Examining the Roles of Experiential Avoidance and Cognitive Fusion on the Effects from Mindfulness to Athlete Burnout: A Longitudinal Study

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Abstract

Objectives: Athlete burnout is a maladaptive outcome that is potentially detrimental for performance and wellbeing. Cross-sectional evidence suggests that mindfulness might be associated with athlete burnout via experiential avoidance and cognitive fusion. In the current study, we extend knowledge of these hypothesized mediational pathways using a longitudinal design.

Methods: Data was collected at three occasions with a three-month interval. A final sample of 280 elite Chinese athletes aged 15-32 years (M_{age} = 19.13; *SD* = 2.92; Female = 130) reported their mindfulness at Time 1, experiential avoidance and cognitive fusion at Time 2, and athlete burnout at Time 3. Structural equation modelling was adopted to examine the mediating roles of experiential avoidance and cognitive fusion on the effects from mindfulness to athlete burnout.

Results: We found statistically meaningful directs effects from mindfulness (Time 1) to experiential avoidance and cognitive fusion (Time 2), which in turn influenced athlete burnout (Time 3). However, the direct effect from mindfulness at Time 1 to athlete burnout at Time 3 was non-significant. The indirect effects of experiential avoidance and cognitive fusion on the effects from mindfulness to athlete burnout were significant, providing longitudinal evidence that these two variables contribute meaningfully to the mindfulness-burnout pathway.

Conclusion: With initial evidence for the mediating effects of experiential avoidance and cognitive fusion, future studies could consider using experimental designs to examine the potential changing mechanisms of mindfulness on reducing athlete burnout.

Keywords: burnout; cognitive fusion; elite athletes; experiential avoidance; mediation; mindfulness.

Introduction

Athletes, in particular elite athletes, who strive for peak performance are at high risk of experiencing burnout due to excessive training, stressful social relations, poor recovery, negative performance demands, and high-performance pressure (Gustafsson et al., 2007, 2011). Conceptually, athlete burnout is considered a syndrome characterized by three main symptoms, namely emotional and physical exhaustion (i.e., perceived depletion of emotional and physical resources due to intense demands of training and/or competition), sport devaluation (i.e., loss of interest and cynical attitudes towards sport), and reduced sense of accomplishment (i.e., negative evaluation of one's own sporting capabilities and achievements) (Raedeke & Smith, 2001). Emotional and physical exhaustion is considered the core dimension and therefore best characterizes the athlete burnout syndrome (Gustafsson et al., 2016; Lundkvist et al., 2018). Regarding the destructive consequences, athlete burnout is associated with negative outcomes such as reduced motivation, disrupted performance, and sport dropout (Gustafsson et al., 2014). Given such potential maladaptive outcomes, knowledge of key protective and risk factors (e.g., perfectionism, stress, coping tendencies, motivation, and affect) is required to inform evidenced-based interventions for reducing or preventing athlete burnout (Gustafsson et al., 2017). Among them, one important protective factor is mindfulness, which is defined as paying attention to the current moment with awareness while adopting an acceptance and non-judgment attitude (Zhang et al., 2017).

Mindfulness helps athletes learn to live with the stressors and challenges in their training and competition (e.g., competing demands, heavy training, and injuries) by observing and maintaining attention to present-moment performance, monitoring the internal reactions towards stressors and private experiences, and adopting an acceptance attitude to avoid the unnecessary self-criticism (Birrer et al., 2012; Zhang, Si et al., 2016). Along with the well-developed mindfulness-based sport-specific interventions for athletes (Zhang & Su, 2020), research aims to identify mindfulness as a protective factor of athlete burnout means that researchers and practitioners can use such knowledge

to adapt intervention programs to certain sports and contexts (e.g., Jouper & Gustafsson, 2013). Correlational and intervention studies provided preliminary evidence that mindfulness is an important protective factor of athlete burnout (Li et al., 2019). Temporal associations between mindfulness and athlete burnout were established based on the cross-sectional findings that mindfulness is negatively associated with athlete burnout among Norwegian junior athletes (Moen et al., 2015), adolescent tennis players (Walker, 2013), and junior elite athletes (Gustafsson et al., 2015; Zhang, Si et al., 2016). Furthermore, there are emerging mindfulness-based intervention studies that are targeting the reduction and protection of athletes from developing into burnout (Li et al., 2019). In the context of an applied practice, a case study demonstrated that the practice of mindfulness leads to the decrease of athlete burnout (Jouper & Gustafsson, 2013). However, the remaining question is what are the underlying changing mechanisms on the improvement of mindfulness lead to the reduction of athlete burnout.

After more than 20 years of research on mindfulness in sports, theorized mechanism of change from mindfulness to sport performance and athletic wellbeing and illbeing (e.g., athlete burnout) have been prosed by researchers with preliminary evidence (Gardner & Moore, 2020). With proposed changing mechanisms, the mindfulness and acceptance-based approach is viewed as more effective and fundamentally different from the traditional control-based approach of psychological skills training (Gardner & Moore, 2017). For example, Birrer and colleagues (2012) proposed a theoretical framework of how mindfulness can influence sport performance, with potential changing mechanisms as bare attention, experiential acceptance, values clarifications, negative emotion regulation, clarity about one's internal life, exposure, psychological flexibility, non-attachment, and less rumination. This framework provides important theoretical guidance regarding how mindfulness can be used to improve sport performance and influence adaptive and maladaptive outcomes of athletes. Further, the changing mechanism of mindfulness on athlete burnout was also informed by the psychological inflexibility framework of Acceptance and Commitment Therapy approach (ACT; Hayes et al., 1999), in which the improvement of mindfulness levels is related to

the reduction of experiential avoidance, cognitive fusion, and the increase of value clarification (Hayes, 2004). Under the theoretical guidance, it is clear that experiential avoidance and cognitive fusion could serve as two key mediators explaining how mindfulness can influence maladaptive outcomes such as athlete burnout (Levin et al., 2012; Zhang et al., 2021).

