

**Mindfulness and Burnout in Elite Junior Athletes: The Mediating Role of Experiential
Avoidance**

Chun-Qing Zhang ^{a*}, Gangyan Si ^b, Pak-Kwong Chung ^a, & Daniel F. Gucciardi ^c

^a Department of Physical Education, Hong Kong Baptist University, Hong Kong

^b Department of Health and Physical Education, Hong Kong Institute of Education, Hong Kong

^c School of Physiotherapy and Exercise Science, Curtin University, Australia

Author Note

*Address correspondence to Chun-Qing Zhang, Department of Physical Education, Faculty of Social Sciences, Hong Kong Baptist University, 224 Waterloo Road, Kowloon Tong, Kowloon, Hong Kong, China. Email: cqzhang@hkbu.edu.hk.

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Abstract

Previous research suggests that mindfulness and experiential avoidance are negatively and positively related to athlete burnout, respectively. It is unknown, however, whether or not experiential avoidance functions as a mediator between mindfulness and athlete burnout. To address this gap, 387 elite Chinese junior athletes ($M = 15.44$ years, $SD = 1.42$) completed self-report measures of mindfulness, experiential avoidance, and athlete burnout. Findings provided cross-sectional evidence that experiential avoidance mediated the inverse association from mindfulness to each of the three burnout dimensions. No gender difference of these indirect effects were revealed. This study is the first to test the theoretical sequence in which mindfulness is associated with athlete burnout via experiential avoidance, and provide additional support the adaptive nature of mindfulness.

Keywords: acceptance; adolescent athletes; coping; mediation;

14 **Mindfulness and Burnout in Elite Junior Athletes: The Mediating Role of Experiential**
15 **Avoidance**

16 Elite junior athletes who are at a critical stage of progressing into adult elite athletes are
17 at a high risk for burnout because of the number of stressors they face each day, including
18 prolonged training hours, repeated skills practice, little control in their training schedule and
19 arrangement, daily fatigue, pain, injury, and performance pressure (Gustafsson, Kentta, Hassm n,
20 & Lundqvist, 2007). Athlete burnout is a syndrome that consists of physical and emotional
21 exhaustion from intense demands of training and competing, reduced sense of accomplishment,
22 and devaluation of sport experiences (Raedeke & Smith, 2001). Given the maladaptive nature of
23 these symptoms, a variety of psychological and behavioral problems have been associated with
24 burnout, such as a sickness absence of training, illness, interpersonal problems, and even drop
25 out from sport (Fraser-Thomas, C t  & Deakin, 2008).

26 With the aim of alleviating the occurrence of athlete burnout, researchers have sought to
27 examine protective (e.g., harmonious passion, hope, problem-focused coping, and self-
28 determined motivation) and risk (e.g., avoidant coping, stress, negative affect, and socially
29 prescribed perfectionism) factors of athlete burnout (see Curran, Appleton, Hill, & Hall, 2011;
30 Gustafsson, Skoog, Podlog, Lundqvist, & Wagnsson, 2013; Hill, Hall, & Appleton, 2010;
31 Lonsdale, Hodge, & Rose, 2009). Mindfulness, which is defined as a receptive and
32 nonjudgmental present-moment mindful attention and awareness (Brown & Ryan, 2003), is one
33 important protective factor that may offer new insight into the prevention of athlete burnout yet
34 has received little attention from scholars (Gustafsson, Davis, Skoog, Kentt  & Harberl, 2015).

35 Given that athlete burnout is proposed to result from an imbalance between chronic stress
36 and a lack of effective coping resources (Raedeke & Smith, 2004), mindfulness could serve as a

MINDFULNESS, EXPERIENTIAL AVOIDANCE, AND BURNOUT

37 key protective factor through which the influence of stress is counterbalanced. This protective
38 hypothesis is proposed since mindfulness allows individuals to simply observe and accept
39 thoughts and feelings during stressful situations without trying to alter the experiences in the
40 present moment (Kabat-Zinn, 1990). In other words, mindfulness helps athletes step back from
41 the experience rather than remaining entangled with an escalated circle of heightened emotional
42 distress (Bishop, 2002). In this sense, mindfulness might influence experiences of stress in two
43 ways: (a) perceptions of stressors via mindfully observing and monitoring internal reactions, and
44 (b) coping with stressors with a nonjudgmental and nonreactive attitude (Roeser et al., 2013).
45 Based on established empirical evidence, Creswell and Lindsay (2014) proposed a biological
46 model of mindfulness stress buffering account, in which mindfulness has been indicated to alter
47 stress processing via two pathways, including a top-down regulatory pathway (i.e., recruiting
48 central stress-regulatory regions of prefrontal cortex) and a bottom-up pathway (i.e., altering the
49 peripheral stress-response cascades). Specifically, mindfulness buffers central stress processing
50 regions in the brain (e.g., amygdala), which in turn reduces the peripheral physiological stress-
51 response activation of sympathetic-adrenal-medullary (SAM) and hypothalamic-pituitary-adrenal
52 (HPA) axes, and further leads to the decrease of subsequent risk for stress-related disease.

