Interaction of athletes' resilience and coaches' social support on the stress-burnout relationship: A conjunctive moderation perspective

Frank J.H. Lu a, *, Wei Ping Lee b, Yu-Kai Chang b, Chien-Chih Chou c, Ya-Wen Hsu d, Ju-Han Lin e, Diane L. Gill f

a Chinese Culture University, Taiwan
b National Taiwan Sport University, Taiwan
c University of Taipei, Taiwan
d National Chia-Yi University, Taiwan
e National Dong-Hwa University, Taiwan
f University of North Carolina at Greensboro, USA

ARTICLE INFO

Article history:
Received 22 September 2014
Received in revised form 27 July 2015
Accepted 9 August 2015
Available online 13 August 2015

Keywords:
Competitive sports
Overtraining
Student-athletes
Psychological well-being

ABSTRACT

Objective: In line with Smith’s (1986) cognitive-affective model of athletic burnout, the purpose of this study was to examine the conjunctive effects of athletes’ resilience and coaches’ social support on the relationship between life stress and burnout.

Design: Cross-sectional, self-report survey.

Methods: A total of 218 student-athletes (M age = 20.04 yrs, SD = 1.32; males = 159, females = 59) participating in team and individual sports completed life stress, resilience, coaches' social support, and athlete burnout scales. Hierarchical multiple regression analyses with one- two- and three-way interactions examined disjunctive and conjunctive moderations.

Results: Resilience and coaches’ social support conjunctively moderated the stress-burnout relationship. Specifically the interaction of athletes’ resilience with coaches’ informational and tangible social support moderated athletes’ stress-burnout relationship in high and low life stress conditions.

Conclusions: We suggest coaches provide useful social support and foster athletes’ resilience to prevent stress-induced burnout in athletes.

© 2015 Elsevier Ltd. All rights reserved.

Introduction

To be successful in competitive sport is never an easy task for young athletes. Competitors, male or female, must start training at young ages and engage in year-round vigorous training to be well-prepared for the competitive season (Gould & Whitley, 2009). On their journey to success, they not only engage in high intensity physical training (Manzi et al., 2010; Scott, Lockie, Knight, Clark, & Janse de Jonge, 2013) but also encounter stressors in competitions, organizational operations and personal/non-sport life events (Fletcher, Hanton, & Mellalieu, 2006; McKay, Niven, Lavalle, White, 2008; Sarkar & Fletcher, 2014). Although stress is an inevitable part of competitive sports, it is well-documented that chronic stress is detrimental to athletes' well-being (DiBartolo & Shaffer, 2002), performance (Humphrey, Yow, & Bowden, 2000), and may lead to burnout (Gould, Tuffey, Udry, & Loehr, 1996, 1997; Gould, Udry, Tuffey, & Loehr, 1996).

According to Smith’s (1986) cognitive-affective model of athletic burnout, burnout is a reaction to chronic stress. Smith (1986) proposed that athletic burnout comprises situational, cognitive, physiological, and behavioural components that progress in four stages. The first stage starts with athletes’ perceived situational demands—such as high conflicting demands, overload training, or parental expectations/pressure placed on athletes. The second stage involves cognitive appraisal to interpret these demands; particularly individuals’ cognitive appraisal of the balance between challenges and resources, and potential consequences. When demands surpass personal resources and consequences will be severe, the process moves to the third stage of physiological and psychological responses—anxiety, tension, insomnia, and illness. Finally, physiological and psychological responses lead to rigid and
inappropriate behaviour, decreased performance and withdrawal from activity.