Experiential avoidance and cognitive fusion are two important constructs closely related to mindfulness (Hayes et al., 1999; Hayes, 2004). In sporting contexts, experiential avoidance refers to an unwillingness of athletes to remain in contact with distressing internal experiences, while attempting to control or avoid these experiences (Zhang et al., 2014). In contrast, cognitive fusion occurs when athletes are attached to and entangled with thoughts because of a strong belief in the literal meaning of the thoughts (Zhang, Si et al., 2016). Athletes with increased mindfulness can lead to increased ability to experientially accept the unwanted and painful internal experiences (i.e., decreased experiential avoidance) and enhanced capability of cognitively defuse the thoughts in which athletes will not have to entangle with them (i.e., decreased cognitive fusion) (see Hayes, 2004; Hayes et al., 1999). That is, mindfulness is an important antecedent that athletes should have before having the ability to experientially accept and cognitively defuse the unpleasant and unwanted private experiences that might lead to burnout. Empirical evidence from correlational studies indicates that mindfulness is significantly and negatively associated with experiential avoidance and cognitive fusion in occupational (Puolakanaho et al., 2018) and sporting contexts (Zhang, Si et al., 2016; Zhang et al., 2021). Intervention studies also showed that reducing psychopathology could be realized via the increase of mindfulness for value-based activities that further leads to decreases of experiential avoidance and cognitive fusion towards unwanted and painful inner experiences (Hayes, 2004; Hayes et al., 1999).

Experiential avoidance and cognitive fusion can be used to explain the development of athlete burnout (Gross, 2020). When athletes try to control or avoid uncomfortable and stressful feelings by viewing them as truth, they can easily backfire and develop burnout (Birrer et al., 2019). That is, trying to avoid and control those unpleasant, distress, and even painful private experiences that

might cause them burnout because the controlling approach actually makes it even worse (Wang et al., 2020; Wegner, 1994). Similarly, when athletes are fused with stressful and unpleasant private experiences, they cannot cognitively distance from the experiences and may contribute to be entangled with them and believe the thoughts are true, which finally lead to burnout symptoms. Preliminary evidence building on previous research in non-sport occupational contexts (Iglesias et al., 2010; Kroska et al., 2017; Vilardaga et al., 2011) and sporting contexts (Zhang, Si et al., 2016; Zhang et al., 2021) indicated that experiential avoidance and cognitive fusion could lead to athlete burnout. In other words, athletes with high levels of experiential avoidance and cognitive fusion normally have higher levels of chances developing into athlete burnout. With this evidence in mind, we can expect that the effects of mindfulness on athlete burnout could be mediated by experiential avoidance and cognitive fusion.

To inform the working mechanisms of mindfulness-based interventions for preventing athlete burnout, empirical evidence on the meditating roles of experiential avoidance and cognitive fusion on the effect from mindfulness to athlete burnout are required (Birrer et al., 2012; Zhang et al., 2021). However, one key limitation is that previous evidence was mainly based on cross-sectional studies (Zhang, Si et al., 2016; Zhang et al., 2021), with the test of mediation effects using cross-sectional designs has limitations such as the substantially biased estimation of the mediation effects (Maxwell et al., 2011). To overcome the limitations of relying on cross-sectional data, methodologists recommend using longitudinal designs to examine mediation effects (Maxwell & Cole, 2007). For example, using a longitudinal approach such as a three-wave approach to test the proposed predictors, mediators, and outcome variables. This way, the direct and indirect effects can be separated temporally and thereby common method bias can be reduced (Podsakoff et al., 2003, 2012).

Aims of the Current Study

In line with previous guidelines on testing the effects in social cognitive theories (Hagger et al., 2017), the primary aim of the current study was to examine the mediating effects of experiential

avoidance and cognitive fusion on the mindfulness-burnout path using a three-wave longitudinal design. Building on the previous established cross-sectional findings (Zhang, Si et al., 2016; Zhang et al., 2021), we hypothesized that the effects from mindfulness to athlete burnout be mediated by both experiential avoidance and cognitive fusion. In other words, it is assumed that elite athletes with high levels of mindfulness will less likely to develop burnout due to their low levels of experiential avoidance and cognitive fusion, the effects are transmitted via the mediators. We also examined as a secondary focus the direct effects within the mediation models. Based on the findings of previous studies (e.g., Moen et al., 2015; Walker, 2013), we hypothesized that mindfulness at Time 1 significantly and negatively be related to athlete burnout at Time 3. Based on the psychological flexibility/inflexibility framework of Acceptance and Commitment Therapy (Hayes et al., 1999), we also hypothesized that mindfulness at Time 1 significantly and negatively be related to experiential avoidance and cognitive fusion of elite athletes at Time 2. In line with previous research (e.g., Iglesias et al., 2010; Kroska et al., 2017; Vilardaga et al., 2011), we hypothesized that experiential avoidance and cognitive fusion of elite athletes at Time 2 significantly and positively be related to athlete burnout at Time 3.

