CPA, 2017).

Clinical/Therapeutic Recommendations

The findings from this capstone project suggest several recommendations for clinicians and sport psychology practitioners seeking to optimize the benefits of mindfulness for athletes. These recommendations emphasize integrating mindfulness into existing sport frameworks, tailoring practices to diverse athlete populations, and ensuring interventions remain ethically and culturally responsive.

Integrate Mindfulness with Established Sport Routines

Mindfulness should not be viewed as a stand-alone practice but as a skill set that can be embedded within athletes' daily training and competitive environments. Incorporating mindfulness exercises into warm-ups, recovery protocols, or pre-performance routines can strengthen consistency and ecological validity (Hill et al., 2020; Chen & Meggs, 2021). This integration supports the transfer of mindfulness skills beyond the therapy or workshop setting into the actual demands of sport.

Emphasize Emotion Regulation and Attentional Training

Given the evidence that emotion regulation and attentional control are key mediators between mindfulness and flow, interventions should explicitly target these skills (Tamminen et al., 2021). For example, brief breath awareness practices can be used to regulate pre-competition anxiety, while body scans or grounding exercises can strengthen attentional focus during performance (Altameemi, 2024). Tailoring interventions toward these mechanisms increases their precision and relevance for athletes under pressure.

Adapt Mindfulness-Based Programs to Sport Contexts

Evidence-based interventions such as MSPE and the MAC approach have demonstrated effectiveness in improving both performance and well-being in athletes (Wang et al., 2023).

Practitioners can adapt these programs by using sport-specific metaphors, experiential exercises, and coach involvement to align with athletes' cultural and competitive environments (Shea et al., 2022). This adaptation ensures interventions remain accessible and engaging. Such contextualization reflects the literature review's conclusion that athlete engagement and program authenticity are strengthened when interventions are embedded within real performance environments.

Foster Collaboration Across Systems

The efficacy of mindfulness training is influenced not only by the individual athlete but also by the support for coaches, teams, and organizations (Sparks & Ring, 2022). Practitioners should advocate for organizational buy-in and coach education to create environments where mindfulness practices are normalized and supported. Collaborative efforts increase program sustainability and reduce the risk that mindfulness is dismissed as a short-term trend. System-level collaboration also ensures that mindfulness is viewed as a shared responsibility within athlete development, which is consistent with the findings on systemic integration earlier in this paper.

Ensure Ethical and Culturally Responsive Practice

Consistent with the CPA's Code of Ethics, practitioners must consider concerns about accessibility, inclusivity, and cultural sensitivity when delivering mindfulness interventions (2017). Athletes from diverse backgrounds may conceptualize mindfulness differently or encounter barriers to participation. Practitioners should adapt language, delivery, and practices to align with athletes' cultural values and ensure interventions are accessible across socioeconomic and developmental contexts (Shea et al., 2022).

Taken together, these recommendations reinforce the applied importance highlighted in the literature review, that effective sport mindfulness programs are ethically grounded, ecologically valid, and culturally inclusive.

Future Research Recommendations

The current literature provides compelling evidence that MBIs are associated with improvements in athletes' emotional regulation, attentional control, resilience, and flow (Wang et al., 2023). However, several limitations across study designs highlight important directions for future research.

First, methodological rigour must be improved. Many studies rely on small samples, short-term follow-up, and heterogeneous outcome measures, making it difficult to generalize results (Ely et al., 2021; Jamshidi et al., 2023). Randomized controlled trials with larger, more diverse samples are needed to strengthen causal claims and improve external validity (Creswell & Poth, 2025). In addition, researchers should adopt consistent measures of flow, such as the Flow State Scale and standardized mindfulness instruments such as the MAAS, to enable cross-study comparisons and meta-analyses (Jackson & Marsh, 1996; MacKillop & Anderson, 2007).

Second, longitudinal research is needed to examine the sustainability and transferability of mindfulness-related benefits across time and contexts. While short-term gains in flow and reduced performance anxiety are frequently reported, little is known about whether these outcomes endure across training seasons of post-athletic careers (Rahrig et al., 2022). Long-term designs incorporating repeated measures could clarify whether mindfulness fosters resilience and well-being beyond sport participation.

Third, future studies should examine cultural, developmental, and contextual diversity in applying MBIs. Currently, research is largely concentrated in Western, collegiate, or elite

samples (Chen & Meggs, 2021; Sparks & Ring, 2022). Research that intentionally includes youth, grassroots athletes, para-athletes, and athletes from non-Western contexts will help determine the accessibility and cultural adaptability of mindfulness practices (Shea et al., 2022).

Fourth, greater attention should be directed toward mechanism-specific testing to clarify causal pathways. Although emotion regulation and attentional control are often cited as mediators, few studies explicitly test these pathways (Oguntuase & Sun, 2022). Incorporating physiological indicators, such as cortisol levels, alongside self-reports may offer a more comprehensive understanding of how mindfulness produces its effects (Puhlmann & Engert, 2025).

