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A longitudinal investigation of coaches' autonomy support in reducing athletes' experiential avoidance: The mediating role of subjective vitality

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Abstract

Experiential avoidance, a personality trait that refers to individuals' tendency to avoid negative experiences, can have a negative impact on athletes' goal achievement. For this reason, it is crucial to identify the factors that can mitigate such a tendency. Drawing on self-determination theory and referring specifically to the function of subjective vitality, we first hypothesize that perceived autonomy support from coaches is positively associated with athletes' subjective vitality, which in turn is negatively associated with athletes' experiential avoidance. Data were collected from one hundred eighty-five high school athletes in Taiwan using a three-wave, time-lagged survey design spanning a period of seven months. These athletes were drawn from ten senior high schools and were in their second year of high school. The results of regression analysis showed that perceived autonomy support from coaches at Time 1 was associated with higher vitality among athletes at Time 2, which was, in turn, associated with lower levels of experiential avoidance at Time 3, conditional on the athletes' experiential avoidance at Time 2. While perceived autonomy support from coaches at Time 1 was also associated with lower experiential avoidance at Time 2, experiential avoidance at Time 2 was not associated with vitality at Time 3 after controlling for vitality at Time 2. The results of mediation analysis further supported the claim that vitality is a critical mediator of the relationship between perceived autonomy support from coaches and athletes' experiential avoidance. Implications concerning the identification of this mediator are discussed.

Keywords: experiential avoidance, autonomy support, vitality, longitudinal study, athletes

Introduction

Athletic lives are filled with many challenges and hurdles. Due to the great pressure to stay competitive, they have to push their physical and psychological limits; accordingly, they have to manage high levels of training load, endure pain and injury, and cope with various forms of mental health challenges, including anxiety and depression, on a daily basis (e.g., Reardon et al., 2019; Soligard et al., 2016). As these challenging experiences are an inevitable part of the journey toward successful performance outcomes, athletes need to find ways to overcome experiential avoidance, which concerns individuals' tendency to be unwilling to stay with certain private experiences—especially those experiences that are negative—and to take actions to escape or modify those experiences (Hayes et al., 1996). In brief, experiential avoidance refers to a personal tendency to attempt to escape, avoid, or modify uncomfortable experiences (Hayes et al., 1996) and is an example of psychological inflexibility or "an inability to persist or change behavior in the service of long-term valued ends," which has negative implications on individuals' mindfulness and acceptance processes (Hayes et al., 2006, p. 6).

Experiential avoidance is considered a maladaptive form of self-regulation, as it has been found to be associated with various negative mental health indicators, such as anxiety, distress and depression (Hayes et al., 2006; Powers et al., 2009). For athletes, a high level of experiential avoidance could lead to maladaptive coping strategies, such as using distraction, thought suppression, and disordered eating, among other possibilities, to avoid and escape unpleasant experiences (Henriksen, 2019). Such strategies have long-term harms, as they can distract athletes from focusing on their goals, staying on pace with their training and deriving enjoyment from playing the sport, ultimately hurting their performance and wellbeing (e.g., Gardner & Moore, 2004; Zhang et al., 2016). Experiential avoidance has been increasingly studied by researchers in sports psychology (e.g., Chang et al., 2019; Chen & Wu, 2016;

Schwanhausser, 2009; Zhang et al., 2016) due to the importance and relevance of this construct for athletes. In particular, athletic lives are filled with both physically and mentally unpleasant experiences, including physical discomfort and pain, exhaustion, burnout, and failure, among others (e.g., Reardon et al., 2019; Soligard et al., 2016). Developing strong mental skills in coping with these negative experiences is crucial for optimal athletic performance; hence, the need to reduce athletes' experiential avoidance or increase their experiential acceptance has been increasingly highlighted (Mahoney & Hanrahan, 2011; Schwanhausser, 2009).

In clinical psychology, acceptance-based behavior therapies, which emphasize psychological acceptance of aversive internal experiences, such as acceptance and commitment therapy (Hayes et al., 1999) or mindfulness-based cognitive therapy (Segal et al., 2013), have been applied to reduce an individual's experiential avoidance (Eustis et al., 2016; Forman et al., 2012; Forman et al., 2007). In line with this, scholars in sports research have adopted a cognitive approach, which emphasizes the importance of a nonjudgmental awareness that encourages the acceptance of one's internal state (Hayes et al., 2012). Supporting this idea, mindfulness-based and acceptance-based interventions have grown substantially in sports and performance contexts, with accumulating evidence pointing to how these interventions can reduce experiential avoidance among athletes (see Birrer et al., 2012; Carraça et al., 2018; Gardner & Moore, 2012; Gardner & Moore, 2017, for reviews)

Departing from a cognitive focus, however, Chen and Wu (2016) proposed a relational approach and emphasized the crucial role of perceived autonomy support from coaches in reducing athletes' experiential avoidance. Autonomy support, referring to "the attitudes and practices of a person or a broader social context that facilitate the target individual's self-organization and self-regulation of actions and experience" (Ryan & Deci, 2008b, p. 188), is a core social environmental factor that enables the fulfillment of

individuals' basic psychological needs (e.g., Deci & Ryan, 1985; Ryan & Deci, 2000; Ryan et al., 2006). In the sports context, coaches act as significant figures in athletes' social environment; hence, autonomy support (vs. a controlling style) from coaches can foster self-determined motivation, quality engagement in sports, and psychological wellbeing among athletes (Adie et al., 2008; Pelletier et al., 2001). Recognizing the importance of perceived autonomy support from coaches, Chen and Wu (2016) attempted to understand the impact of this factor on athletes' individual tendencies toward experiential avoidance. Autonomy support from significant others can decrease experiential avoidance, as such support can enable individuals to develop a capable response in managing their own thoughts and emotions during stressful situations, whereas a controlling environment can foster individuals' tendency to suppress and avoid emotions (e.g., Jaffe et al., 2010; Williams et al., 2012). Chen and Wu (2016) suggested that perceived autonomy support from coaches can provide athletes with resources that they can rely on when approaching negative experiences, which can enable athletes to develop positive, approach-oriented perspectives toward these experiences (e.g., by adopting a more open and welcoming mindset) rather than attempting to escape them, leading to a reduced level of experiential avoidance.