Methods

Participants and Procedure

This study is part of a three-wave, longitudinal research project focused on examining mindfulness, potential mediators, and the adaptive and maladaptive outcomes among elite Chinese athletes. Data collected at baseline (Time 1) has been published elsewhere [*blinded for review*]. At Time 1, we recruited 515 elite Chinese athletes (290 males and 225 females) aged from 12 to 31 years (M = 18.24; SD = 3.16) from three provincial sports centers located in the North, Central, and South China. Three months later at Time 2, we were able to collect data from 376 elite athletes (204 males and 172 females) aged from 12 to 31 years (M = 18.34; SD = 3.12) from the same sample at Time 1, with a dropout rate of 27.0%. Of athletes who participated in the assessment at Time 2, a total of 302 elite athletes (160 males and 142 females) aged from 13 to 32 years (M = 18.73; SD =

3.15) completed the same set of self-reported measures at Time 3, which is another three months after the assessment at Time 2. The dropout rate from Time 2 to Time 3 is 19.7%. Given that we collected data from sports training center-based athletes, the main reasons for dropout include: (a) Athletes along with their teams cannot attend the follow-up measurements due to the out-of-base training schedules preparing for important competitions, (b) Athletes at the previous assessments left the team because they were still in the role of trial athletes and cannot enter the teams as formal athletes, and (c) Athletes were retired or they were on personal leaves when the assessments were taking place at their sports training centers.

Although a sample of 302 elite athletes remained at Time 3, there are seven athletes who are aged at 13 years old and there are 15 athletes who are aged at 14 years old might not be able to fully understand the meaning of mindfulness, experiential avoidance, cognitive fusion and athlete burnout. We therefore excluded the 22 junior elite athletes and used the final sample of 280 elite athletes (150 males and 130 females) aged from 15 to 32 (M = 19.13; SD = 2.92) for formal analysis. Among the 280 elite athletes, there are 253 athletes of individual sports and 23 athletes of team sports, and they reported a range of 1 to 22 years of training (M = 8.53; SD = 3.72). Athletes reported a range of 1.5 to 9 hours of training per day (M = 5.67; SD = 1.37), and 3 to 7 days of training per week (M = 5.92; SD = .36). In terms of previous mindfulness and meditation-related experience, 160 athletes reported having such experiences, whereas 120 athletes did not.

Regarding the procedure of data collection, we approached those people-in-charge of the three elite sports training centers to seek their approval allowing us to approach the sport center-based elite athletes. We sought assistance from trained center-based physicians, physiotherapists, and sport psychology practitioners for the distribution and collection of the package of self-report questionnaires. Athletes completed the printed package of questionnaires along with informed consent forms before, after, or during the break of their daily training sessions. Our research staff distributed the package of questionnaires to elite athletes in person, and waited at the training venues for elite athletes to complete the questionnaires on site. For junior athletes younger than 18

years old, approvals from their coaches were obtained who served as a proxy of parents. Prior to the start of the study, ethical approval was obtained from the Research Ethics Committee (REC) of [*blinded for review*] University.

Measures

Mindfulness. We used the 16-item Chinese version Athlete Mindfulness Questionnaire (AMQ; Zhang et al., 2017). The AMQ consists of three dimensions, including: present-moment attention (e.g., "I can easily sustain my attention on the competition"), awareness (e.g., "I am aware that my emotions during training and competition can influence my thinking and behavior"), and acceptance (e.g., "Even though some thoughts and feelings during training and competition may be unpleasant or miserable, I can get along with them peacefully"). Items were rated on a five-point rating scale, ranging from 1 (*never true*) to 5 (*always true*). The Chinese version of the AMQ has demonstrated satisfactory reliability and validity evidence (Zhang et al., 2017).

Experiential avoidance. We measured athletes' experiential avoidance using the 7-item Chinese version Acceptance and Action Questionnaire II (AAQ-II; Bond et al., 2011). Items (e.g., "I'm afraid of my feelings") were on a seven-point rating scale, ranging from 1 (*never true*) to 7 (*always true*). High scores on the AAQ-II are reflective of greater experiential avoidance (Bond et al., 2011). The Chinese version of the AAQ-II has demonstrated satisfactory reliability and validity evidence (Zhang et al., 2014).

Cognitive fusion. We measured athletes' cognitive fusion by using the 7-item Chinese version Cognitive Fusion Questionnaire (CFQ; Gillanders et al., 2014). Items (e.g., "I struggle with my thoughts") were rated on a seven-point rating scale, ranging from 1 (*never true*) to 7 (*always true*). Higher scores of CFQ represents higher levels of cognitive fusion (Gillanders et al., 2014). The Chinese version of the CFQ has demonstrated satisfactory reliability and validity evidence (Zhang, Chung et al., 2016).

Athlete Burnout. We used the Chinese version (Zhang, Si et al., 2016) of the Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001). The 15-item ABQ has three subscales, including

reduced sense of accomplishment, emotional/physical exhaustion, and sport devaluation. We utilized the exhaustion subscale only (e.g., “I feel extremely tired from sport participation”) because it is considered the core component to represent athlete burnout (Gustafsson et al., 2016) and subscales of reduced sense of accomplishment and sport devaluation are unstable and theoretically overlap with other constructs (Gustafsson et al., 2011; Lundkvist et al., 2018). Items were rated on a five-point rating scale, ranging from 1 (*almost never*) to 5 (*almost always*).