Past research adopting Smith (1986) model has generally supported the link between stressors and athlete burnout. For example, Gould and his colleagues (Gould, Tuffey, et al., 1996; Gould et al., 1997; Gould, Udry, et al., 1996) reported that situational and personal factors may interactively contribute to youth tennis players' burnout. They found psychological stress, such as high expectations from parents and coaches, pressure to please others and emphasis on winning/ranking are major factors leading to burnout. Similarly, Cresswell and Eklund (2006) interviewed 15 elite rugby players and found 8 major stressors (i.e., competition transitions, pressure to comply with demands, heavy training/loading, injury, competitive rugby environment, anti-rest culture, pressure to perform, media/public expectations associated with burnout.) Further, Gustafsson and colleagues (Gustafsson, Hassmen, Kenta, & Johansson, 2008) interviewed 10 Swedish elite athletes who had quit sport due to burnout. Results indicated that psycho/social stressors such as negative performance demands, social relations, and lack of social support were the major factors associated with burnout. Recently, Tabei and colleagues (Tabei, Goodger, 2012; Galli & Sarkar, 2013; Galli & Vealey, 2008) interviewed 4 English and 5 Japanese athletes to explore the relationship between organizational stressors and burnout. Results suggested multiple demands (e.g., training, competition, travel, leadership) linked to the dimensions of athlete burnout, and specific organizational-related issues—such as “hard training and insufficient rest” associated with incidence of burnout. These findings provide good evidence that athletes' life stress is associated with athlete burnout.

Although understanding the stress-burnout relationship is important, it is also imperative to understand the mechanisms underlying this relationship. More specifically, it is important to investigate why some athletes are more vulnerable than others to stress-induced burnout. Empirical sport stress research provides one approach to this issue by suggesting that resilient athletes can adapt well even when encountering adversities and stressors (Fletcher & Sarkar, 2013; Galli & Gonzalez, 2014; Sarkar & Fletcher, 2013, 2014; Sarkar, Fletcher, & Brown, 2015). For example, Galli and Vealey (2008) adopted Richardson and colleagues' (Richardson, Neiger, Jensen, & Kumpfer, 1990) resilience model to explore athletes' experiences of adversities (i.e., injury, slumps, and career transition) and how resilience process influences their adaptation. They found resilience helps these athletes adapt to difficult situations and promote positive growth. Also, they found sociocultural influences (e.g., social support) and personal attributes/capabilities (e.g., mental and physical toughness) interactively facilitated the resilience process.

Recently, Fletcher and Sarkar (2012) interviewed 12 Olympic champions to explore the relationship between psychological resilience and optimal sport performance. Their resulting “grounded theory of psychological resilience and optimal performance” suggested that the relationship between Olympic champions' stressors and optimal performance is a series of dynamic interactions between numerous psychological factors (i.e., positive personality, motivation, confidence, focus, and perceived social support) and challenge appraisals and meta-cognition. These processes, which in turn promote facilitative responses — such as taking decisive actions, strengthening positive cognitions, increased efforts and commitment; eventually lead to optimal performance.

The sport resilience research offers several implications for stress-burnout research. First, it is possible that athletes may encounter many stressors/adversities but not necessarily experience burnout because their resilience helps them to adapt to stressors. This provides a rationale for studying the stress-burnout relationship from a resilience perspective because much research indicates that resilient individuals can maintain health and well-being even high in stress (Fischbacher, 2014; Noor & Alwi, 2013; Salami, 2010; Windle, Woods, & Markland, 2011). Second, recent sport resilience research (e.g., Galli & Vealey, 2008; Fletcher & Sarkar, 2012) suggests that psychological factors interact with each other to facilitate responses during the resilience process. Specifically, Galli and Vealey (2008) suggested that sociocultural influences such as “social support” interact with personal factors to facilitate resilience process. Fletcher and Sarkar (2012) grounded theory of psychological resilience and optimal performance also suggested that social support interacts with other positive personality traits as the core psychosocial factors in influencing challenge appraisal and meta-cognitions (Fletcher & Sarkar, 2012). Therefore, we considered both personal and sociocultural factors in examining stress-burnout relationship. We included social support as a socio-cultural factor and athletes' resilience as a personal factor (e.g., Fletcher & Sarkar, 2012; Galli & Vealey, 2008).

Further, research suggests social support can be provided by many people in sport settings such as family, friends, teammates, coaches, managers, fitness trainers, physiotherapists, and psychologists (Reese, Hardy, & Freeman, 2007). However, because coaches are considered particularly close to athletes (Jowett & Poczwarowski, 2007), we focused on the role of coaches' social support in the stress-burnout relationship. Moreover, because both Galli and Vealey (2008) and Fletcher and Sarkar (2012) research suggested “interaction” effects of psychological factors in the resilience process, we adopted Smith and colleagues' (Smith, Smoll, & Pracek, 1990) suggestion by using a conjunctive moderating approach to examine the joint moderating effects of athletes' resilience and coaches' social support on the stress-burnout relationship.

