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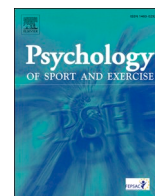
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Team identification and athlete burnout: Testing longitudinal serial mediation via perceived support and stress

Hanna L. Glandorf^{a,*}, Pete Coffee^b, Daniel J. Madigan^a

^a York St John's University, York, United Kingdom

^b Department of Psychology, School of Social Sciences, Heriot-Watt University, United Kingdom

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ABSTRACT

Sport participation is associated with exposure to high-stress environments that can lead to the development of athlete burnout. Researchers have, therefore, shown great interest in identifying relevant coping resources. While perceived support has been shown to act as such a coping resource, its effectiveness is likely influenced by other social factors. Following the social identity approach, team identification and stress may be relevant factors. Thus, the present study employed a two-wave longitudinal design to test whether team identification predicts athlete burnout through a serial mediation of perceived support and stress. Online surveys were used to assess team identification, perceived support, stress, and athlete burnout in 176 athletes (Time 1) and 95 athletes (Time 2). Path analyses indicated that team identification did not predict athlete burnout directly or indirectly. However, perceived support significantly and negatively predicted athlete burnout via stress. The results suggest that perceived support may reduce stress, and in turn reduce the risk of athlete burnout development in athletes, but the effects of team identification may occur via alternative pathways.

1. Introduction

Sport participation commonly increases exposure to stressful stimuli (Lin et al., 2021). Stress represents a negative experience that, over time, may lead to detrimental consequences such as athlete burnout (Smith, 1986). Therefore, research has investigated coping resources that can support athletes to manage the high-stress environment of sport (Gustafsson et al., 2017). While several studies have found perceived support to act as one such coping resource (Hartley & Coffee, 2019), other research has highlighted that the effectiveness of perceived support is likely subject to other social factors (Pacewicz et al., 2019). Some of these factors may be explained by the social identity approach which suggests social identification facilitates a positive interpretation of the perceived available support (Rees et al., 2015). Such a positive interpretation would then lower stress (Hartley et al., 2020). Following this approach, increased team identification may reduce athlete burnout through its effects on perceived support and stress. While this relationship has been tested and supported in an organisational setting (Avanzi et al., 2018), it has not been investigated in a sporting context. The present study addresses this gap by examining, through a two-wave longitudinal design, whether team identification predicts athlete

burnout in athletes through a serial mediation of perceived support and stress.

1.1. Athlete burnout

Athlete burnout is thought to be a cognitive-affective syndrome characterised by three symptoms (Raedeke & Smith, 2001). These symptoms are: emotional and physical exhaustion (fatigue and amotivation), sport devaluation (lack of interest and negative attitude), and a reduced sense of athletic accomplishment (perceived inability to reach goals; Raedeke & Smith, 2001). It has been estimated that approximately 10% of athletes experience moderate-to-severe athlete burnout symptoms at any given time (Gustafsson et al., 2017) with many more being at risk of developing such symptoms over the course of their career (Eklund & DeFreese, 2015). Recent evidence even suggests that rates of athlete burnout symptoms may be increasing over time (Madigan et al., 2022). This is worrying because athlete burnout is associated with negative consequences such as reductions in mental (e.g., mood disturbances; Gustafsson et al., 2017) and physical health (Goodger et al., 2007) as well as potential reductions in motivation and athletic performance (Smith et al., 2019).

* Corresponding author.

E-mail address: h.glandorf@yorks.ac.uk (H.L. Glandorf).

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According to [Smith's \(1986\)](#) cognitive-affective model, athlete burnout develops as one of the consequences of chronic stress. Broadly, stress is conceived as a negative experience caused by an individual feeling unable to cope with the demands of a situation ([Lazarus & Folkman, 1984](#)). Individuals therefore perceive the situation to be uncontrollable, unpredictable, or overloading ([Cohen et al., 1983](#)). In [Smith's \(1986\)](#) model, stress is triggered when an athlete appraises an imbalance between the demands of a situation (e.g., competition) and their available coping resources. A chronic imbalance between perceived demands and resources will result in physiological (e.g., tension) and behavioural responses (e.g., avoidance). The ultimate consequence of which will be athlete burnout development.

Research has sought to test the efficacy of the ideas proposed by [Smith \(1986\)](#). Most notably, [Lin et al. \(2021\)](#) recently published a systematic review and meta-analysis summarising research that had examined the relationship between stress and athlete burnout. Across 48 studies (including 12,303 athletes), they found significant stress-athlete burnout correlations with an overall positive medium effect size. Effect sizes were similar across all three athlete burnout dimensions. As such, stress appears to play a key role in the development of athlete burnout and does so across all three athlete burnout symptoms.