53 Stress and athlete burnout are two closely related constructs (e.g., Gustafsson et al., 2013;
54 Raedeke & Smith, 2004). According to the cognitive-affective stress model of athlete burnout
55 (Smith, 1986), burnout develops along with stress via four stages towards contextual, cognitive,
56 physiological, and behavioral demands of stress. In short, burnout can be viewed as a particular
57 and prolonged stress response to chronic stressors (Gustafsson et al., 2015). Therefore, high
58 levels of mindfulness should be related to low levels of stress and athlete burnout. Empirical
59 support for an inverse association between mindfulness and burnout was demonstrated in three

MINDFULNESS, EXPERIENTIAL AVOIDANCE, AND BURNOUT

60 cross-sectional investigations of South African junior tennis athletes ($n = 104$; Walker, 2013),
61 Norwegian junior athletes ($n = 382$; Moen, Federici, & Abrahamsen, 2015) and Swedish elite
62 junior athletes ($n = 233$; Gustafsson et al., 2015). Furthermore, in non-sport contexts,
63 intervention studies have shown that enhanced mindfulness decreases in burnout among teachers
64 (e.g., Roeser et al., 2015) and nurses (e.g., Mackenzie, Poulin, & Seidman-Carlson, 2006).

65 Previous research has explored possible mediational pathways from mindfulness to
66 athlete burnout. For example, Gustafsson and colleagues (2015) demonstrated that the
67 relationship between mindfulness and athlete burnout was partially mediated by both positive
68 and negative affect, whereas positive affect fully mediated the link from mindfulness to the
69 subscale of sport devaluation. The examination of the potential changing mechanisms can
70 provide insights on explain how mindfulness is related to reduced experiences of athlete burnout.
71 One potential mechanism by which mindfulness may lead to reduced levels of athlete burnout is
72 through reductions in experiential avoidance. The construct of experiential avoidance is
73 described as an unwillingness to experience unwanted private thoughts, feelings, and sensations,
74 and attempts to change, alter, or avoid these private events (Hayes, Strosahl, & Wilson, 1999;
75 Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). The tendency to experientially avoid,
76 control or change negative personal experiences due to athlete burnout may result in
77 progressively higher levels of distress and feelings of exhaustion, reduced sense of
78 accomplishment and devaluation.

79 A systematic approach to reduce experiential avoidance is the acceptance and
80 commitment therapy (ACT; Hayes et al., 1999). In ACT, mindfulness and acceptance processes
81 are incorporated into commitment and behavior change processes that link to individuals' values
82 to overcome the ubiquitous and harmful experiential avoidance and cognitive defusion (Hayes,

MINDFULNESS, EXPERIENTIAL AVOIDANCE, AND BURNOUT

83 2004). According to the model of ACT, the mindfulness ability of bringing attention completely
84 to the present moment is designed to counter experiential avoidance by adopting a direct and
85 non-evaluative contact with present experiences (Hayes et al., 1999). Preliminary evidence
86 showed that intervention studies that are based on ACT model can significantly reduce burnout
87 in samples of substance abuse counselors (Hayes et al. 2004) and social workers (Brinkborg,
88 Michanek, Hesser, & Berglund, 2011).

89 Athletes' mindfulness capability might exert an influence on burnout via the decrease of
90 experiential avoidance. Theoretically, the two facets (mindful observation and
91 nonjudgmental/nonreactive attitude) of how mindfulness influences experiences of stress and
92 athlete burnout are in line with the reductions of those two key components of experiential
93 avoidance, namely, (a) the tendency to be unwilling to sustain contact with present moment
94 experiences, and (b) the intention to change or control the experiences (Chawla & Ostafin, 2007).
95 Empirically, higher levels of mindfulness have been found to be significantly related to lower
96 levels of experiential avoidance in a cross-sectional study of elite Chinese athletes (Zhang,
97 Chung, Si, & Liu, 2014). In addition, a recent randomized controlled trial demonstrated that
98 mindfulness training can lead to a significant decrease of experiential avoidance (i.e., increase of
99 experiential acceptance) in a sample of beginners in dart throwing (Zhang et al., 2016).

100 Although the direct link from experiential avoidance to athlete burnout has not yet been
101 established in sport contexts, high levels of experiential avoidance has been demonstrated to be
102 significantly related to higher levels of burnout in a sample of Spanish critical care nurses
103 (Iglesias, de Bengoa Vallejo, & Fuentes, 2010). Research has also shown that experiential
104 avoidance is a stronger and more consistent determinant of burnout than work-related variables
105 such as job control, coworker support and workload among a sample of addiction counselors

MINDFULNESS, EXPERIENTIAL AVOIDANCE, AND BURNOUT

106 (Vilardaga et al., 2011). Building on the theoretical explanation and established relations among
107 mindfulness, experiential avoidance, and burnout, we aimed to test this theoretical sequence in a
108 sample of athletes, and examine whether or not experiential avoidance mediates the inverse
109 association between mindfulness and athlete burnout in the current study.