Empirically, Chen and Wu (2016) studied collegiate athletes from a wide range of sports specialties (e.g., basketball, track and field, tennis, among others) who had an average of close to 10 years of experience in their respective sports. Using a time-lagged design, they reported that perceived autonomy support from coaches as assessed at Time 1 was negatively associated with athletes' experiential avoidance after five months (Time 2) after controlling for their initial (Time 1) experiential avoidance. This effect, however, was observed only among athletes who were high in trait gratitude. Their study provided initial evidence and indicated a new research direction toward effective strategies for mitigating athletes' experiential avoidance. As their study was the first and only study to examine perceived

autonomy support from coaches' and athletes' experiential avoidance, it is too early to determine whether such support can help reduce athletes' experiential avoidance. Furthermore, Chen and Wu (2016) examined only the direct association between autonomy support and experiential avoidance and did not test possible mediating mechanisms. It is thus premature to claim that autonomy support exhibits mediating mechanisms that help reduce experiential avoidance only for athletes who are high in trait gratitude. We seek to identify a mediating mechanism by which autonomy support could help reduce athletes' experiential avoidance regardless of their levels of trait gratitude or other traits.

In this study, we draw on self-determination theory (Deci & Ryan, 2008) and the function of subjective vitality (Ryan & Frederick, 1997) to propose that athletes' subjective vitality is a key mediator in explaining the association between perceived autonomy support from coaches on experiential avoidance. By focusing on vitality as the mediating mechanism, we argue that autonomy support has a main effect that contributes to higher vitality regardless of the level of athletes' trait gratitude because coaches' autonomy support provides relational energy to and heightens the psychological resourcefulness of athletes. Such a positive social environment affects athletes' vitality during their daily activities and thus facilitates a reduction in their experiential avoidance regardless of their level of trait gratitude.

Self-determination theory identifies autonomy support as a central construct in one's social environment, which offers choice and meaning and allows individuals to feel as if they are in control of their own actions; such a social environment supports the satisfaction of individuals' basic psychological needs and hence leads to self-actualization and positive wellbeing (e.g., Deci & Ryan, 1985; Ryan et al., 2006). When individuals feel as if they are capable of choosing their own actions instead of feeling burdened by external controls, they experience higher levels of vitality, which is defined as "one's conscious experience of

possessing energy" or as "the experience of having positive energy available to or within the regulatory control of one's self" (Ryan & Frederick, 1997, p. 530). Being provided autonomy support by important others, such as coaches in the case of athletes, is likely to increase relational energy or heighten psychological resourcefulness such as "vitality, stamina, and vigor that is generated as a result of a series of interpersonal exchanges" (Owens et al., 2016, p. 37). For example, when offering autonomy support, coaches can build positive interactions with athletes and boost athletes' energy and aliveness by encouraging athletes to make their own goals, training plans and aspirations and endorsing athletes' decisions. Empirically, autonomy support has been positively associated with higher vitality in the sports context. For instance, in a cross-sectional study of adult-sports participants, Adie et al. (2008) found that perceived autonomy support from coaches was associated with reports of higher levels of vitality on the part of participants. In another cross-sectional study conducted to investigate adolescent soccer and cricket players, Reinboth et al. (2004) also found that athletes' perception of coach autonomy support was associated with their subjective vitality. The same results were replicated in longitudinal investigations, such as investigations of elite youth soccer players (Adie et al., 2012) and young players from soccer schools (Balaguer et al., 2012).

Higher subjective vitality in turn would lead to lower experiential avoidance. Because vitality reflects positive energy that is felt and experienced as one's own (Ryan & Fredrick, 1997), it provides critical psychological resources that individuals can mobilize and utilize when dealing with physical and psychological stress, allowing them to become more resilient and capable toward these experiences (Ryan & Deci, 2008a; Weinstein & Ryan, 2011). More specifically, as difficult and stressful situations arise, they can take a toll on individuals' existing resources (Hobfoll, 2002). Without a sufficient reservoir of resources to cope with these demands, individuals are likely to enter into a defensive mode, such as withdrawing

189 from the situations, for the purpose of resource protection (Hobfoll et al., 2018; Hobfoll &
190 Lilly, 1993). From this perspective, vitality can supply individuals with positive, energetic
191 resources that they can utilize when approaching difficult situations (Ryan & Frederick,
192 1997), for example, by perceiving such situations as a challenge rather than a stressor.
193 Accordingly, they are more likely to own and integrate their unpleasant experiences and less
194 likely to adopt defensive or avoidant strategies (Weinstein et al., 2011; Weinstein & Ryan,
195 2011). This more positive approach-oriented rather than avoidance-oriented mindset (Elliot &
196 Thrash, 2002) toward their negative experiences is likely to enable them to reduce their
197 experiential avoidance over time.