Data Analyses

Descriptive statistics, correlations, and internal consistency reliabilities of the study variables were calculated using IBM SPSS Statistics 26 (Armonk, NY; IBM Corp, 2019). Item-level missing data was inconsequential at time 1 (0.27%) and non-existent at times 2 and 3. Therefore, the data of final example for analysis has no missing data.

Using Mplus 7.3 statistical software (Muthén & Muthén, 1998-2014), structural equation modelling with maximum likelihood estimation was conducted to respectively test the mediation roles of experiential avoidance and cognitive fusion on the effects from mindfulness to athlete burnout (see *Figure* 1). To avoid the common method bias of using data from the same measurement time, in the hypothesized model, the predictor of mindfulness was from Time 1, the proposed mediators of experiential avoidance and cognitive fusion were from Time 2, and the outcome variable of athlete burnout was from Time 3. Given that mindfulness has three factors, we coded it as a second-order factor in the mediation models, where present-moment attention, awareness, and acceptance are first-order factors.

Multiple model fit criteria were used to assess goodness of fit of the models, including the comparative fit index (CFI), the root-mean-square error of approximation (RMSEA) and the standardized root mean square residual (SRMR). For the CFI, values exceeding .90 indicated good fit, whereas for the RMSEA and SRMR, less than .06 and .08 indicated good fit, respectively (Hu & Bentler, 1999). Standardized regression coefficients were reported along with the 95% confidence intervals and significance.

Results

Descriptive statistics, bivariate correlations, and internal consistency reliabilities of mindfulness at Time 1, experiential avoidance and cognitive fusion at Time 2, and athlete burnout at Time 3 are shown in Table 1. The internal consistency reliabilities of the study variables were all satisfactory (i.e., $\alpha > .70$). Bivariate correlations among the study variables were significant, except the bivariate correlations between mindfulness at Time 1 and cognitive fusion at Time 2, as well as between mindfulness at Time 1 and athlete burnout at Time 3.

The Mediation Model of Experiential Avoidance

Regarding the hypothesized model of experiential avoidance mediating the effect from mindfulness to athlete burnout, a marginally acceptable fit was shown but indicated room for improvement, χ^2 (519) = 802.45, $p < .001$, CFI =.897, TLI =.886, SRMR = .054, RMSEA (90%*CI*) = .044 (.038, .050). The high model modification indices provided by the statistical software indicated that covariance should be added to items 1 and 2 and items 2 and 3 of experiential avoidance as well as items 2 and 4 of emotional/physical exhaustion. Conceptually, the meanings of these items are similar as they belong to the same scale measuring the same factor, while sequencing to each other. Therefore, we sequentially adding the residual covariance between items 1 and 2, then between items 2 and 3 of experiential avoidance, and finally between items 2 and 4 of the emotional/physical exhaustion of athlete burnout. With these modifications, the model's goodness-of-fit indices improved substantially, reaching a satisfactory level, χ^2 (516) = 712.97, $p < .001$, CFI =.928, TLI =.920, SRMR = .053, RMSEA (90%*CI*) = .037 (.030, .043). In the modified model, there are still some remaining model modification indices but all are below 20. Items were loaded significantly on each factor ($p < .001$), with completely standardized loadings ranging from .38 to .85.

Standardized effect sizes of both the direct and indirect paths with 95% confidence intervals of the mediation model of experiential avoidance are described in Table 2. Regarding the direct effects, mindfulness at Time 1 significantly and negatively predicted experiential avoidance at Time 2 (β =

-.270, $p < .001$), indicating that elite athletes with high levels of mindfulness tend to report low levels of experiential avoidance during their training and competition. In addition, experiential avoidance at Time 2 significantly predicted athlete burnout at Time 3 ($\beta = .255$, $p < .001$), indicating that athletes with high levels of experiential avoidance have higher chances of athlete burnout later on. However, the effect from mindfulness at Time 1 to athlete burnout at Time 3 was non-significant ($\beta = .036$, $p = .632$). It seems that with a time lag of six months the influence of mindfulness on athlete burnout becomes trivial. Furthermore, the indirect effect from mindfulness at Time 1 to athlete burnout at Time 3 via experiential avoidance at Time 2 was significant ($\beta = -.069$, $p = .008$), indicating the some of the effects of mindfulness on athlete burnout occurs via the mediator of experiential avoidance. The controlled path coefficients from the demographic variables (i.e., gender, age, sport type, years of training, training hours per day, training days per week, and mindfulness related experience) to mindfulness at Time 1, experiential avoidance at Time 2, and athlete burnout at Time 3 are detailed in Table A1 of the online supplementary materials.