110 Currently, little work has been devoted to tests of gender differences of the associations
111 among mindfulness, experiential avoidance and burnout. An understanding of the moderating
112 effect of gender on the changing mechanism from mindfulness to athlete burnout through the
113 reduction in experiential avoidance is important if practitioners are to effectively apply the
114 mindfulness training on decreasing athlete burnout in intervention studies in the future. The test
115 of measurement invariance of the latent constructs is a prerequisite to assessments of the
116 associations among the latent factors, tests of the latent factor mean differences, and moderation
117 analyses (Martin, Sass, & Schmitt, 2012). Previous research has indicated measurement
118 invariance across gender on mindfulness assessed by the Mindful Attention Awareness Scale
119 (Brown & Ryan, 2003) in a sample of elite athletes (Chung, Si, Liu, & Zhang, 2013). Likewise,
120 gender invariance of experiential avoidance as measured by Acceptance and Action
121 Questionnaire II (Bond et al., 2011) was demonstrated in sport contexts (Zhang et al., 2014). In
122 contrast, there are mixed findings regarding gender differences of the different dimensions of
123 burnout in sport context (Goodger, Gorely, Harwood, & Lavallee, 2007) and also in working
124 context (Purvanova & Muros, 2010). However, previous research (Gustafsson et al., 2007) failed
125 to establish the gender invariance of athlete burnout as measured by the Eades Burnout Inventory
126 (Eades, 1990). Moreover, to date, there is no gender measurement invariance analysis on another
127 widely-used measure of athlete burnout, the Athlete Burnout Questionnaire (Raedeke & Smith,

128 2001), which makes it premature to directly test the gender differences on both the direct and
129 indirect associations among the latent factors of interest.

130 In summary, the purposes of this study were to examine the associations among
131 mindfulness, experiential avoidance and three dimensions of athlete burnout (i.e.,
132 physical/emotional exhaustion, reduced sense of accomplishment, and devaluation), and test a
133 theoretical sequence in which mindfulness is related directly to burnout and indirectly through
134 experiential avoidance a sample of adolescent athletes (see Figure 1). It was hypothesized that
135 mindfulness would be inversely associated with experiential avoidance and the three dimensions
136 of athlete burnout (i.e., higher levels of mindfulness are related to lower levels of experiential
137 avoidance and athlete burnout), whereas the relation between experiential avoidance and the
138 three dimensions of athlete burnout would be positive (i.e., higher levels of experiential
139 avoidance are related to lower levels of athlete burnout). In addition, it was hypothesized that
140 mindfulness would be indirectly associated with lower levels of burnout via experiential
141 avoidance. Lastly, we investigated the measurement invariance of the Athlete Burnout
142 Questionnaire (Raedeke & Smith, 2001) across gender as well as gender differences in the
143 relations of the proposed theoretical sequence; given the absence of past work on these
144 associations, no specific hypothesis were proposed.

145 **Methods**

146 **Participants**

147 In total, 387 adolescent athletes (164 females, 222 males, and 1 unknown; $M_{\text{age}} = 15.44$
148 years, $SD_{\text{age}} = 1.42$; range 12 - 18) participated in this study. All participants were recruited from
149 five elite sport training centers in China, and drawn from 21 different sports, comprising a
150 variety of individual ($n = 332$; e.g., archery, table tennis, and wrestling) and team ($n = 55$; e.g.,

151 basketball, soccer, and volleyball) disciplines. The majority of participants were competing at
152 national levels ($n = 356$), with some athletes competing or had competed at the international
153 level ($n = 31$). On average, athletes had participated in their sport competitively for 2.79 years
154 ($SD = 1.42$; range .50 - 10).

155 **Measures**

156 **Mindful attention awareness scale** (MAAS; Brown & Ryan, 2003). The MAAS is a 15-
157 item unidimensional scale measuring the general tendency of one's attention to or awareness of
158 present-moment experiences (e.g., "I find myself doing things without paying attention"). Items
159 are rated on a 6-point Likert scale from 1 (*almost always*) to 6 (*almost never*). The Chinese
160 version of the MAAS (Deng et al., 2012) has demonstrated satisfactory construct validity,
161 internal consistency reliability ($\rho = .86$), and test-retest reliability ($r = .66$) in a sample of elite
162 Chinese athletes (Chung et al., 2013).

163 **Acceptance and action questionnaire II** (AAQ-II; Bond et al., 2011). The AAQ-II is a
164 7-item self-report measure used to assess the tendency to avoid aversive internal experiences,
165 including negative emotions, thoughts, and memories (e.g., "My painful memories prevent me
166 from having a fulfilling life"). Items are rated on a 7-point Likert scale, from 1 (*never true*) to 7
167 (*always true*). The Chinese version of the AAQ-II has demonstrated satisfactory construct
168 validity, internal consistency reliability ($\rho = .85$), and test-retest reliability ($r = .74$) in a sample
169 of elite Chinese athletes (Zhang et al., 2014).