2. Social support and athlete burnout

Due to the detrimental consequences of the stress-burnout relationship in athletes, research has sought to identify protective factors ([Madigan et al., 2020](#)). Social support has been proposed to act in this manner ([Gustafsson et al., 2017](#)). Social support, however, is a complex concept and has therefore been conceptualised in different ways. The most prominent of these conceptualisations involves the separation of social support into the perception of received support and the perception of available support ([Freeman et al., 2011](#)). Due to its stronger evidence base ([Hartley et al., 2020](#)), the present study focuses on the perception of available support (referred to as perceived support from now on).

Several models have been proposed to explain the influence that perceived support has on athlete burnout. The models vary in regard to the pathways through which support may affect burnout symptoms. For example, the main effects model proposes that perceived support directly reduces athlete burnout ([Cohen & Wills, 1985](#)). In addition, the stress-buffering model proposes that perceived support reduces athlete burnout by moderating the effects of high stress ([Cohen & Wills, 1985](#)). Finally, the stress prevention model proposes that perceived support reduces athlete burnout by reducing the stressfulness of situations (i.e., mediation; [Barrera, 1986](#)).

Research on the protective effects of perceived support to the stress-burnout relationship has primarily examined these effects through the stress-buffering or stress prevention models. Based on both models, perceived support plays a key role in stress appraisal by influencing perceived capability and coping resources ([Lazarus & Folkman, 1984](#)). This has been supported by [Freeman and Rees \(2009\)](#) who found athletes' perceived support to be positively associated with perceived situational control. In turn, situational control was positively associated with appraising stressors as a challenge and negatively associated with appraising stressors as a threat. Since threat appraisal has been linked with emotional exhaustion ([Palmwood & McBride, 2019](#)), a symptom of burnout, [Freeman and Rees' \(2009\)](#) study not only supports the idea that perceived support influences stress appraisal but also implies that appraisal may be associated with athlete burnout. Indeed, there is evidence that perceived support buffers the negative effects of stress on athlete burnout ([Hartley & Coffee, 2019](#)), and that social support is associated with lower athlete burnout through a mediation of stress ([Raedeke & Smith, 2004](#)).

Despite the evidenced effect of perceived support in reducing athlete burnout, its effectiveness is likely influenced by other factors. For instance, a negative interpretation of perceived support may increase, instead of reduce, athlete burnout ([Pacewicz et al., 2019](#)). [Vangelisti](#)

(2009) suggested that this interpretation is likely formed by the context. While the context includes a range of factors, the relationship between the individual and their support provider as well as the individual's judgement of the appropriateness of the available support likely plays an important role. As such, examining only the relationship between perceived support, stress, and athlete burnout may fail to capture the complexities of the social environment that perceived support is subject to.

2.1. Social identity and athlete burnout

The social identity approach may be able to account for some of these complexities. This approach originates in [Tajfel and Turner's \(1979\)](#) social identity and [Turner's \(1982\)](#) self-categorisation theories. Following these theories, individuals categorise themselves into groups and subsequently define themselves in terms of that group membership. This self-definition based on group membership represents an individual's social identity. As individuals can be part of multiple groups, they can also hold multiple social identities at the same time. Shared social identities among group members can represent psychological resources, for example, by creating the basis for the provision and receipt of social support ([Rees et al., 2015](#)).

Group membership and shared social identities are key to the provision and receipt of social support. This is because social support is not only a factor of the recipient, but also of the provider ([Hartley et al., 2020](#)). When individuals define themselves as part of a group, they will also expect to give and receive support from group members. This expectation means that support from group members will be interpreted more positively and thus be more effective than support from non-group members. In contrast, provision of support from a non-group member may be interpreted negatively and be less optimal. Thus, shared social identity facilitates a positive interpretation of perceived support.

The link between social identification and social support may influence the stress appraisal process and thereby determine whether a stimulus is interpreted as a stressor ([Rees et al., 2015](#)). For instance, when an athlete identifies highly with their sports team, they may perceive more support to be available from their team, as well as interpret this available support favourably ([Hartley et al., 2020](#)). This may then facilitate their ability to cope with stressful events and the stressful environment (e.g., of training or competitions). Therefore, identification with a sports team may reduce athlete burnout through its influences on social support and stress.