The Mediation Model of Cognitive Fusion

Findings of the hypothetical model of cognitive fusion mediating the effect from mindfulness to athlete burnout, an acceptable fit was shown but also indicated room for improvement, χ^2 (519) = 810.51, $p < .001$, CFI =.900, TLI =.889, SRMR = .055, RMSEA (90%*CI*) = .045 (.039, .051). The high model modification indices also indicated that covariance should be added to items 1 and 2 and items 2 and 3 of cognitive fusion as well as items 2 and 4 of emotional/physical exhaustion. Conceptually, these items sequenced to each other also showed similar meanings as they belong to the same scale measuring the same factor. Likewise, we sequentially adding the residual covariance between items 1 and 2, between items 2 and 3 of cognitive fusion, and then between items 2 and 4 of the emotional/physical exhaustion of athlete burnout. After the modifications, the model's goodness-of-fit indices improved substantially, reaching a satisfactory level, χ^2 (516) = 709.10, $p < .001$, CFI =.934, TLI =.926, SRMR = .054, RMSEA (90%*CI*) = .037 (.030, .043). The remaining

model modification indices are all below 20 in the modified model. Items were loaded significantly on each factor (p <.001), with completely standardized loadings ranging from .37 to .86.

Standardized effect sizes of both the direct and indirect paths with 95% confidence intervals of the mediation model of cognitive fusion are described in Table 3. For the direct effects, mindfulness at Time 1 significantly and negatively predicted cognitive fusion at Time 2 (β = -.194, p = .007), indicating that elite athletes with high levels of mindfulness will less likely to cognitively fused with their thoughts and feelings during their training and competition. In addition, cognitive fusion at Time 2 significantly predicted athlete burnout at Time 3 (β = .247, p < .001), indicating that athletes with high levels of cognitive fusion tend to have higher levels of athlete burnout. However, the effect from mindfulness at Time 1 to athlete burnout at Time 3 was non-significant (β = .014, p = .849), indicating that the direct influence of mindfulness on athlete burnout become trivial with a time lag of six months. Furthermore, the indirect effect from mindfulness at Time 1 to athlete burnout at Time 3 via experiential avoidance at Time 2 was significant (β = -.048, p = .030). This finding demonstrates that cognitive fusion contributes as a mediational pathway between the effects of mindfulness on athlete burnout. The controlled path coefficients from the demographic variables (i.e., gender, age, sport type, years of training, training hours per day, training days per week, and mindfulness related experience) to mindfulness at Time 1, cognitive fusion at Time 2, and athlete burnout at Time 3 are detailed in Table A2 of the online supplementary materials.

Discussion

Using a three-wave longitudinal design, the current study examined the mediating roles of experiential avoidance and cognitive fusion on the effects from mindfulness to athlete burnout. Findings of this study demonstrated significant direct effects from mindfulness at Time 1 to experiential avoidance and cognitive fusion at Time 2. The direct effects from experiential avoidance and cognitive fusion at Time 2 to athlete burnout at Time 3 was also significant. However, the direct effects from mindfulness at Time 1 to athlete burnout at Time 3 was non-significant. In terms of the mediation effects, findings showed that both the proposed mediators,

experiential avoidance and cognitive fusion at Time 2, significantly mediated the effects from mindfulness at Time 1 to athlete burnout at Time 3. With the established longitudinal evidence on the mediating roles of experiential avoidance and cognitive fusion in the current study, we suggest future research continue to establish empirical evidence from randomized controlled trials.

Consistent with previous studies on the mediating effects from mindfulness to adaptive and maladaptive outcomes (e.g., Zhang, Si et al., 2016; Zhang et al., 2021), findings of the current study supported our expectations regarding the mediation effects of experiential avoidance and cognitive fusion. That is, athletes with higher levels of mindfulness have low levels of burnout due to their low levels of experiential avoidance and cognitive fusion. This finding suggests that mindfulness training can be used to alleviate and reduce the burnout syndromes among elite athletes with the changing mechanism of reducing the experiential avoidance and cognitive fusion of elite athletes (Birrer et al., 2012). Nonetheless, findings of the current study are still correlational in nature. Future studies are therefore needed to further confirm the mediating roles of cognitive fusion using experimental design for causal relations (Spencer et al., 2005). It is also highly suggested that the potential underlying changing mechanisms of experiential avoidance and cognitive fusion on the effect from mindfulness to athlete burnout should be further examined in randomized controlled trials (Frogeli et al., 2016; Gross, 2020). Given that Birrer and colleagues (2012) proposed nine potential mediators from mindfulness to sport performance and adaptive and maladaptive outcomes, the changing mechanisms from mindfulness to athlete burnout are likely broader than simply experiential avoidance and cognitive fusion. Therefore, future studies should consider examining other potential mediators on the mindfulness-burnout relations to provide insights for the underlying mechanism on mindfulness interventions to prevent athlete burnout.

In line with previous findings (Puolakanaho et al., 2018; Zhang, Si et al., 2016; Zhang et al., 2021), significant direct effects from mindfulness at Time 1 to experiential avoidance and cognitive fusion at Time 2 were revealed. This reflected that there are longitudinal relations with athletes have higher levels of dispositional mindfulness are able to live with and accept the discomfort private

experiences they tend to avoid or the fact-like subjective experiences they might entangle with (Birrer et al., 2019). Likewise, the direct effects from experiential avoidance and cognitive fusion at Time 2 to athlete burnout at Time 3 were found in the current study. This finding is in line with those of previous cross-sectional studies that found experiential avoidance and cognitive fusion were significantly related to athlete burnout (Zhang et al., 2016, 2021). These findings provided evidence supporting the working mechanism that athlete with higher tendencies towards the avoidance of unpleasant private experiences and high levels of fusions with the painful thoughts and feelings normally have high levels of burnout. Although mindfulness can be viewed as an important protective factor on athlete burnout (Gustafsson et al., 2017) and potential intervention target (Jouper & Gustafsson, 2013), findings of the current study did not provide support of the longitudinal effect from mindfulness to athlete burnout with a six-month time gap, which is inconsistent with previous cross-sectional findings (e.g., Li et al., 2019; Moen et al., 2015; Walker, 2013). It indicated that these effects are full mediation effects that the mindfulness impacts on athlete burnout are completely transmit from these two mediators (Aguinis et al., 2017). Overall, findings of the current study provided empirical support for the proposed changing mechanism of mindfulness on the adaptive and maladaptive outcomes of athletes (Birrer et al., 2012).