170 **Athlete burnout questionnaire** (ABQ; Raedeke & Smith, 2001). The ABQ is a 15-item
171 self-report instrument measuring three components of burnout: emotional/physical exhaustion
172 (e.g., "I am exhausted by the mental and physical demands of sport"), reduced sense of
173 accomplishment (e.g., "I am not achieving much in sport"), and devaluation (e.g., "The effort I

174 spent in sport would be better spent doing other things”). Items are rated on a 5-point Likert scale
175 ranging from 1 (*almost never*) to 5 (*almost always*). The ABQ was translated and back-translated
176 into Chinese for the purposes of this study. The Chinese version of the ABQ has not been tested
177 in past work and therefore was examined with the current sample.

178 **Procedure**

179 Prior to data collection, ethical approval was granted from the University of [Name
180 masked for review]. The coaches and team managers at five provincial level sport training
181 centers located in east, east north, middle, north, south, and west south of Mainland China were
182 contacted via sport psychologists based in these centers. The purpose of the study was explained
183 to them in order to obtain gate keeper permission to distribute the survey package to athletes.
184 The questionnaires were distributed by the researchers or the center-based sport psychologists to
185 athletes prior to, or after, their regular training sessions, and the voluntary role and the
186 confidential nature of their responses were explained; informed consent forms were collected
187 from athletes. Athletes were asked to return the completed questionnaires at the next training
188 session. Once the questionnaires had been collected, they were returned to the primary researcher
189 for data input and analysis.

190 **Data Analysis**

191 The measurement model for each psychological instrument was firstly tested using
192 confirmatory factor analysis (CFA) with the robust maximum likelihood (MLR) estimation
193 within Mplus 7.3 (Muthén & Muthén, 1998-2012). A sequential model testing approach was
194 adopted, via multi-group CFA, to examine whether the first-order three-factor measurement
195 model of the athlete burnout displayed invariance across male and female athletes (Dimitrov,
196 2010). The configural invariance was firstly examined without imposing any equality constraints

MINDFULNESS, EXPERIENTIAL AVOIDANCE, AND BURNOUT

197 on model parameters estimates across gender groups. Then, metric invariance was examined by
198 constraining the factor loadings to be equal across gender groups. The third step was to examine
199 the strong invariance by constraining both factor loadings and item intercepts across gender
200 groups. Finally, strict invariance was examined by constraining the factor variances and
201 covariances across gender groups to be equal, while retaining the constraints of factor loadings
202 and item intercepts. In line with Cheung and Rensvold (2002) for determining invariance in
203 multiple-sample testing, the absolute value of the change of CFI (Δ CFI) between two nested
204 samples larger than .01 indicates a lack of invariance.

205 Structural equation modelling (SEM) was used to test the hypothesized theoretical
206 sequence depicted in Figure 1. To obtain confidence intervals of effects from mindfulness to the
207 three dimensions of athlete burnout, simple models excluding experiential avoidance were also
208 tested. The 95% bias corrected (BC) bootstrapping method (with $n = 5000$ bootstrap resamples)
209 was subsequently employed to test the indirect effects of mindfulness on athlete burnout through
210 experiential avoidance (Hayes, 2009). An indirect effect is considered meaningful if no zero
211 value is included within the upper and lower-bound confidence interval (CI) of the indirect effect
212 path. The guidelines provided by Cohen (1988) were followed to interpret the effect size of the
213 regression paths and correlation coefficients (small, $r = 0.1$; medium, $r = 0.3$; or large $r = 0.5$).
214 With regard to the CFA and SEM tests, acceptable model-data fit was supported when the values
215 of comparative fit index (CFI) and Tucker-Lewis index (TLI) exceeded .90, and the value of
216 root-mean-square error of approximation (RMSEA) was less than .08 (Marsh, Hau, & Grayson,
217 2005). Composite reliability (Rho [ρ]; Raykov, 1997) was calculated for each subscale to
218 provide an index of internal reliability.

219 The procedure recommended by Lau and Cheung (2012) was followed to test gender
 220 differences regarding the strength of the indirect effects in the mediation models. The difference
 221 of an indirect effect is considered meaningful when the upper and lower-bound of the 95% BC
 222 bootstrap confidence interval does not encompass zero. Although the use of this method will
 223 slightly inflate Type I error rate, the extra power provided for comparing specific mediation
 224 effects may outweigh this drawback (Taylor, MacKinnon, & Tein, 2008). This method can also
 225 provide more information than the chi-square difference tests in which the equivalent constraints
 226 are imposed on the structural paths (Lau & Cheung, 2012).

227 **Results**

228 **Preliminary Analyses**

229 The data of two athletes were removed because they did not provide responses to the
 230 ABQ, thereby leaving a sample size of 385 valid responses. No evidence of non-normality was
 231 revealed (i.e., absolute values of skewness and kurtosis of all items were < 2) and there was no
 232 significant pattern of missing data in the remaining responses (missing data = 0.58%). However,
 233 the Missing Completely at Random (MCAR; Little, 1988) test revealed that data were not
 234 missing completely at random ($p = .001$). Therefore, the robust maximum likelihood estimator
 235 (MLR) was used. Missing data were handled using full information maximum likelihood (FIML)
 236 estimation, which produces more efficient and unbiased treatment of missing data than other
 237 methods such as pairwise deletion and imputation (Enders & Bandalos, 2001).