The idea that social identification creates a basis for social support, which consequently affects the stress-athlete burnout relationship has been supported by prior research. Shared social identities have been found to positively influence judgements of support ([Lavalley et al., 2019](#)) and social identification building exercises have been reported to reduce stress ([Steffens et al., 2019](#)). Social identification has also been associated with stress through a mediation of social support ([Haslam et al., 2005](#)) and with athlete burnout ([Fransen et al., 2019](#)). [Avanzi et al. \(2018\)](#) built on these studies by testing whether social identification is associated with athlete burnout through a serial mediation of social support and workload using a cross-sectional design. This relationship was supported in their sample of teachers. However, how social identification plays into the relationship between perceived support, stress, and athlete burnout has not yet been investigated in sport.

2.2. The present study

The present study aims to build on [Avanzi et al's \(2018\)](#) findings by examining whether team identification predicts athlete burnout through a serial mediation of perceived support and stress in athletes. As most of the current literature relies on cross-sectional designs (see [Lin et al., 2021](#)), we employed a two-wave longitudinal design. Longitudinal designs are better suited for mediation models as these assume a temporal link ([Schoemann et al., 2017](#)). The present study's two-wave design

tested whether team identification (Time 1 [T1]) predicted athlete burnout (emotional and physical exhaustion, devaluation, reduced sense of accomplishment; Time 2 [T2]) through a mediation of perceived support (T1) and stress (T1).

The ordering of variables assessed at Time 1 is based on the social identity approach and current literature. That is, group membership makes social support possible, which is evidenced by previous studies that showed increased social identification facilitates effective social support (e.g., Haslam et al., 2005). This has been replicated by Avanzi et al. (2018) who found organisational identification linked to athlete burnout with social support and workload as mediators in sequence. Hence, team identification should be placed earlier in the mediation sequence than perceived support.

The social identity approach further suggests that increased social identification lowers stress (Steffens et al., 2019). Other research has shown that social support is a significant mediator between social identification and stress (Haslam et al., 2005). As such, team identification should serve as the predictor, while perceived support should be entered as the first mediator with stress as the second mediator.

Taking these together, current literature and theory support the hypothesised sequence of variables, which will serve as the study's hypotheses:

1. Team identification (T1) will be significantly positively associated with perceived support (T1).
2. Perceived support (T1) will be significantly negatively associated with stress (T1).
3. Stress (T1) will significantly positively predict athlete burnout (T2).
4. Team identification (T1) will significantly negatively predict athlete burnout (T2), mediated by (higher) perceived support (T1) and (lower) stress (T1).

3. Methods

3.1. Design

This study used a two-wave longitudinal design to allow the predictor and mediation variables to influence the outcome variable over time. The predictor variable was team identification (T1). Perceived support (T1) and stress (T1) served as mediators and athlete burnout (T2) as the outcome variable. The pre-registration for this study can be found on the Open Science Framework [Glandorf & Coffee, 2021].¹

3.2. Participants

Participants ($N = 176$, 94 females) between the ages of 18 and 67 years ($M = 22.91$, $SD = 7.33$) were recruited during the first wave through convenience sampling. The link to the Time 1 online survey was distributed through personal contacts, emailing sports organisations and over several social media channels. Inclusion criteria were: being an athlete who was aged over 18, competed in the UK, competed before COVID-19 restrictions, and was competing or planning to compete once COVID-19 restrictions were lifted for their sport at the time of data collection.

Prior to data collection, a power analysis estimated a minimum

¹ It should be noted here that this study was developed during the COVID-19 lockdown in the UK and data collection took place while COVID-19 restrictions were being lifted. Although our pre-registration indicated burnout levels may differ due to this context, recent research has shown that stress and burnout level did not significantly differ during lockdown compared to before imposed restrictions (Woods et al., 2022). As such, although the present study took place immediately after the COVID-19 lockdown in the UK, it can be assumed that stress and burnout were relevant variables at the time of data collection and the data are comparable to previous research.

required sample size of between 162 and 183 participants. This power analysis was based on a cross-sectional sequential mediation model calculated with R (developed by Schoemann et al., 2017). The cross-sectional approach was chosen because there is currently not one agreed approach to determine power for longitudinal mediation models (Pan et al., 2018). Thus, we aimed to meet power on the first wave based on the cross-sectional power analysis. Since longitudinal analyses are more powerful than those based on cross-sectional data, we did not require the same number of people on the second wave. For the second wave, we aimed to recruit at least 80 participants to meet the minimum 10:1 and desired 20:1 number of observations to model parameters ratios for path analyses (Jackson, 2003), where the number of observations represents the number of participants times the number of waves (two here).