In sum, the purpose of this study was to examine the conjunctive effects of athletes' resilience and coaches' social support on the stress-burnout relationship. We hypothesized that there is a conjunctive moderating effects of athletes' resilience and coaches' social support on the stress-burnout relationship both in high and low stress conditions.

Method

Participants

A total of 218 Taiwanese Division-I college student-athletes (Females = 59; Males = 159) were recruited for this study. All participants were representing their school teams with an age range of 18–25 years (M = 20.0, SD = 1.3). Participants had an average of 9.1 years (SD = 2.8) of participation in their sports, training days per week (M = 5.5, SD = 1.1), and training hours per day (M = 4.3, SD = 1.1) in the individual sports of track and field, taekwondo, tennis, and archery (n = 162) or team sports of basketball and baseball (n = 56).

Procedure

After gaining the approval of the Institutional Review Board, the authors contacted all participants through each team's head coaches. Data were collected through pen-and-paper surveys distributed to six sport teams (archery, baseball, basketball, taekwondo, tennis, track). Participants were informed that the general purpose of the study was to examine their life experiences as collegiate athletes, and that questionnaire responses would remain anonymous and be analysed by group. No individual information was revealed by this study. After participants understood the study and agreed to participate, they completed the survey package. It
took approximately 20 min to complete the survey, which was administered either before or after each team's training session.

**Measures**

**Life stress**
Life stress was assessed using the 24-item College Student-Athlete Life Stress Scale (CSALSS; Lu, Hsu, Chan, Cheen, & Kao, 2012). This scale consists of eight subscales that tap into two main domains of stressors; general life stressors (academic requirements, family relationships, interpersonal relationships, romantic relationships) and sport life stressors (coach relationships, performance demand, sports injury, training adaptation). Participants responded to the 24-items on a 6-point Likert scale from 1 (never) to 6 (always). The generic stem for the CSALSS was “I am worried about ...” and example items include “… being injured frequently”, “… my poor academic skills”, and “… my unstable competition performance”. The internal consistency for the eight factor CSALSS ranged from .72 to .86 and the total coefficient was appropriate ($\alpha = .86$).

**Resilience**
To assess participants' resilience, we used the abbreviated version of the Connor-Davidson Resilience Scale — 2 (CD-RISC2; Vaishnavi, Connor, & Davidson, 2007). The CD-RISC2 assesses individuals’ resilience as a personality trait. The two items were taken from the original CD—RISC (Connor & Davidson, 2003), namely “Adapt to change” and “Tend to bounce back after illness or hardship.” Respondents answered the two items according to “How true it describes them” on a 5-point Likert scale ranging from 1 (not true at all) to 5 (true nearly all of the time). Internal consistency of the CD-RISC2 in this study was marginal ($\alpha = .66$).

**Social support**
The recently developed Athletes’ Received Support Questionnaire (ARSQ; Freeman, Coffee, Moll, Rees, & Sammy, 2014) was used to assess the social support that athletes received. The 22-item ARSQ measures four types of social support namely, emotional support (5-item), esteem support (5-item), informational support (6-item), and tangible support (6-item). The stem was slightly modified to measure coaches’ social support; “In the last week, how often did your coach ...” and all responses range on a 5-point frequency scale with 1 (not at all), 2 (once or twice), 3 (three or four times), 4 (five or six times), and 5 (seven or more times). Cronbach’s $\alpha$ for all four of the subscales were good ranging from .90 to .94.

**Burnout**
Burnout was assessed using the 15-item Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001), which was designed to measure athletes’ burnout symptoms. The ABQ is composed of three subscales namely emotional or physical exhaustion, reduced sense of accomplishment, and sport devaluation. The stem for each item is; “How often do you feel this way about your participation in your current sport?” Participants indicated on a 5-point Likert scale with 1 (Almost never) to 5 (Almost Always). Internal consistency for the ABQ was good ($\alpha = .89$).