238 The means, standard deviations, internal reliability coefficients, and bivariate correlations
 239 for all study measures are detailed in Table 1. All subscales evidenced adequate internal
 240 reliability ($\rho > .70$), except the subscale of reduced sense of accomplishment ($\rho = .52$).
 241 Preliminary analyses indicated medium to high levels of significant and negative associations

242 from mindfulness to the three dimensions of athlete burnout and experiential avoidance, as well
243 as medium to high levels of significant and positive associations from experiential avoidance to
244 three dimensions of athlete burnout.

245 **Factorial Validity of the Measurement Instruments**

246 The CFA revealed that the hypothesized correlated three-factor model of athlete burnout
247 was acceptable according to the multiple indices of model fit, $\chi^2(87) = 135.33, p < .001$, CFI
248 = .96, TLI = .95, RMSEA = .038 (90% CI = .025 to .050). In addition, the model fit of the
249 hypothesized single-factor model of mindfulness was also acceptable, $\chi^2(90) = 152.37, p < .001$,
250 CFI = .93, TLI = .92, RMSEA = .042 (90% CI = .030 to .054). Finally, the CFA revealed that the
251 hypothesized single-factor model of the experiential avoidance was acceptable according to the
252 multiple indices of model fit, $\chi^2(14) = 37.82, p < .001$, CFI = .95, TLI = .93, RMSEA = .066 (90%
253 CI = .041 to .092). Given that measurement invariance of the single-factor model of mindfulness
254 (Chung et al., 2013) and experiential avoidance (Zhang et al., 2014) across male and female
255 athletes have been established, only the gender measurement invariance of three-factor model of
256 athlete burnout was further examined in the current study. The absolute value of Δ CFI (change
257 of CFI) was less than .01 thereby providing support for gender invariance, including configural
258 invariance, metric invariance, strong invariance, but not the strict invariance (i.e., invariant factor
259 variance and covariance). Based on the demonstration of strong invariance across groups,
260 moderation analysis (i.e., structural invariance) of structural parameters can be conducted (Wang
261 & Wang, 2012). A summary of results is presented in Table 2.

262 **Structural Validity of the Hypothesized Theoretical Sequence**

263 The full measurement model with all variables included (i.e., mindfulness, experiential
264 avoidance, emotional/physical exhaustion, reduced sense of accomplishment, and sport

MINDFULNESS, EXPERIENTIAL AVOIDANCE, AND BURNOUT

265 devaluation) was examined prior to the test of the paths and indirect effects in three independent
266 structural models, and an acceptable model fit was indicated, $\chi^2(619) = 895.69, p < .001$, CFI
267 = .91, TLI = .90, RMSEA = .034 (90% CI = .029 to .039). An overview of the model fit indices
268 and path coefficients for all three structural models tested is detailed in Table 3. Significant and
269 negative total effects from mindfulness to the three dimensions of athlete burnout were obtained
270 in the simple model (higher levels of mindfulness related to lower levels of athlete burnout),
271 which represent medium and large effect sizes. Similarly, in the mediation model, the direct
272 effects from mindfulness to the three dimensions of athlete burnout were negative and significant,
273 with the size of path coefficients interpreted as medium in strength. The direct effect from
274 mindfulness to devaluation was higher than from mindfulness to reduced sense of
275 accomplishment and emotional/physical exhaustion, indicating that mindfulness is related to
276 lower levels of devaluation than reduced sense of accomplishment and emotional/physical
277 exhaustion. The indirect effects from mindfulness to the three dimensions of athlete burnout via
278 experiential avoidance were negative and significant and similar in size (small to medium),
279 indicating that the higher level of mindfulness is related to lower levels of athlete burnout via
280 the mediating variable of experiential avoidance.

281 **Gender Differences in the Structural Model**

282 The 95% confidence interval for the indirect effects from mindfulness to reduced sense of
283 accomplishment (-.01 to .32), devaluation (-.15 to .25), and physical/emotional exhaustion (-.03
284 to .50) encompassed zero, thereby indicating that there were no gender difference in these
285 pathways. The 95% confidence interval analysis indicated that there were no gender differences
286 on direct effects from mindfulness to reduced sense of accomplishment (-.42 to .02) and
287 physical/emotional exhaustion (-.42 to .12). However, a significant gender difference on the

288 direct effect from mindfulness to devaluation was found (-.87 to -.08). Further examination of
289 this direct effect indicated that there was a larger effect size for male athletes when compared
290 with female athletes ($\beta = -.50$ vs. $\beta = -.07$).

291 **Discussion**

292 The primary purpose of this study was to test a theoretical sequence in which mindfulness
293 is directly related to burnout and indirectly through experiential avoidance. To date, this
294 theoretical sequence has not yet been investigated, and therefore can shed light on the potential
295 mechanisms by which mindfulness might be related with athlete burnout. We also tested whether
296 or not gender differences existed in these proposed direct and indirect (via experiential avoidance)
297 pathways from mindfulness to athlete burnout. Consistent with our expectations, we revealed
298 significant and negative effects from mindfulness to experiential avoidance and all three
299 dimensions of athlete burnout. There were indirect effects of mindfulness on all three dimensions
300 of athlete burnout via experiential avoidance. With the exception of the direct effect from
301 mindfulness to the devaluation component of burnout, all direct and indirect pathways were not
302 significantly different between male and female athletes.