198 Altogether, we propose a sequential relationship such that perceived autonomy
199 support from coaches leads to increased vitality among athletes, which further leads to
200 decreased experiential avoidance for athletes (Hypothesis 1). In this study, we sought to
201 depict a temporal process in which autonomy support from coaches helps cultivate athletes'
202 vitality, which in turn helps reduce their experiential avoidance over time. To accomplish this
203 goal, we employed a three-wave time-lagged design to examine the time-lagged mediated
204 effect of perceived autonomy support from coaches at Time 1 via vitality at Time 2 and via
205 experiential avoidance at Time 3. To provide a rigorous test of this mediation hypothesis, we
206 also tested an alternative pathway, i.e., perceived autonomy support from coaches predicts
207 experiential avoidance, which in turn predicts vitality. This alternative pathway is
208 theoretically plausible because coaches who provide autonomy support enable and respect
209 athletes' choices and aspirations, which could motivate athletes to be willing to face
210 unfavorable experiences and thus have lower experiential avoidance at Time 2. Athletes with
211 lower experiential avoidance could thus have higher vitality at Time 3, as they do not need to
212 put effort and energy into regulating themselves to escape from unfavorable experiences and
213 possibly be ready and energetic to approach their goals. To gauge the directional relationship

between vitality and experiential avoidance, we also included experiential avoidance at Time 2 and vitality at Time 3 to test an alternative mediational process in which perceived autonomy support from coaches at Time 1, via experiential avoidance at Time 2, shapes vitality at Time 3. Figure 1 presents the examined relationships of variables in this study.

Insert Figure 1 here

Method

Participants and Procedure

One hundred eighty-five athletes from 10 senior high schools (one located in eastern Taiwan, eight in northern Taiwan, and one in central Taiwan) participated in this study. Athletes participated in this study during their second year of high school. We obtained permission from the Institutional Review Board and the schools to perform the research with the athletes in each class during their break time. Athletes were invited to join the study and did so voluntarily. As most of our participants were less than 18 years old, we also collected parental consent prior to conducting their survey in the class. Athletes attend sports-talent classes in the Taiwanese education system. They normally spend half of their time in school (ranging from 3 to 5 hours per day) training. Coaches are normally members of the school staff and are responsible for athletes' daily training programs. As such, the interactions between coach and athlete are intensive. We collected data from those sports classes directly. In these classes, athletes read and signed the informed consent form, which explained their rights as study participants. The study survey was administered in classrooms without the coach present.

Athletes returned their questionnaires directly to the research assistant. As such, only the research team had access to athletes' responses. Athletes were asked to provide their student IDs in the survey, which were used for data matching. As the research team did not have access to athletes' identification information, such as their names, that could allow them to match student IDs, there was no way for the research team to link responses to specific athletes. This procedure thus protects response confidentiality and anonymity. Participants received NTD 100 (equivalent to approximately USD$3.50) for returning their survey at each time. At Time 1, two hundred and sixty-one participants were contacted in classes. A total of 247 participants (response rate = 95%) returned questionnaires that asked about their demographic background (i.e., gender, age, tenure in the sports specialty, and the highest level of competition), perceived autonomy support from coaches and vitality. After removing 10 participants who did not provide completed answers, we collected data from 237 participants. After four months (Time 2), 198 of the same participants completed a second survey assessing their vitality and experiential avoidance. Subsequently, after another three months (Time 3), 185 of the same participants completed another survey assessing their vitality and experiential avoidance. The data collection period was from May 2018 to January 2019. We chose these time intervals to accommodate the athletes' schedules since these times did not include their competitive season.

The 185 athletes (133 male) were from 33 different sports teams among the ten schools. The mean age was 16.87 years (*SD* = 0.53), and the average number of years of experience with their specialized sport was 5.37 (*SD* = 2.28). The athletes participated in 23 sports specialties. In total, there were 37 track and field athletes, 15 softball players, 14 basketball players, 13 baseball players, 12 table tennis players, 11 volleyball players, 11 taekwondo participants, 10 korfball players, and 10 fencing participants. There were fewer than 10 players in each of the other 14 specialties. We examined the demographic background of

those who completed only the Time 1 survey (n = 52) and those who completed all surveys. The two groups did not differ in their gender distribution (χ^2 =.51, p =.47), age (t(235) = -1.77, p =.08) or tenure in the sports specialty (t(235) = -.32, p =.97). The two groups did not differ in terms of the mean of perceived autonomy support from coaches at Time 1 (t(235) = .07, p =.94). We also investigated the participants who had completed the Time 2 survey (n = 13) and those who completed all the surveys. The two groups did not differ in terms of the means of vitality (t(196) = -.77, p =.44) and experiential avoidance at Time 2 (t(196) = .10, p =.92).

Measurements

Perceived autonomy support from coaches. Similar to Chen and Wu (2016)**,** we used a short version of the Sport Climate Questionnaire (SCQ) developed by Deci (2001) to measure perceived autonomy support from coaches (Adie et al., 2012; Jõesaar et al., 2012). Jõesaar et al. (2012) used the short version of the SCQ and found that perceived autonomy support from coaches at Time 1 can significantly predict Time 2 task involvement after controlling for Time 1 task involvement, supporting the predictive effect of this instrument. Cronbach's α was .80 at Time 1 and .81 at Time 2 in their study. In Chen and Wu's (2016) study, Cronbach's α was .93 in a sample of collegiate athletes in Taiwan. Sample items are "I feel that my coach provides me choices and options" and "I feel understood by my coach." A seven-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*) was used in this study.