**Data analysis**
Hierarchical multiple regression analyses were conducted to assess the disjunctive (single) and conjunctive (interactive) moderation effects. To reduce multicollinearity among the main effects and interaction terms, scores of all independent (predictor) variables were standardized before calculation of the two-way and three-way interaction product terms (Finney, Mitchell, Cronkite, & Moos, 1984; Mitchell, Evans, Rees, & Hardy, 2014). A total of four analyses were conducted with the standardized independent variables (life stress, resilience, four types of support — emotion, esteem, information, and tangible) and burnout as the dependent variable.

The variables were entered for the three steps of each analysis as follows: Step 1 (main effects: life stress, resilience, emotional/esteem/informational/tangible support); Step 2 (two-way interactions: life stress x resilience, life stress x emotional/esteem/informational/tangible support, resilience x emotional/esteem/informational/tangible support); Step 3 (three-way interactions: life stress x resilience x emotional/esteem/informational/tangible support). Two-way (disjunctive) or three-way (conjunctive) interaction is established if there is a significant change in the $R^2$ from Step 1 to 2 and Step 2 to 3 respectively. The procedures recommended by Cohen and Cohen (1983) were used to plot interaction effects by defining the high and low groups of both resilience and different types of social support if any of the two-way interaction terms was significant in the regression equation. For significant three-way interactions, Dawson and Richter (2006) test for significant differences between slopes was conducted to plot the interaction effects. An alpha level of .05 was used for all statistical tests.

**Results**
Descriptive statistics and correlations for the variables analysed in this study are presented in Table 1. Based on the means and standard deviations of the variables, it was found the athletes had a moderate level of life stress and high resilience. The amount of social support the athletes received was moderate to high. Lastly, the athletes' burnout level was moderate. As shown in Table 1, all correlations between life stress and burnout (IV and DV), and resilience and 4 types of social support (potential moderators) ranged from $r = -.15$ to $-.33$.

**Moderation testing**
(I) Hierarchical regression analyses with life stress, resilience, and emotional social support predicting burnout

Results from the hierarchical multiple regression analyses were used to determine whether resilience and four types of social support disjunctively or conjunctively moderate the relationship between life stress and burnout are presented in Table 2. The main effects entered in Step 1 of the first analysis accounted for 21.2% of variance in burnout, $F(3, 214) = 19.134$, $p < .001$. Only life stress ($b = 2.902$, $p < .001$) and resilience ($b = -1.512$, $p = .003$) significantly predicted burnout, thereby reflecting that higher life stress and lower resilience results in higher burnout. No moderator effects were found for the two-way interaction terms at Step 2 and three-way interaction term at Step 3.

(II) Hierarchical regression analyses with life stress, resilience, and esteem social support predicting burnout

For the second analysis, the main effects entered at Step 1, accounted for 23.0% of variance in burnout, $F(3, 214) = 21.274$, $p < .001$. Life stress ($b = 2.718$, $p < .001$) positively, resilience ($b = -1.348$, $p = .009$) negatively, and esteem support ($b = -1.487$, $p = .006$) negatively predicted burnout. Reflecting that higher life stress, lower resilience and esteem support were related to higher burnout. No disjunctive moderator effects were found when the two-way interaction terms were entered at Step 2. However, the final interaction term (i.e., life stress x resilience x esteem support) was statistically significant ($p = .043$) and accounted for a 1.5%
increase in the explained variance. Dawson and Richter (2006) test for significant differences between slopes were conducted to interpret the significant conjunctive moderation. Despite the final interaction term was statistically significant in $R^2$ change of the hierarchical multiple regression analysis, no differences were found between the six pairs of the four slopes; hence no support for conjunctive moderation was established.

(III) Hierarchical regression analyses with life stress, resilience, and informational social support predicting burnout

The main effects of the third analysis explained 22.3% of variance at Step 1, $F(3, 214) = 20.459, p < .001$. Similar to the previous analysis, life stress $(b = 2.798, p < .001$, resilience $(b = 1.399, p = .007)$, and informational support $(b = -1.281, p = .017)$ significantly predicted burnout. The introduction of the two-way interaction terms at Step 2 did not result in a significant $R^2$ change. However, the combination of resilience and informational support was found to interact in a conjunctive manner to influence the relationship between life stress and burnout. As shown in Table 2, the final interaction term had a significant increase of 2.6% in accounted variance $(p = .007)$. The conjunctive moderation was further interpreted with the test for significant differences between slopes (Dawson & Richter, 2006). Results indicated that under low life stress, participants with high resilience and low informational support are less prone to burnout than athletes who are low in both resilience and informational support $(t = 2.417, p = .016)$. In addition, athletes who are low in resilience but high in informational support are also less susceptible to burnout than athletes who are low in both resilience and informational support $(t = 2.047, p = .042)$. Fig. 1 presents the interpretation of the conjunctive moderation effects.