Finally, ethical and systematic considerations in sport-specific interventions deserve systematic attention. Given the unique pressures of high-performance environments, research should ensure athletes' autonomy in participation, address confidentiality in team-based settings, and evaluate risks such as heightened awareness of distress (CPA, 2017). Embedding protocols into research design will not only protect athletes but also strengthen the credibility of findings.

Overall, advancing this field will require research that is methodologically rigorous, culturally inclusive, and ethically grounded, reflecting the integrative and applied frameworks. Doing so will not only clarify how mindfulness facilitates flow in sport but also guides the development of interventions that are both effective and accessible across diverse athletic populations.

Reflections

Engaging in this capstone project has reinforced the importance of bridging the gap between research and applied practice in sport psychology. The process of critically reviewing the literature highlighted both the promise and the limitations of current research on mindfulness

and flow. While it is encouraging to see growing evidence for the effectiveness of mindfulness-based interventions, it has also become clear that methodological weaknesses, cultural gaps, and ethical oversights continue to constrain the field.

This project deepened my understanding of how much mindfulness operates as both a psychological and relational construct, affecting not only athletes' intrapsychic process but also the systems in which they perform. As an aspiring clinician, I recognize that simply knowing that an intervention "works" in a controlled setting is not enough. One must also consider how the intervention can be adapted to different athletes, sport environments, and cultural contexts.

On a personal level, this project has strengthened my commitment to evidence-based practice while also reminding me of the importance of critical reflection. Synthesizing findings across chapters demonstrated that effective practice requires both scientific grounding and reflexive awareness of one's professional values and assumptions.

Moving forward, I intend to continue engaging with current research, supervision, and reflective practice to refine my use of mindfulness-based techniques within a culturally sensitive and ethically sound framework. Lastly, I leave this project with a greater sense of responsibility. Sport psychology intersects with health, equity, and culture, requiring practitioners to hold both performance and well-being in view. My hope is that the knowledge synthesized in this capstone can contribute not only to performance outcomes but also to the overall well-being and resilience of athletes across contexts.

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Appendix I

List of Core Articles Included in Methodological Critique

Author(s)	Year	Title	Journal	Type
Wang, Y., Lei, S., & Fan, J.	2023	Effects of mindfulness-based interventions on promoting athletic performance and related factors among athletes: A systematic review and meta-analysis of randomized controlled trials	<i>Frontiers in Psychology</i>	Quantitative (systematic review & meta-analysis)
Si, X. W., Yang, Z. K., & Feng, X.	2022	A meta-analysis of the intervention effect of mindfulness training on athletes' performance	<i>International Journal of Sport Psychology</i>	Quantitative (meta-analysis)
Nien, J., Gill, D., L., Chou, T., Liu, C., Geng, X., Hung, T., & Chang, Y.	2020	Effects of brief mindfulness and relaxation inductions on anxiety, affect, and brain activation in athletes	<i>Psychology of Sport and Exercise</i>	Quantitative (experimental)
Gu, S., Li, Y., Jiang, Y., Huang, J. H., & Wang, F.	2022	Mindfulness training improves sport performance via inhibiting uncertainty-	<i>Frontiers in Psychology</i>	Quantitative (experimental)

		induced emotional arousal and anger		
Oguntuase, S. B., & Sun, Y.	2022	Effects of mindfulness training on resilience, self-confidence and emotion regulation of elite football players: The mediating role of locus of control	<i>Current Psychology</i>	Quantitative (intervention study)
Chen, M. A., & Meggs, J.	2021	The effects of Mindful Sport Performance Enhancement (MSPE) training on mindfulness, and flow in national competitive swimmers	<i>Journal of Human Sport and Exercise</i>	Mixed methods (intervention study)
Peng, J., Jing, L., Wang, P., & Wang, H.	2023	Mindfulness and self-rated performance among novice athletes in China: A sequential mediating role of flow and cognitive anxiety	<i>Frontiers in Psychology</i>	Quantitative (survey based)
Liu, X., Zhang, Y., & Wang, L	2025	Examining the effects of brief mindfulness training on athletes' flow: The mediating role of resilience	<i>Journal of Applied Sport Psychology</i>	Quantitative (experimental)

Martiny, L., Dias, G., Ferreira, J. P., Mendes, R., & Mendes, R.	2023	Flow Training Program: Mindfulness, decision making, and mental well- being of young and adult elite handball athletes	<i>Frontiers in Psychology</i>	Mixed methods (program evaluation)
Sparks, K. V., & Ring, C.	2022	A rowing-specific mindfulness intervention: Effects on mindfulness, flow, reinvestment, and performance	<i>Psychology of Sport and Exercise</i>	Quantitative (sport specific intervention study)