Vitality. We measured athletes' vitality at Time 2 and Time 3 using a scale originally developed by Ryan and Frederick (1997) and later validated by Bostic et al. (2000). In Ryan and Frederick's (1997) report, the original version has seven items that were loaded on the same factor. The scale also had expected positive associations with indexes of wellbeing, including self-actualization and self-esteem, and negative associations with indexes of ill-

being, including psychopathology, anxiety and depression, based on data collected from multiple samples across studies. Nevertheless, using a sample of 526 participants, Bostic et al. (2000) performed a confirmatory factor analysis and found that the negatively worded item did not perform well, and it was then removed to improve the model fit. We thus followed Bostic et al.'s (2000) suggestion and used only the six items in our study. A previous study using the Chinese version of vitality with an athlete population also reported satisfactory reliability and validity (Chen & Chang, 2017). We asked participants to rate their vitality in a general context (i.e., not in a specific sports-related context) based on their current experiences when completing the survey. Sample items are "I feel alive and vital" and "I nearly always feel awake and alert." A seven-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*) was used.

Experiential avoidance. We followed Chen and Wu (2016) and used the Chinese version of the Acceptance and Action Questionnaire-II (AAQ-II) to measure athletes' experiential avoidance in a general context (i.e., not specifically in a sports-related context) at Time 2 and Time 3. The Chinese version was validated by Chang et al. (2017) and is based on the AAQ-II developed by Bond et al. (2011). While there were seven items on the original scale, Chang et al. (2017) performed confirmatory factor analysis in a sample of undergraduate students and found that one item had a lower factor loading. They thus used only six items in the Chinese version. They also examined the test–retest reliability within a 10-month interval (r =.65, p <.01) and the factor invariance across an athlete sample (N = 170) and an undergraduate student sample (N = 154). They further reported that the Chinese version of the AAQ-II was negatively related to positive emotion (r = -.37, p <.001) and positively related to negative emotion (r =.67, p <.001) and depression (r =.70, p <.001). Overall, the psychometric properties of the six items in the Chinese version of the AAQ-II are satisfactory. We asked participants to rate their experiential avoidance based on their current

experiences when completing the survey. Sample items are "I'm afraid of my feelings" and "I worry about not being able to control my worries and feelings." In Chen and Wu's (2016) study, Cronbach's α was .82 and .78 when measured at two different times for a sample of collegiate athletes in Taiwan. A seven-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*) was used in this study.

Analytic Strategy

We performed data analysis in SPSS (IBM Corp, 2020) in four steps. First, we performed descriptive data analysis to report the means, standard deviations, Cronbach's α and correlations of the variables. We also checked the skewness, kurtosis, normality, and outliers of variables. Second, as have repeated measures of vitality and experiential avoidance at both Time 2 and Time 3, we performed paired-sample *t* tests to determine whether there were changes in the means of vitality and experiential avoidance in the sample as a whole. While our focus is not on the mean change in vitality and experiential avoidance of the sample over time, the mean change analysis helps depict and understand our data.

Third, we conducted regression analyses to examine our hypothesized relationships. Given a power at .80 and a significance level at .05 for a medium effect ($f^2 = .15$; $R^2 = .13$) (Cohen, 1988) with respect to seven predictors and including control variables in multiple regression, at least 103 participants are needed. Our sample size is thus sufficiently large for analysis. Specifically, we regressed vitality at Time 2 and experiential avoidance at Time 2 on perceived autonomy support from coaches at Time 1 to examine the association of autonomy support from coaches at Time 1 on the two variables. We regressed vitality at Time 3 on all variables at Time 1 and Time 2 to gauge whether vitality at Time 2 will have a time-lagged effect on experiential avoidance at Time 3. To examine an alternative mediation process, we also regressed experiential avoidance at Time 3 on all variables at Time 1 and Time 2 to explore whether experiential avoidance at Time 2 predicts vitality at Time 3. We

337 performed these analyses with and without demographic variables, including gender (M = 0;
338 F = 1), age (in years) and tenure in the sports specialty (in years), and the highest competition
339 level in our analysis. We consider athletes' highest level of competition, as those who exhibit
340 better performance may be better able to cope with negative experiences (e.g., Holt & Dunn,
341 2004) and thus have lower experiential avoidance. Athletes were requested to report their
342 highest competition at four levels: 1) the international level (n = 10), 2) the Asian level (n =
343 11), 3) the national level (n = 133), and 4) the city or county level (n = 31). All athletes had
344 performed at one of these levels.

345 Finally, in the fourth step, we used the PROCESS macro in SPSS (Hayes, 2018) to
346 examine our proposed and alternative mediation effects formally by using a bootstrapping
347 method to obtain the 95% confidence interval of estimates. A mediation effect is significant
348 when the 95% confidence interval of the estimate does not include zero.

349 **Results**

350 Table 1 presents the means, standard deviations, skewness, kurtosis, Cronbach's α and
351 correlations for the variables. Except for the highest competition level that has kurtosis larger
352 than 2, other variables had skewness and kurtosis within or around ±1.0. The highest
353 competition level had higher kurtosis, as most of the participants had the highest competition
354 level at the national level (n = 133, 71.9%). Regarding normality, the Kolmogorov–Smirnov
355 test for normality (Myers et al., 2010) was not significant for vitality at Time 2 and
356 experiential avoidance at both Time 2 and Time 3, suggesting that these variables follow
357 normal distributions. The Kolmogorov–Smirnov test for normality was significant for
358 perceived autonomy support from coaches at Time 1 (Kolmogorov–Smirnov statistic =.08, df
359 = 185, p <.01) and vitality at Time 2 (Kolmogorov–Smirnov statistic =.08, df = 185, p <.01).
360 However, as reflected in their degrees of skewness and kurtosis, their distributions did not
361 deviate far from a normal distribution.