303 The mindfulness ability of focusing attention and awareness on one's negative thoughts
304 and feelings instead of trying to dis-identify with them may help athletes prevent the occurrence
305 of emotional/physical exhaustion and the subsequent feelings of reduced sense of
306 accomplishment and devaluation (Gustafsson et al., 2015; Jouper & Gustafsson, 2013). The
307 significant and inverse associations between mindfulness and all three dimensions of athlete
308 burnout revealed in the current study are in line with previous studies in junior elite athletes
309 (Gustafsson et al., 2015; Moen et al., 2015; Walker, 2013), providing additional support for the
310 link between mindfulness and athlete burnout. However, it should be noted that the inverse

MINDFULNESS, EXPERIENTIAL AVOIDANCE, AND BURNOUT

311 association from mindfulness to devaluation was stronger than the pathways from mindfulness to
312 reduced sense of accomplishment and emotional/physical exhaustion in the simple model, which
313 were similar in magnitude. The direct association from mindfulness to devaluation remained
314 significant in the mediation model, whereas the associations from mindfulness to reduced sense
315 of accomplishment and emotional/physical exhaustion became small and non-significant. These
316 findings suggest that the mindfulness ability of living in the present moment in a receptive and
317 non-judgmental manner may be able to more directly and largely counter the tendency of
318 devaluating one's sport experiences (Kabt-Zinn, 1990). In other words, the tendency to evaluate
319 their sport experiences in a negative way is reduced when athletes were equipped with the
320 capacity to notice and let go of such self-evaluative thoughts. Collectively, these findings suggest
321 that mindfulness may be important for reducing or minimizing athlete burnout syndromes during
322 training and competition, and therefore may represent a protective factor.

323 The current findings add to a growing body of research within sport settings (e.g., Zhang
324 et al., 2014) and other achievement and clinical contexts (e.g., Glick, Millstein, & Orsillo, 2014;
325 Hayes et al., 2004) that have supported an inverse association between mindfulness and
326 experiential avoidance. Collectively, these findings suggest that the protective nature of
327 mindfulness allows individuals to be more accepting of potentially distressing experiences,
328 which in turn help alleviate their tendencies to experientially avoid these negative private
329 experiences (Gardner & Moore, 2007; Hayes et al., 1996). Most importantly, the large effect size
330 from mindfulness to experiential avoidance may indicate that experiential avoidance works as a
331 proximal mediator from mindfulness to diverse psychological problems (Fletcher & Hayes,
332 2005). The positive relation from experiential avoidance to burnout confirmed in the current
333 study and other contexts (e.g., Iglesias et al., 2010) provides further empirical support to the

MINDFULNESS, EXPERIENTIAL AVOIDANCE, AND BURNOUT

334 theoretical framework of acceptance and commitment therapy (Hayes et al., 1999), in which
335 experiential avoidance is viewed as an important risk factor that relates to a diverse array of
336 psychological and behavioral difficulties (Biglan, Hayes, & Pistorello, 2008).

337 Mindfulness and acceptance-based behavioral change theory led us to expect that
338 experiential avoidance might help explain the influence from mindfulness to three dimensions of
339 athlete burnout (Gardner & Moore, 2012; Hayes, Strosahl, & Wilson, 2011). Athletes with high
340 levels of mindfulness tend to have low levels of experiential avoidance (Gardner & Moore, 2007;
341 Hayes et al., 1996), which may in turn minimize the maladaptive influences of stressors and
342 other negative factors on the syndromes of athlete burnout. The demonstration of experiential
343 avoidance as a mediator between mindfulness and athlete burnout in the current study provides
344 further support for the proposition that experiential avoidance is a mechanism of change in
345 mindfulness- and acceptance-based interventions aiming to prevent and recover from the
346 symptoms of athlete burnout (Gardner & Moore, 2007; Jøuper & Gustafsson, 2013). It is
347 important that future research confirms the mediational properties of experiential avoidance in
348 mindfulness- and acceptance- based interventions adopting a randomized control trial design. In
349 short, the current findings contribute to the theoretical development of the mechanism explaining
350 how mindfulness can help alleviate the burnout syndromes.

351 With the exception of the direct effect from mindfulness to devaluation, analyses
352 revealed that the associations among mindfulness, experiential avoidance, and burnout were not
353 statistically different between male and female athletes. The indirect effects from mindfulness to
354 all three dimensions of athlete burnout via experiential avoidance were generally larger for
355 female athletes when compare with male athletes. In particular, we found larger indirect effects
356 from mindfulness to reduced sense of accomplishment and physical/emotional exhaustion for

MINDFULNESS, EXPERIENTIAL AVOIDANCE, AND BURNOUT

357 female than male athletes in the current study. This finding may be the case since females report
358 higher level of experiential avoidance, reduced sense of accomplishment, and physical/emotional
359 exhaustion than males (Biglan et al., 2015; Howe-Martin et al., 2012; Purvanova & Muros,
360 2010). Although the use of 95% BC bootstrap confidence interval to compare the gender
361 difference of the indirect effects is considered to have much power and provides more
362 information than the significance test (Lau & Cheung, 2012), further examinations of gender
363 difference on the mediation effects using a larger and more diverse athletic population is needed
364 in order to (dis)confirm the current findings (Fritz & MacKinnon, 2007).