(IV) Hierarchical regression analyses with life stress, resilience, and tangible social support predicting burnout

The main effects of the final analysis accounted for 23.5% of variance in Step 1, $F(3, 214) = 21.945, p < .001$. Revealing that all 3 variables significantly predicted burnout, namely life stress $(b = 2.741, p < .001)$, resilience $(b = -1.301, p = .011)$, and tangible support $(b = -1.612, p = .002)$. Similar to three of the previous analysis, no disjunctive moderator effects was found at Step 2. However, the final interaction term (life stress x resilience x tangible support) was statistically significant $(p = .007)$ with an increase of 2.6% in $R^2$. Further analysis found that athletes with high resilience and tangible support are less susceptible to burnout than athletes with high resilience but low tangible support $(t = -2.013, p = .045)$ in the high life stress condition. In addition, similar to the previous conjunctive moderator effect, athletes who are high resilience but with low tangible support are less prone to burnout compared with athletes who are low on both resilience and tangible support $(t = 2.566, p = .011)$ in the low life stress condition. Fig. 2 is plotted according to findings of the test for significant differences between slopes (Dawson & Richter, 2006).

Discussion

In line with Smith’s (1986) cognitive-affective model of athletic burnout, this study examined the conjunctive moderating effects of athletes’ resilience and coaches’ social support on stress-burnout

### Table 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Life stress</td>
<td>.86</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Resilience</td>
<td>-1.5*</td>
<td>.66</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. SS – emotional</td>
<td>-32**</td>
<td>.10</td>
<td>.94</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. SS – esteem</td>
<td>-33**</td>
<td>.19**</td>
<td>.82**</td>
<td>.94</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. SS – informational</td>
<td>-31**</td>
<td>.17**</td>
<td>.77**</td>
<td>.89**</td>
<td>.92</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. SS – tangible</td>
<td>-29**</td>
<td>.20**</td>
<td>.75**</td>
<td>.75</td>
<td>.82**</td>
<td>.90</td>
<td></td>
</tr>
<tr>
<td>7. Burnout</td>
<td>.41**</td>
<td>-24**</td>
<td>-23**</td>
<td>-32**</td>
<td>-29**</td>
<td>-32**</td>
<td>.89</td>
</tr>
</tbody>
</table>

### Table 2

<table>
<thead>
<tr>
<th>Criterion Variable</th>
<th>Unstandardized regression coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burnout</td>
<td></td>
</tr>
<tr>
<td>Step 1</td>
<td>F</td>
</tr>
<tr>
<td>19.134</td>
<td>.212</td>
</tr>
<tr>
<td>10.048</td>
<td>.222</td>
</tr>
<tr>
<td>8.755</td>
<td>.226</td>
</tr>
</tbody>
</table>

### Table 3

| Note: Alpha values are diagonal, correlation values below diagonal. SS = social support. *p < .05, **p < .01. |
Results found athletes’ resilience and the two types of coaches’ social support conjunctively moderated the stress-burnout relation in high and low stress conditions. Specifically, under low life stress, athletes with high resilience but low informational support, or low resilience but high informational support are less prone to burnout than those who are both low in resilience and informational social support. As to coaches’ tangible social support, there are two conjunctive moderations. In the high life stress conditions, we found athletes who are both high in resilience and tangible support are less susceptible to burnout than those with high resilience but low tangible support. However, in the low life stress condition, findings revealed that athletes with high resilience but low tangible support are less prone to burnout than those both low in resilience and tangible support.