We used Tukey's Interquartile Range (IQR) (Tukey, 1977) method to detect outliers. IQR highlights the differences between the 25th (Q1) and 75th (Q3) percentiles for a variable. Observations that are more than 1.5 IQR below Q1 or more than 1.5 IQR above Q3 are considered to be outliers. Using this approach, we detected one outlier for perceived autonomy support from coaches at Time 1 (i.e., a score of 1 on the seven-point scale) and two outliers for vitality at Time 3 (i.e., a score of 1 on the seven-point scale). We also used z scores to detect outliers and found only one z score lower than -3 (Bordens & Abbott, 2014) for perceived autonomy support from coaches at Time 1. To investigate the influence of outliers, we compared the results and found that the mean (5.04) and the 5% trimmed mean (5.10) of perceived autonomy support from coaches at Time 1 were similar. The mean (4.72) and the 5% trimmed mean (4.74) of vitality at Time 3 were also similar. We ultimately included these values in our analysis, as including these outliers did not distort the distributions of the two variables.

Regarding correlations, we found that perceived autonomy support from coaches was positively related to vitality at Time 2 and Time 3 (r =.44 and .41, respectively, p <.01). It was negatively related to experiential avoidance at Time 2 (r = -.20, p <.01) but not at Time 3 (r = -.10, p =.16). Vitality at Time 2 was negatively related to experiential avoidance at both Time 2 and Time 3 (r = -.35 and -.33, p's <.01). Vitality at Time 3 was also negatively related to experiential avoidance at both Time 2 and Time 3 (r = -.28 and -.34, p's <.01).

Regarding changes in the means of vitality and experiential avoidance in the sample as a whole, the results of the paired-sample t tests indicated that vitality at Time 2 (M = 4.71, SD = 1.27) was not significantly different from vitality at Time 3 (M = 4.72, SD = 1.27) (t (184) = -.22, p =.83). Experiential avoidance at Time 2 (M = 3.75, SD = 1.27) was not significantly different from experiential avoidance at Time 3 (M = 3.80, SD = 1.30) (t (184) = -.63, p =.53). These findings, however, did not prevent us from performing the analysis to test our

hypothesis, as we sought to examine whether those perceiving higher levels of autonomy support from coaches had higher vitality and thus lower experiential avoidance relative to other athletes over time, rather than examining mean-level changes in the sample. For details about the different types of change, please refer to Caspi et al. (2005).

We next performed a series of regression analyses to test our hypotheses. Our main results did not include control variables, based on the consideration that the control variables did not present significant relationships with focal study variables (see Table 1). The main results from the regression analysis are presented in the top half of Table 2 (Model 1 – 4). However, to provide informative data to readers, we also included results from the supplementary analysis where control variables were included, and these results are presented in the bottom half of Table 2 (Model 5 – 8). We now discuss results from the main analysis, while noting that results from the supplementary analyses where control variables were included yielded similar findings.

In Model 1, we used perceived autonomy support at Time 1 to predict vitality at Time 2. We found that perceived autonomy support at Time 1 positively predicted vitality at Time 2 (B =.44, *S.E.* =.07, β =.44, p <.01). In Model 2, we used perceived autonomy support at Time 1 to predict experiential avoidance at Time 2. We found that perceived autonomy support at Time 1 negatively predicted experiential avoidance at Time 2 (B = -.20, *S.E.* =.07, β = -.20, p <.01). Subsequently, in Model 3, we used perceived autonomy support at Time 1 as well as both vitality and experiential avoidance at Time 2 to predict vitality at Time 3. We found that vitality (B =.63, *S.E.* =.06, β =.63, p <.01), but not experiential avoidance at Time 2, predicted vitality at Time 3. In Model 4, we used the same set of predictors to predict experiential avoidance at Time 3. We found that both vitality (B = -.17, *S.E.* =.07, β = -.17, p <.05) and experiential avoidance (B =.60, *S.E.* =.06, β =.58, p <.01) at Time 2 predicted experiential avoidance at Time 3. The explained variance (i.e., R^2) of Time 2 vitality (Model 1) and Time

412 3 experiential avoidance (Model 4) were .19 and .41, respectively, which are considered to be
413 medium to large effect sizes according to the guidelines provided by Cohen (1988), who
414 suggested .13 as a medium effect size of R^2 and .26 as a large effect size.

415 Finally, we used the PROCESS macro (Hayes, 2018) to examine mediating effects. We
416 integrated Model 1 and Model 4 to estimate the mediating effect of vitality at Time 2 on the
417 relationship between perceived autonomy support at Time 1 and experiential avoidance at
418 Time 3, which was significant (unstandardized mediating effect = -.07, *S.E.* =.04, 95% C.I. =
419 -.16 to -.01; completely standardized mediation effect = -.07, *S.E.* =.04, 95% C.I. = -.15 to
420 -.01). We integrated Model 2 and Model 3 to estimate the mediating effect of experiential
421 avoidance at Time 2 on the relationship between perceived autonomy support at Time 1 and
422 vitality at Time 3, which was nonsignificant (unstandardized mediation effect =.01, *S.E.* =.01,
423 95% C.I. = -.02 to. 04; completely standardized mediation effect =.01, *S.E.* =.01, 95% C.I. =
424 -.02 to. 03). Altogether, we found support for Hypothesis 1, suggesting that vitality has a
425 mediating function with respect to the relationship between perceived autonomy support and
426 experiential avoidance. In contrast, experiential avoidance does not have a mediating function
427 with respect to the relationship between perceived autonomy support and vitality.