365 Although it was not the main focus of the current study, the mean scores of athlete
366 burnout in our sample were high for reduced sense of accomplishment, emotional/physical
367 exhaustion, and devaluation ($M = 2.80, 2.88, \text{ and } 2.50$, respectively), when compared to the
368 scores of western athletes, such as New Zealand elite junior rugby players ($M = 2.35, 2.76, \text{ and}$
369 2.00 , respectively; Hodge, Lonsdale, & Ng, 2008) and Swedish elite junior athletes ($M = 2.49,$
370 $1.87, \text{ and } 1.70$, respectively; Gustafsson et al., 2015). Given that elite Chinese athletes normally
371 start their professional training in a closed environment earlier (Si, Duan, Li, & Jiang, 2011) and
372 train longer and harder when compared to their western counterparts (Hays, 2008), as well as
373 report higher levels of negative dimensions of mood (Zhang, Si, Chung, Du, & Terry, 2014), it
374 may be that the norm/cut-off scores of both high and low burnout for elite Chinese athletes could
375 be higher than their western counterparts (Hodge et al., 2008). It might also be that the Chinese
376 translation of the Athlete Burnout Questionnaire did not accurately reflect the original meaning
377 as expected by the questionnaire developers (Sumathipala & Murray, 2000). Additional research
378 on the translation of this scale or the cultural dimensions of burnout in Chinese athletes might
379 shed light on the cultural difference on the interpretation of the burnout items.

380 Notwithstanding the promising findings in the current study, limitations should also be
381 considered and future direction could be informed when drawing from conclusions from this
382 work. Firstly, inferences regarding the hypothesized causal sequence must be tempered by the
383 cross-sectional nature of this study. Future research using longitudinal models and experimental
384 designs would permit conclusions regarding the hypothesized theoretical sequences tested in this
385 study. In order to establish conclusions regarding causal effects, it is important that future
386 research makes use of randomized controlled trials (Cartwright, 2010). Secondly, the findings
387 may be tempered by common method bias since we relied on self-report measures. Future
388 studies might use multiple evaluation method or objective measures to alleviate this concern. For
389 example, it would be informative to collect behavioral measures of experiential avoidance and
390 biomarkers of athlete burnout in the future. Thirdly, the internal consistency of the reduced sense
391 of accomplishment was comparatively lower than the other two subscales. The norm to accept
392 the internal consistency value is .70, and therefore the low internal consistency value (.52) of the
393 reduced sense of accomplishment subscale should be interpreted cautiously. Given the fact that
394 the number of items in this dimension is small (< 10), high level of internal consistency
395 reliability is less likely with a small number of items (Loewenthal, 2001). We therefore can
396 consider this low value as acceptable since previous studies have provided sound theoretical and
397 practical reasons for all items to be included in this dimension (e.g., Raedeke & Smith, 2001).
398 Nonetheless, future studies should further examine reduced sense of accomplishment subscale
399 due to the limitations of less reliable scales in measurement and structural model tests.

400 In conclusion, the current study extends our understanding of the inversed association
401 from mindfulness to athlete burnout by revealing that their relation is mediated by experiential
402 avoidance. It was also demonstrated that there was no gender difference on the mediation effects

MINDFULNESS, EXPERIENTIAL AVOIDANCE, AND BURNOUT

403 of experiential avoidance on the inversed associations from mindfulness to the three dimensions
404 of athlete burnout, although the overall size of the mediation effects were larger for female
405 athletes than male athletes. The findings provide a platform from which future research can
406 replicate and extend our understanding of the inversed association from mindfulness to athlete
407 burnout, and explanations for the nature of this relation.

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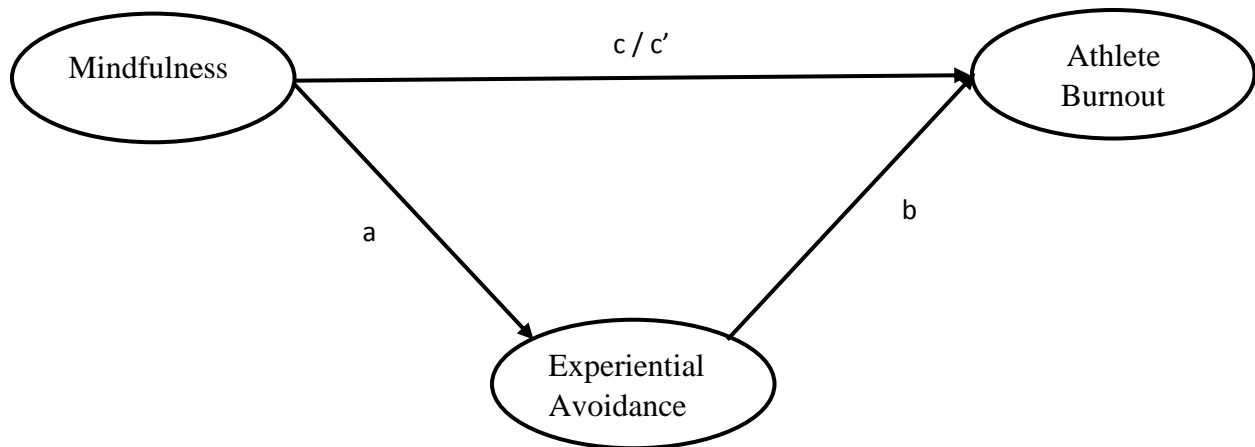