Our results confirm that high stress is associated with athlete burnout (e.g., Cresswell, 2009; Cresswell & Eklund, 2006; Gustafsson, Kentta, & Hassmen, 2011; Gustafsson & Skoog, 2012; Raedeke & Smith, 2004; Tabei et al., 2012), that high resilience is negatively associated with stress-induced outcomes (e.g., King, King, Fairbank, Keane, & Adams, 1998; Rutter, 2007; Silver, 2009; Waysman, Schwarzwald, & Solomon, 2001), and that social support is negatively associated with burnout (e.g., Huynh, Xanthopoulou, & Winefield, 2013; Raedeke & Smith, 2004; Udry, Gould, Bridges, & Tuffey, 1997).

The results have implications for future research. First, this study, to the best of our knowledge, was the first study using resilience theory in examining stress-burnout. Past sport resilience research mostly focuses on how resilient personality protects against trauma (King et al., 1998; Waysman et al., 2001), or facilitates positive adaptation (e.g., Galli & Vealey, 2008) or performance (e.g., Fletcher & Sarkar, 2012; Morgan, Fletcher, & Sarkar, 2013, 2015). Very few studies have examined athletes’ stress-burnout relationship from a resilience perspective. Our study extends sport resilience research to the stress-burnout relationship.

Another strength of our study was using a conjunctive approach to examine the interaction of athletes’ resilience and coaches’ social support; and its influence on the stress-burnout relationship. As Smith and colleagues (Smith et al., 1990) suggested that some moderators may function more effectively in the presence of other moderators, rather than singularly. Smith and colleagues (Smith et al., 1990) indicated that the single moderator approach not only has limitations in revealing the complexity of behaviour but also hinders our understanding of how another potential moderator may mask the underlying mechanism (Smith et al., 1990, p.361). Our study, using the conjunctive approach, revealed the complexity of athletes’ resilience and coaches’ social support on the stress-burnout relationship.

The findings of the conjunctive effects of coaches’ social support and athletes’ resilience are worthy of further discussion. Specifically, we found coaches’ information and tangible support
combined with athletes’ resilience conjunctively moderated stress-burnout relationship. Our results are in line with previous findings that tangible social support moderated the relationship between stress and negative affect (Freeman et al., 2014), and that co-workers’ informational social support reduced the negative effect of job stress (AbuAlRub, 2004) and facilitated cancer patients’ adjustment of life (Helgeson & Cohen, 1996). According to the literature, informational support refers to the provision of advice and guidance; such as helping athletes deal with slumps/set-backs, failures, problems of training and competitions, and enhance athlete fitness (Rees & Hardy, 2000). On the other hand, tangible support is concrete instrumental assistance, in which a person in a stressful situation is given the necessary resources (Cutrona & Russell, 1990; Freeman et al., 2014; Rees & Hardy, 2004; Rees et al., 2007). Thus, our results add to our understanding of how coaches’ informational/tangible social support may function in athletes’ stress-burnout relationship.

We did not find any conjunctive moderating effects of coaches’ esteem or emotional social support, and that need further study. Emotional social support is the provision of comfort, security, and a sense that individual is loved and care for, while esteem social support refers to the bolstering of an individual’s sense of competence (Freeman et al., 2014; Rees & Hardy, 2004, 2000; Rees et al., 2007). Past studies found both emotional social support and esteem social support negatively correlated with athlete burnout (Freeman, Coffee, Rees, & 2011). The reasons for failing to support past research are unclear. Our participants were all adults, experienced, and competitive-oriented Division-I athletes. They may need coaches’ informational and tangible social support more than esteem and emotional support. As past leadership literature suggested (Chelladurai & Carron, 1983; Horn, 2002; Martin, Jackson, Richardson, & Weiller, 1999) mature athletes preferred instruction and training from their coaches as compared to young athletes. However, this interpretation needs to be verified with future research.