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429 Insert Table 1 and Table 2 here

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431 **Discussion**

432 In this study, we attempted to extend the prior literature on the relational aspect of
433 athletes' experiential avoidance and to shed light on how perceived autonomy support from
434 coaches can facilitate a reduction in this attribute among athletes. Our longitudinal
435 investigation using data collected from 185 athletes over seven months provides empirical

436 evidence that this relationship was mediated by the athletes' subjective vitality. Specifically,
437 perceived autonomy support from coaches at Time 1 led to higher vitality among the athletes
438 at Time 2, which further led to lower experiential avoidance at Time 3, conditional on the
439 athletes' scores for this construct at Time 2. The results fully support the mediating effect of
440 athletes' vitality with respect to the impact of perceived autonomy support from coaches on
441 athletes' experiential avoidance.

442 **Theoretical Implications**

443 The negative impact of experiential avoidance on athletic performance and wellbeing
444 has drawn substantial research attention to this construct over the last decade (e.g., Birrer et
445 al., 2012; Carraça et al, 2018; Gardner & Moore, 2012, 2017). While cognitive-oriented
446 interventions have been found useful in reducing this individual tendency (Birrer et al., 2012;
447 Carraça et al, 2018; Gardner & Moore, 2012, 2017), it is necessary to identify additional
448 strategies that can complement these interventions to offer more holistic and day-to-day
449 support to athletes in mitigating this negative attribute.

450 A viable approach, which is a relational perspective offered by Chen and Wu (2016),
451 indicates that athletes' experiential avoidance can be mitigated when coaches provide athletes
452 with high levels of autonomy support. Their study, however, focused on perceived autonomy
453 support from coaches as a moderator for the relationship between athletes' gratitude and
454 experiential avoidance, hence offering support to the relational perspective only among a
455 particular group of athletes. Our study builds on that earlier study and focuses on the main
456 direct effect by which perceived autonomy support from coaches leads to decreases in
457 athletes' experiential avoidance. In this way, our study provides evidence that perceived
458 autonomy support from coaches is something that all athletes could benefit from, hence
459 offering stronger support for the crucial role of perceived autonomy support coaches in
460 mitigating athletes' experiential avoidance. Moreover, our study provides new evidence in

addition to that provided by the earlier study by investigating a different population and using a different time span. Chen and Wu (2016) used data from collegiate athletes collected at two time points (5 months apart), while our study used data collected from high school athletes at three time points (covering 7 months in total). Overall, our study extends Chen and Wu's (2016) study with more direct and additional evidence supporting the validity of the relational perspective in mitigating athletes' experiential avoidance.

Stronger support for the relational perspective is important, as it validates a key factor concerning coaches' interpersonal behaviors in helping athletes reduce their experiential avoidance. The focus on perceived autonomy support from coaches as a crucial aspect of coaches' behaviors is in line with much broader literature, underpinned by the self-determination theory (Deci & Ryan, 2008) that suggests autonomy support from significant others is essential. This type of support fulfills individuals' fundamental human need for autonomy, enabling them to perceive themselves as the origin of choice, which contributes to individuals' performance, wellbeing and optimal functioning. Our study, alongside the research of Chen and Wu (2016), contributes new knowledge to the application of self-determination theory in the context of sports by highlighting the fact that autonomy support from coaches not only shapes athletes' motivation, behavioral and wellbeing outcomes, as previous studies have suggested (e.g., Adie et al., 2008; Pelletier et al., 2001), but can also shape athletes' personal attributes in terms of experiential avoidance.

Further extending Chen and Wu's (2016) research, our study provides a novel perspective and new evidence by shedding light on the psychological mechanism through which perceived autonomy support from coaches exerts its effect. We uncovered subjective vitality – the positive energy that individuals possess (Ryan & Frederick, 1997) – as a key mediator in this process. The identification of subjective vitality is noteworthy, as it has been found by researchers (e.g., Chang et al., 2014; Dubreuil et al., 2014; Rivkin et al., 2018) to be

related to critical, positive psychological states such as flow, which describes intense and focused concentration and the immersion of oneself in doing activities (Csikszentmihalyi, 2008), and mindfulness, which describes a nonjudgmental awareness of the present moment (Kabat-Zinn, 1994). For this reason, it is necessary to find ways to develop and sustain athletes' subjective vitality. Our longitudinal study, which yielded the result that autonomy support from coaches can serve this purpose, is in line with a series of earlier studies in sports settings (e.g., Adie et al., 2012; Balaguer et al., 2012; Cheval et al., 2017; Kinnafick et al., 2014; Taylor & Lonsdale, 2010), reinforcing the need-supportive impact when coaches adopt a coaching style that respects and supports individual athletes' autonomy.

More importantly, our study goes beyond earlier research by highlighting how vitality can have important implications for individuals' attributes of experiential avoidance. Vitality can provide individuals with positive energy resources that are available at their disposal, which can be mobilized during stressful situations to cope with heightened demands (Ryan & Frederick, 1998; Weinstein & Ryan, 2011). As individuals accumulate these important energy resources, they are less likely to feel consumed and depleted in difficult situations and are hence less likely to take an avoidant strategy in their responses (Weinstein et al., 2011; Weinstein & Ryan, 2011). Given that personal attributes can be shaped and changed as individuals habitually experience new perceptions, emotions and behaviors day-to-day as elicited by the situation (e.g., Roberts, 2018), a more positive response to each difficult episode will likely translate into a personal tendency of reduced experiential avoidance over time.