Figure 1. The mediation model of mindfulness on athlete burnout through experiential avoidance.

Path c represents the inversed total effects from mindfulness to the three dimensions of athlete burnout estimated in a simple model without including experiential avoidance; path c' represents the inversed direct association from mindfulness to the three dimensions of athlete burnout in the mediation model; path a represents the inversed direct association from mindfulness to experiential avoidance; and path b represents the positive direct association from experiential avoidance to athlete burnout. The product of a and b ($a \times b$) represent the inversed indirect effects from mindfulness to athlete burnout via experiential avoidance.

MINDFULNESS, EXPERIENTIAL AVOIDANCE, AND BURNOUT

Table 1.

Descriptive statistics and Pearson correlation matrix for mindfulness, experiential avoidance, and three dimensions of athlete burnout

Variables	<i>M</i>	<i>SD</i>	Composite Reliability	1	2	3	4	5
1. Mindfulness	4.10	.76	.84					
2. Experiential avoidance	3.30	1.06	.81	-.47				
3. Reduced sense of accomplishment	2.80	.77	.52	-.26	.43			
4. Emotional/Physical exhaustion	2.88	.75	.76	-.24	.36	.53		
5. Devaluation	2.50	.78	.77	-.40	.39	.53	.63	

Note. All correlations were significant at $p < .001$ (2-tailed).

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MINDFULNESS, EXPERIENTIAL AVOIDANCE, AND BURNOUT

Table 2.

Measurement Invariance of the Three-factor Model of Athlete Burnout across Male and Female Athletes

Model	χ^2_R	<i>df</i>	χ^2_R/df	CFI	Δ CFI	RMSEA	RMSEA 90% <i>CI</i>
M1: Configural invariance	285.40	184	1.55	.918		.054	.041-.065
M2: Metric invariance	293.71	196	1.50	.921	.003	.051	.038-.063
M3: Strong invariance	307.43	201	1.53	.914	-.007	.053	.040-.064
M4: Strict invariance	326.87	207	1.58	.903	-.011	.055	.043-.066

Note. χ^2_R = Robust chi-square; *df* = degrees of freedom; CFI = comparative fit index; RMSEA = root mean square error of approximation; *CI* = confidence interval.

MINDFULNESS, EXPERIENTIAL AVOIDANCE, AND BURNOUT

Table 3.

Fit statistics and estimated path coefficients for structural models

Dimensions	Model fit					Mindfulness → Burnout	Mindfulness → EA	EA → Burnout	Indirect effects β (95% CI)
	χ^2	df	CFI	TLI	RMSEA(90% CI)	β (95% CI)	β (95% CI)	β (95% CI)	
Reduced sense of accomplishment									
Simple model	349.01	169	.88	.86	.053(.045 to .060)	c = -.20 (-.47 to -.06)			
Mediation model	601.62	321	.88	.87	.048(.042 to .053)	c' = <u>-.05</u> (-.22 to .01)	a = -.70 (-1.04 to -.46)	b = .18 (.08 to .33)	a×b = -.12 (-.24 to -.05)
Emotional/Physical exhaustion									
Simple model	350.27	169	.90	.88	.053(.045 to .061)	c = -.23 (-.37 to -.13)			
Mediation model	583.29	321	.90	.89	.046(.040 to .052)	c' = <u>-.05</u> (-.17 to .07)	a = -.68 (-1.03 to -.45)	b = .28 (.15 to .48)	a×b = -.19 (-.32 to -.11)
Devaluation									
Simple model	284.68	169	.93	.92	.042(.034 to .051)	c = -.49 (-.72 to -.33)			
Mediation model	529.14	321	.92	.91	.041(.035 to .047)	c' = -.32 (-.56 to -.16)	a = -.69 (-1.03 to -.45)	b = .24 (.08 to .47)	a×b = -.16 (-.31 to -.06)

Note. CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; CI = confidence interval; EA = Experiential avoidance; c = the total effect from mindfulness to burnout in the simple model; c' = the direct effect from mindfulness to burnout in the mediation model. In the simple model, the proposed mediator experiential avoidance isn't included. Underlined path coefficients were not significant at $p = .05$. All other path coefficients were significant at $p < .01$. Bootstrap resamples: $n = 5000$.