In terms of practical implications, findings of the current study provided empirical support on applying mindfulness and acceptance-based interventions, such as ACT, for the prevention of burnout among elite athletes (Lundgren et al., 2020; Shortway et al., 2018; Smith et al., 2019). According to the psychological flexibility/inflexibility theoretical framework of ACT (Hayes, 2004), increases in mindfulness levels can contribute to the reduction of psychopathology via the reduction of mindlessness, experiential avoidance, cognitive fusion, and psychological inflexibility (Levin et al., 2012). Indeed, preliminary evidence has been established that the mindfulness-based interventions are effective on reducing the experiential avoidance (Goodman et al., 2014; Zhang Si et al., 2016), cognitive interference of disruptive thoughts (Doron et al., 2020), and athlete burnout (Li et al., 2019). From the perspective of reducing athlete burnout in applied contexts, we expect the

effects of ACT-based intervention to produce reliable findings after a relatively long-term mindfulness training (Verhaeghen, 2021). For example, despite exhausted feelings during the training and competition, athletes may still be able to stay focused with an acceptance attitude at their early stages of mindfulness practice. However, the relations between mindfulness and burnout at the early stages may not necessarily be negatively correlated. In other words, athletes are able to stay focused on sport tasks, experientially accept them with no fusion, but still feel exhausted. That said, there might be a short-term effect that mindfulness training helps athletes be aware of their burnout feelings, but the effects of mindfulness on reducing athlete burnout via the reduction of experiential avoidance and cognitive fusion are long-termed. It also implies the importance of assessing the effectiveness of mindfulness- and acceptance- based interventions with both scale-measured quantitive findings and interview-revealed qualitative findings (e.g., Hussey et al., 2020).

To prevent the occurrence of athlete burnout, ACT-based principles and practices can be used to help athletes reduce their tendencies of experiential avoidance and cognitive fusion (Harris, 2019). To further examine whether and how experiential avoidance and cognitive fusion can work as underlying changing mechanisms on the path from mindfulness to athlete burnout (Zhang et al., 2021) and beyond the longitudinal design of the current study, robust designs such as the randomized controlled trials based on ACT principles are therefore required for casual relations (MacKinnon et al., 2002; Spencer et al., 2005). It is suggested that the mindfulness and acceptance-based interventions, such as the original ACT, and the sport specific versions of Mindfulness-Acceptance-Commitment (MAC; Gardner & Moore, 2007) and Mindfulness-Acceptance-Insight-Commitment (MAIC; Si et al., 2016; Su et al., 2019), on improving sport performance, increasing the adaptive outcomes and decreasing maladaptive outcomes (e.g., athlete burnout) of elite athletes should at the same time examine the theory-based changing mechanisms such as experiential avoidance and cognitive fusion. This is because it is important for researchers to use mediation analyses testing theory-specified psychological changes in order to explain the underlying changing mechanisms of behavioral change of interventions (Michie & Abraham, 2004).

Strengths, Limitations, and Future Directions

Key strengths of our work include: using three-wave longitudinal data to examine the mediation models, incorporation of a relatively representative sample of Chinese elite athletes with a total of 22 different types of sports, and minimization of missing data via in-person supervision of data collection with athletes.

Notwithstanding these strengths, limitations of the current study also should be acknowledged when interpreting the findings. First, we relied on self-assessment of key study variables. Self-reports are susceptible to positive (faking good) and negative response bias (faking bad) (Furnham & Henderson, 1982) as well as common method biases (Podsakoff et al., 2003, 2012), when taking consideration that in the current study we also collected data from a sub-group of junior elite athletes. Furthermore, mindfulness measures present particular difficulties on using the self-reported approach given the importance difference between in-the-moment attention and general tendencies (Baer, 2011). Future research should consider to address the potential biases by using the labor-intensive interview approach in one-on-one interactions with skilled and experienced interviewers (Grossman & Van Dam, 2011), assuring self-reports are supplemented with objective behavioral methods (Baer, 2019) and so on. Second, we measured athlete mindfulness, experiential avoidance, cognitive fusion, and athlete burnout at three waves of assessments. It should be noted that dispositional mindfulness measured in the current study is in nature different from state mindfulness, where state measures reflect the mindfulness levels just happened (if not now) rather than general mindfulness capacity in a certain period (Bravo et al., 2018; Davidson, 2010; Wheeler et al., 2016). To further examine the mediating models from mindfulness to athlete burnout, future studies are therefore suggested to measure the effects from state mindfulness to state burnout symptoms using intensive longitudinal designs of ecological momentary assessments (Stone & Shiffman, 1994; Shiffman et al., 2008). Relatedly, we utilized a sport-specific measure of mindfulness that is contextualized to training and competition settings, whereas the burnout scale is generic in nature regarding one's engagement with sport. It may well be that athletes who are strong