Overall, the adoption of a relational perspective to mitigate athletes' experiential avoidance exhibits substantial potential to enable the development of athletes' positive personal attributes. Since this perspective remains in its infancy, there is room to expand current knowledge significantly, such as by systemically investigating the efficacy of this

511 relational approach compared to that of the cognitive approach using mindfulness-based
512 interventions with respect to reducing athletes' experiential avoidance. Whereas we identified
513 vitality as a mediating mechanism from this perspective, future studies can extend the scope
514 of our research by identifying additional mechanisms, such as the growth of self-efficacy that
515 can be facilitated by a supportive coach (e.g., Saville & Bray, 2016). In addition, longitudinal
516 studies that cover a longer time span and focus on different sports contexts (e.g., on training
517 and competitions or on contexts featuring elite athletes) would be useful to provide a more
518 nuanced understanding of the ways in which athletes' experiential avoidance tendency can be
519 reduced.

520 **Practical Implications**

521 Our study has practical implications for supporting athletes in better regulating and
522 managing their experiential avoidance—a tendency that prevails among many people (Hayes
523 et al., 1996) but that has particularly important implications for athletes, given the vast
524 number of difficult experiences that athletes need to manage on a day-to-day basis. Coaches
525 are of great significance to athletes in terms of their performance and careers and can provide
526 additional day-to-day support that athletes can regularly draw on when evaluating themselves
527 and their performance. As reflected in our measure of autonomy support, coaches can offer
528 autonomy support to athletes by providing choices and options to athletes and being open to
529 discussion with athletes regarding what, when and how they can improve their performance
530 and the target they seek to achieve. Autonomy support from coaches can also be
531 demonstrated in many ways, such as by understanding individual athletes' personal situations
532 and needs and by supporting them in the pursuit of goals that they personally aspire to. For
533 example, coaches invite athletes to participate in discussions concerning training plans,
534 thereby offering athletes the autonomy to rearrange the order of training contents and
535 expressing supportive comments with respect to this adjustment. Such supportive practices

from coaches can provide positive psychological resources for athletes, enhancing their vitality—or the energy and enthusiasm that they experience—and subsequently enabling them to develop positive psychological attributes such as reduced experiential avoidance.

In addition, coaches can use different approaches to help athletes reduce experiential avoidance. Coaches or schools can incorporate mindfulness sessions into school schedules to help reduce athletes' experiential avoidance (Bierrer et al., 2012; Gardner & Moore, 2012) or provide autonomy support to indirectly help athletes reduce experiential avoidance by promoting athletes' vitality. These two approaches are not mutually exclusive, as they can be supplementary to each other to motivate athletes to accept aversive internal experiences while replenishing athletes' vitality to overcome unfavorable and experienced challenges. The growth of vitality and the reduction in experiential avoidance, as empowered by autonomy support from coaches, could enable athletes to experience more positive emotions and adopt a more positive approach as they cope with difficulties in training, competition and life, thereby supporting their flourishing as athletes (e.g., Pankow et al., 2021).

Limitations

A number of limitations to our study should be noted. First, we focused only on perceived support for autonomy from coaches, rather than their support for the two other important psychological needs, the need for competence and the need for relatedness. While autonomy support has been highlighted the most in SDT (e.g., Ryan et al., 2006), there is value in including the other types of support provided by coaches to yield a more comprehensive picture.

Second, although we adopted a longitudinal approach by tracking athletes three times over seven months, all the measures were self-reported; hence, common method bias could be present (Lindell & Whitney, 2001). Future studies could attempt to collect others' ratings

to provide further validation of our results and to generate interesting discussions if discrepancies were found through the use of different rating sources.

Third, when choosing our time intervals for data collection, we accommodated athletes' schedules by selecting times that did not conflict with their competitions. While this approach was suitable for the purposes of data collection, it is possible that perceived autonomy support from coaches might be different during a period featuring such competitions. While previous studies concerning university athletes have provided evidence suggesting that coaches' autonomy support to athletes does not differ across training and competition contexts (e.g., van de Pol et al., 2015), such differences could be more pronounced in the context of highly competitive elite sports, which could have different implications with respect to athletes' experiential avoidance. This possibility would present an interesting question for future research.

Fourth, while we included a set of control variables, including athletes' success as measured by their best performance record, to rule out alternative explanations—an improvement over previous studies (e.g., Chen & Wu, 2016)—it is possible that we omitted other important variables that may play a role in shaping athletes' experiential avoidance, such as their injury history or failure experiences. Future studies would benefit from taking a broader range of such factors into consideration.

Fifth, we collected perceived autonomy support from coaches at only one time point. Our reason for taking this approach was that coaches' autonomy support is often considered to be a form of interpersonal style (e.g., Balaguer et al., 2012; Fenton et al., 2014; van de Pol et al., 2015) that is relatively stable over time and across different contexts. However, it would have been better to test the stability of this empirically by collecting relevant data at each time point.

584 Last, while our study has demonstrated the need to reduce athletes' experiential
585 avoidance, it would be valuable to extend this study to clarify how this attribute impacts
586 athletes' subsequent performance outcomes. A causal model demonstrating how
587 improvements in performance can occur as the result of a reduction in experiential avoidance,
588 as facilitated by autonomy support from coaches, would lend stronger support to the role of
589 experiential avoidance in the athletic context and to the role of coaches as enabling factors.

590 **Conclusion**

591 In this study, we build on the relational approach to mitigating athletes' experiential
592 avoidance by investigating the psychological mechanism driving the effect of perceived
593 autonomy support from coaches. Through a longitudinal investigation using data collected
594 from high school athletes over seven months, we found that perceived autonomy support
595 from coaches at Time 1 led to higher levels of vitality among athletes at Time 2, which
596 further led to reduced experiential avoidance at Time 3. Our study provides not only further
597 evidence in support of the relational approach as an alternative method for reducing athletes'
598 experiential avoidance but also adds new evidence that enables a more nuanced
599 understanding of the role of autonomy support from coaches.