Limitations and future suggestions

Several methodological and interpretive issues must be discussed. First, the CSALSS scale has only been validated in Taiwan, future study is needed to validate CSALSS and examine its’ correlations with athlete burnout in other cultures. Also, recently, other forms of athletic stressors such as organizational stressors (Arnold, Fletcher, & Daniels, 2013) can be used to examine the stress-burnout relationship in the future. Further, this study used the two-item CD-RISC2 (Vaishnavi et al., 2007), which is limited in several ways. First, the internal consistency of the CD-RISC2 in this study was only marginal (α = .66). Vaishnavi and colleagues (Vaishnavi et al., 2007) claimed that CD-RISC2 is a good representant of the overall Connor-Davidson Resilience Scale (CD-RISC, Connor & Davidson, 2003). However, too few items cannot capture the whole concept of resilience, limiting its application and interpretation. Also, the CD-RISC2 was developed in non-sport settings, and measures individual traits just as the original 25-item CD-RISC did (Sarkar & Fletcher, 2013, p.272). Therefore, there is an urgent need to develop a sport-specific measure of resilience that comprises three pivotal components — adversity, positive adaptation, and protective factors — in a tripartite fashion in order to accurately assessing resilience in sport.

Furthermore, this study’s findings of the associations between student-athletes’ life stress, resilience, coaches’ social support, and burnout do not imply a causal relationship. We suggest that future studies adopt a longitudinal design with independent variables (i.e., life stress, resilience, and social support) predicting the dependent variable (i.e., burnout) at a later time to examine causal effects. Further, the participants in this study were all student-athletes. Therefore, the results could not be generalized to other athletes such as professional athletes or junior athletes. Additionally, the data were collected from Taiwanese student-athletes; hence the results may not be generalizable to different cultures. We recommend researchers adopt similar approaches to measure student-athletes’ life stress and its association with burnout/injury, and also investigate their relationship along with social support and resilience.

Applied implications

To apply our research we offer the following suggestions. First, it is important to help athletes prevent and alleviate burnout. We suggest that sport organizations, administration units and athletic teams need to collaborate to offer educational programs teaching life skills and time management. Programs such as “Challenge Athletes’ Minds for Personal Success” (CHAMPS) Life Skills program can teach student-athletes academic, athletic, career, and community service life skills (Ahlgren-Bedics & Monda, 2009) to help them to reduce life stress such as time conflicts, interpersonal relations, and academic pressures.

To foster athletes’ resilience we can start by reducing athletes’ risk factors and stressors (Masten & Reed, 2002). Ferrante and colleagues (Ferrante, Etzel, & Pinkney, 1991) proposed a service provision model that integrates athletic and student affairs offices and personnel to provide counselling services (e.g., athletic directors, sport medicine assistants, coaches, tutors, faculty members, as well as staff in counselling centre, learning centre, minority affairs, student health, and residence life). Thus, the support system may help athletes to reduce risk factors in athletics (e.g., overtraining, injury), or other life crisis (e.g., interpersonal difficulties, poor academic performance of leaning difficulties).

Further, to strengthen athletes’ resilience we might promote athletes’ protective factors (Fletcher & Sarkar, 2012; Sarkar & Fletcher, 2014). These protective factors include positive personality (e.g., optimism, hope, competitiveness, proactivity), motivation, confidence, focus, and social support. Furthermore, coaches, administrators, or sport psychology consultants many introduce resilience training programs for athletes (e.g., Reivich, Seligman, & McBride, 2011; Schinke, Peterson, & Couture, 2004). Generally, resilience training programs include all types of challenge appraisal and meta-reflective strategies training such as evaluating personal strengths and weakness, minimizing negative thoughts, challenging counterproductive beliefs, and cognitive restructuring. Moreover, to facilitate social support, sport professionals can incorporate different sources of social support, such as coaches, parents, teachers, and peers, as well as different types of social support, such as informational, emotional, tangible and esteem social support into their helping system. We also suggest that sport professionals may help athletes by matching specific types of social support with specific stressor (Rees & Hardy, 2004).

Conclusion

Athlete burnout is a prominent issue in competitive sports because it influences young athletes’ health, performance, motivation, and psychological well-being. By adopting Smith’s (1986) cognitive-affective model of athletic burnout and conjunctive moderating approach we found variables may interactively influence athlete burnout. Interaction of athletes’ resilience and coaches’ social support is just a starting point for research on this issue. With increasing numbers of youth engaging in competitive sports every year, the problems of burnout require attention. Sport
psychology researchers should address this issue, particularly from the perspective of student-athletes’ life stress.

Acknowledgements
The authors would like to extend their appreciations toward Ministry of Science and Technology of Taiwan for its research grant NSC 101-2410-H-175-004-MY2.

References