in mindfulness within training and competition settings may still experience elements of burnout because of other factors within their sport (e.g., organizational stressors like selection decisions). Third, even though we provided evidence on the mediating role of experiential avoidance and cognitive fusion from mindfulness to athlete burnout using longitudinal design, our tests are still correlational in nature. Strictly speaking, the changing mechanisms of the increase of mindfulness on the decrease of athlete burnout cannot be examined using the non-experimental correlational design. Experimental manipulations of antecedent (e.g., mindfulness) and mediator (e.g., cognitive fusion) variables are required to shed light on causal evidence (MacKinnon et al., 2002; Spencer et al., 2005). Future studies should consider adopting the design of randomized controlled trials to examine the effectiveness of mindfulness training on changes in mindfulness, experiential avoidance, cognitive fusion, and burnout (e.g., Kiken et al., 2015). Fourth, we recruited an unbalanced number of athletes from individual and team sports, in which the number of individual athletes outweighs those from team sports. Given that mindfulness in team sports setting might be different from the individual sports setting (Josefsson et al., 2020), future studies on examining the relations among mindfulness, athlete burnout, and potential mediators could consider to recruit a balanced sample of elite athletes in terms of sport type.

Conclusion

In the current study, we extended knowledge on the mediating roles of experiential avoidance and cognitive fusion on the effect from mindfulness to athlete burnout via a longitudinal perspective. Findings provide insights on the changing mechanisms how mindfulness can reduce athlete burnout. With the limitations of reliance on self-reports on measuring dispositional study variables, there is need for additional work to addresses the limitations and which might offer a more robust test of these dynamics using ecological momentary assessments. Future studies should also consider to experimentally examine the improvement of mindfulness levels can lead to the decrease of athlete burnout via the reduction of experiential avoidance and cognitive fusion using the design of randomized controlled trials.

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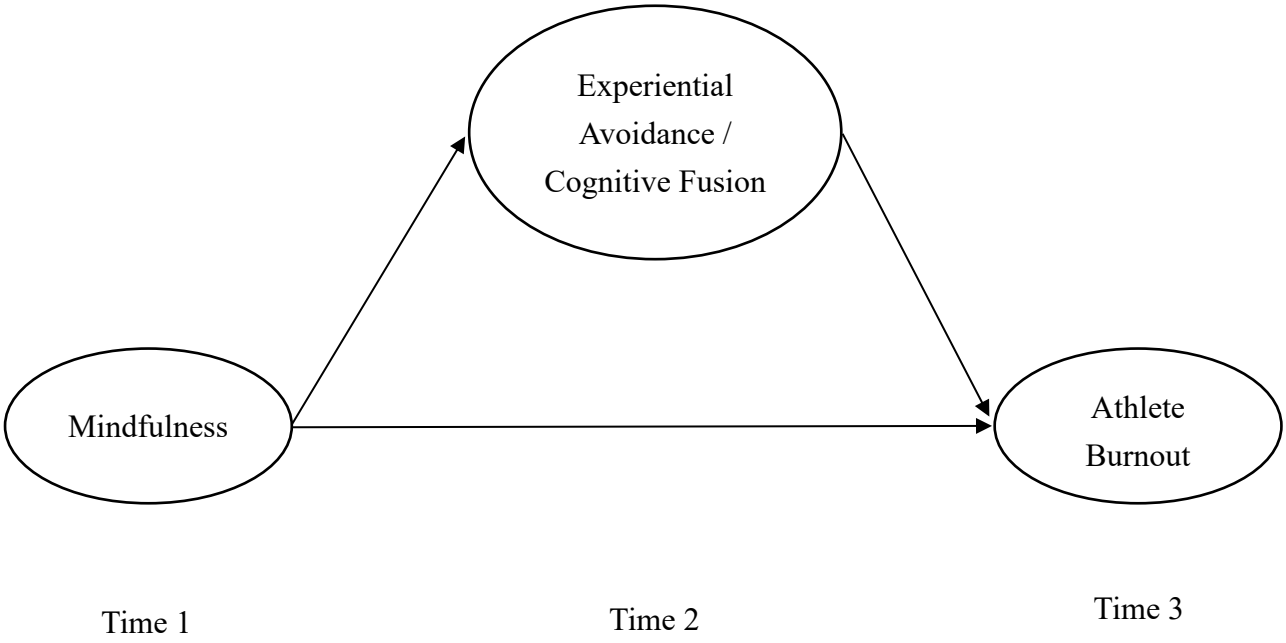

Figure 1.
Theoretical models on the effects from mindfulness to athlete burnout via the proposed mediators of experiential avoidance and cognitive fusion. Controlled effects from demographic variables to key study variables were not shown in the model.

Table 1.

Descriptive statistics, international consistency reliabilities, and bivariate correlations among mindfulness, experiential avoidance, cognitive fusion, and athlete burnout (n = 280)

Variables	Mean	*SD*	1	2	3	4
1. T1 Mindfulness	3.62	.47	.83			
2. T2 Experiential avoidance	3.10	1.15	-.15*	.89		
3. T2 Cognitive fusion	3.34	1.14	-.10	.81**	.91	
4. T3 Athlete burnout	2.61	.78	.01	.22**	.23**	.86

Note. T1= Time 1; T2 = Time 2; T3 = Time 3; *SD* = standard deviations; Reliabilities of the study variables are presented at the diagonal. *p < .05; **p < .01.

Table 2.