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Table 1. Descriptive statistics among research variables (N = 185).

	M	SD	Skewness	Kurtosis	Cronbach's α	Correlations							
						1	2	3	4	5	6	7	8
1. Gender (M = 0; F = 1)	0.28	0.45	.98	-1.05	--								
2. Age (years)	16.87	0.53	-.37	1.04	--	-.05							
3. Tenure in the sport specialty (years)	5.37	2.28	.48	.34	--	-.06	.03						
4. Highest competition level [a]	3.00	0.67	1.11	2.66	--	.04	.05	.23**					
5. Perceived autonomy support from coaches (Time 1)	5.04	1.26	-.55	-.01	.91	-.01	.09	-.06	.10				
6. Vitality (Time 2)	4.71	1.27	-.21	-.52	.69	-.08	-.02	-.03	.18*	.44**			
7. Vitality (Time 3)	4.72	1.27	-.25	-.07	.71	-.13	.06	-.14	.04	.41**	.70**		
8. Experiential avoidance (Time 2)	3.75	1.27	.04	-.37	.82	.07	.09	.10	-.01	-.20**	-.35**	-.28**	
9. Experiential avoidance (Time 3)	3.80	1.30	.12	-.06	.87	.03	.09	.13	.00	-.10	-.33**	-.34**	.63**

Note: a) * $p < .05$, ** $p < .01$; b). Athletes reported their best performance in four ranks including 1) International level, 2) Asian level, 3) National level, and 4) City and County level.

Table 2. Results of regression analysis without and with control variables (N = 185).

	Model 1 Vitality (Time 2)			Model 2 Experiential avoidance (Time 2)			Model 3 Vitality (Time 3)			Model 4 Experiential avoidance (Time 3)		
	B	S.E.	β	B	S.E.	β	B	S.E.	β	B	S.E.	β
Intercept	2.49	.35	--	4.75	.37	--	1.19	.44	--	1.92	.49	--
Perceived autonomy support from coaches (Time 1)	.44**	.07	.44	-.20**	.07	-.20	.13*	.06	.13	.09	.07	.08
Vitality (Time 2)	--	--	--	--	--	--	.63**	.06	.63	-.17*	.07	-.17
Experiential avoidance (Time 2)	--	--	--	--	--	--	-.03	.06	-.03	.60**	.06	.58
F	42.94**			7.37*			61.84**			42.09**		
R^2	.19			.04			.51			.41		

	Model 5 Vitality (Time 2)			Model 6 Experiential avoidance (Time 2)			Model 7 Vitality (Time 3)			Model 8 Experiential avoidance (Time 3)		
	B	S.E.	β	B	S.E.	β	B	S.E.	β	B	S.E.	β
Intercept	4.83	2.71	--	.27	2.97	--	-.92	2.12	--	.69	2.43	--
Gender (M = 0; F = 1)	-.26	.19	-.09	.22	.20	.08	-.22	.15	-.08	-.06	.17	-.02
Age (years)	-.18	.16	-.07	.25	.18	.11	.17	.13	.07	.06	.14	.02
Tenure in the sport specialty (years)	-.02	.04	-.04	.05	.04	.09	-.06*	.03	-.11	.04	.03	.07
Best performance in previous competition	.29*	.13	.15	-.04	.14	-.02	-.12	.10	-.06	.03	.12	.02
Perceived autonomy support from coaches (Time 1)	.43**	.07	.42	-.20**	.07	-.20	.12*	.06	.12	.09	.07	.09
Vitality (Time 2)	--	--	--	--	--	--	.64**	.06	.65	-.17*	.07	-.17
Experiential avoidance (Time 2)	--	--	--	--	--	--	-.02	.06	-.01	.59**	.06	.58
F	10.20**			2.39*			28.99**			18.12**		
R^2	.22			.06			.53			.42		

Note: a) * $p < .05$, ** $p < .01$; b) results for the main analysis which did not include control variables are presented in Model 1 – 4; results for the supplementary analysis which included control variables are presented in Model 5 – 8.

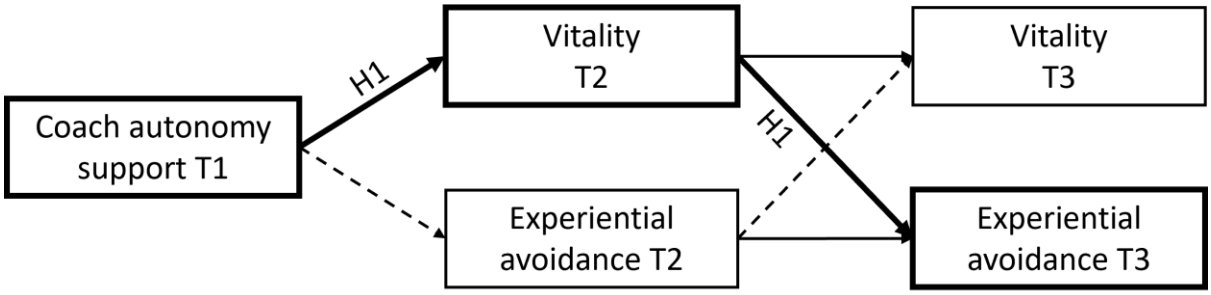

Figure 1. The research model.

Thick-lines represent the hypothesized mediation process, while dot-lines represent an alternative mediation process.