Path coefficients for the mediation model of experiential avoidance on the effect from mindfulness to athlete burnout (n = 280).

Effects	β	95%*CI*		p
		LL	UL	
Direct effects				
T1 Mindfulness ⟶ T2 Experiential avoidance	-.262	-.399	-.124	<.001
T2 Experiential avoidance ⟶ T3 Athlete burnout	.255	.127	.384	<.001
T1 Mindfulness ⟶ T3 Athlete burnout	.037	-.109	.183	.619
Indirect effects				
T1Mindfulness⟶T2Experiential avoidance⟶T3Athlete burnout	-.067	-.117	-.017	.009

Note. *CI* = Confidence interval; LL = Lower limit; UL = Upper limit. T1-T3 = Time1-Time3.

Table 3.

Path coefficients for the mediation model of cognitive fusion on the effect from mindfulness to athlete burnout (n = 280).

Effects	β	95%*CI*		p
		LL	UL	
Direct effects				
T1 Mindfulness ⟶ T2 Cognitive fusion	-.194	-.335	-.053	.007
T2 Cognitive fusion ⟶ T3 Athlete burnout	.247	.120	.373	<.001
T1 Mindfulness ⟶ T3 Athlete burnout	.014	-.130	.157	.849
Indirect effects				
T1Mindfulness ⟶ T2Cognitive fusion⟶ T3Athlete burnout	-.048	-.091	-.005	.030

Note. *CI* = Confidence interval; LL = Lower limit; UL = Upper limit. T1-T3 = Time1-Time3.

Online Supplementary Materials

Table A1

Controlled effects from demographic variables to mindfulness, experiential avoidance, and athlete burnout (n = 280).

Effects	β	95%*CI*		p
		LL	UL	
Gender → T1 Mindfulness	-.035	-.169	.099	.607
Age → T1 Mindfulness	.122	-.037	.280	.132
Sport type → T1 Mindfulness	-.071	-.210	.069	.320
Years of training → T1 Mindfulness	-.118	-.275	.039	.141
Mindfulness-related experience → T1 Mindfulness	.083	-.052	.218	.227
Training hours per day → T1 Mindfulness	.084	-.057	.226	.242
Training days per week → T1 Mindfulness	.137	.001	.273	.048
Gender → T2 Experiential avoidance	.039	-.085	.164	.535
Age → T2 Experiential avoidance	-.064	-.212	.085	.399
Sport type → T2 Experiential avoidance	-.068	-.196	.060	.295
Years of training → T2 Experiential avoidance	.082	-.063	.227	.269
Mindfulness-related experience → T2 Experiential avoidance	.016	-.111	.142	.808
Training hours per day → T2 Experiential avoidance	.001	-.131	.133	.989
Training days per week → T2 Experiential avoidance	.086	-.041	.212	.184
Gender → T3 Athlete burnout	-.010	-.134	.114	.876
Age → T3 Athlete burnout	-.019	-.167	.129	.801
Sport type → T3 Athlete burnout	.048	-.079	.175	.463
Years of training → T3 Athlete burnout	.137	-.007	.280	.062
Mindfulness-related experience → T3 Athlete burnout	-.025	-.150	.100	.695
Training hours per day → T3 Athlete burnout	.136	.006	.266	.040
Training days per week → T3 Athlete burnout	.067	-.059	.192	.298

Note. Standardized effect sizes β was used. CI = Confidence interval; LL = Lower limit; UL = Upper limit. T1= Time 1, T2 = Time 2, T3 = Time 3.

Table A2

Controlled effects from demographic variables to mindfulness, cognitive fusion, and athlete burnout (n = 280).

Effects	β	95%*CI*		p
		LL	UL	
Gender → T1 Mindfulness	-.035	-.169	.099	.610
Age → T1 Mindfulness	.122	-.036	.279	.131
Sport type → T1 Mindfulness	-.069	-.209	.070	.331
Years of training → T1 Mindfulness	-.116	-.274	.041	.147
Mindfulness-related experience → T1 Mindfulness	.083	-.052	.218	.227
Training hours per day → T1 Mindfulness	.084	-.057	.225	.242
Training days per week → T1 Mindfulness	.136	-.001	.272	.051
Gender → T2 Cognitive fusion	.030	-.095	.154	.641
Age → T2 Cognitive fusion	-.094	-.242	.054	.215
Sport type → T2 Cognitive fusion	-.034	-.162	.093	.597
Years of training → T2 Cognitive fusion	.132	-.013	.276	.074
Mindfulness-related experience → T2 Cognitive fusion	.012	-.114	.138	.855
Training hours per day → T2 Cognitive fusion	.057	-.075	.189	.398
Training days per week → T2 Cognitive fusion	.038	-.089	.164	.559
Gender → T3 Athlete burnout	-.007	-.131	.116	.906
Age → T3 Athlete burnout	-.012	-.160	.136	.872
Sport type → T3 Athlete burnout	.039	-.088	.166	.548
Years of training → T3 Athlete burnout	.125	-.019	.270	.089
Mindfulness-related experience → T3 Athlete burnout	-.024	-.149	.101	.709
Training hours per day → T3 Athlete burnout	.122	-.008	.253	.066
Training days per week → T3 Athlete burnout	.079	-.046	.204	.213

Note. Standardized effect sizes β was used. CI = Confidence interval; LL = Lower limit; UL = Upper limit. T1= Time 1, T2 = Time 2, T3 = Time 3.