In line with current recommendations for power analyses on mediation models (Zhang, 2014), a Monte Carlo simulation and bootstrapping were used to power the indirect effect from team identification to perceived support to stress to sport devaluation. Correlations from prior research (see Supplementary Table A for details) were used to simulate the data. This power analysis was repeated ten times to estimate a range of minimum sample sizes (each run based on 1000 replications with 20,000 Monte Carlo draws each; target power = 0.8; alpha = .05). While a range of minimum sample sizes is shown here, the pre-registration set a single minimum sample size ($N = 177$) as it was based on one run of the described power analysis. Since this power analysis was based on simulated data, a range of minimum sample sizes is provided here instead.

Of the 176 participants from the Wave 1 survey, 125 participants agreed to be contacted about the Wave 2 survey and 95 participants completed this second survey. Data were screened to exclude participants who gave the same response to each statement of the questionnaires or indicated not meeting the inclusion criteria.

The final longitudinal sample was 95 athletes (48 females) between the ages of 18 and 55 ($M = 23.12$; $SD = 6.87$) and predominantly British (83%). Most of the participants had experienced UK COVID-19 restrictions as they had lived in the UK prior to (95%) and during lockdown (91%; see Supplementary Table B and C for further details). Participants included both individual (53%) and team athletes (42%) in an almost even split (see Supplementary Table D for all sports). On average, the participants had participated in their sport for eight years with half of the participants competing at a club, 18% at a regional, 19% at a national, and 13% at an international level; 91% of participants wanted to return to their previous competition level following restrictions imposed due to COVID19.

3.3. Measures

3.3.1. Team identification

Team identification was assessed with the Four Item measure of Social Identification (FISI; Postmes et al., 2013). The FISI is a 4-item scale on which participants indicate their agreement with items such as "I am glad to be part of my sports team". The 7-point Likert scale ranges from 1 (*strongly disagree*) to 7 (*strongly agree*). This measure is an adaptation from Doosje et al. (1995) that has previously been used to assess team identification in individual athletes (Stevens et al., 2018). The FISI has also been shown to have good reliability and construct validity (Postmes et al., 2013).

The Social Identity Questionnaire for Sport (SIQS; Bruner & Benson, 2018) was also used. The SIQS is a 9-item sport-specific measure of team identification with the stem: "Please reflect how you feel about being a part of your team". No specific reference was made to the exact team to be inclusive of individual athletes whose team likely consists of the support team around them and other athletes in their training groups. Participants indicate their agreement to each item on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). The SIQS has three dimensions, ingroup ties, cognitive centrality, and ingroup affect, that

have been shown to provide good fit and adequate reliabilities (Bruner & Benson, 2018).

3.3.2. Perceived support

Perceived support was assessed with the brief-form of the Perceived Social Support Questionnaire (BPSSQ; Lin et al., 2019). The BPSSQ is a 6-item scale that asks participants to indicate their agreement with items such as “I experience a lot of understanding and security from others”. Participants respond on a 5-point Likert type scale from 1 (*not true at all*) to 5 (*very true*). The BPSSQ is the short version of the German Perceived Social Support Questionnaire (F-SozU) which has been previously used in a sporting context (Horvath et al, 2004; Lourenco, 2021). Studies have shown that the BPSSQ (including its English translation) is cross-culturally valid and robust as well as that it has good validity and reliability (Lin et al., 2019).

3.3.3. Stress

Stress was assessed with the Perceived Stress Scale (PSS; Cohen et al., 1983) that determines individuals’ perception of the degree to which a given situation in life is considered stressful. The PSS is a 10-item scale with the stem: “The questions ask about your feelings and thoughts during the last month. In each case, you will be asked to indicate how often you felt or thought in a certain way”. Participants indicate the frequency on a 5-point Likert type scale from 0 (*never*) to 4 (*very often*). The PSS was originally developed as a unidimensional measure (Cohen et al., 1983), but was revised as a two-factor solution with dimensions of perceived distress (PD; six items) and perceived coping inability (PCI; four items; Chiu et al., 2016). This two-dimensional PSS has shown good reliability, discriminant validity and convergent validity in athletes (Chiu et al., 2016).

3.3.4. Athlete burnout

Athlete burnout was assessed with the 15-item Athlete burnout Questionnaire (ABQ; Raedeke & Smith, 2001). The stem for the ABQ is: “Please indicate the extent to which you are currently experiencing each feeling”. Participants answer on a 5-point Likert type scale from 0 (*almost never*) to 4 (*almost always*). The ABQ has three dimensions: emotional and physical exhaustion (EPE), devaluation, and reduced sense of accomplishment (RSA), with five items each. The ABQ has been developed for a sporting context and previously demonstrated adequate internal consistency on each dimension in this context (Hartley & Coffee, 2019) as well as good construct and structural validity (Cresswell & Eklund, 2006).²

3.3.5. Demographics

Participants were asked to indicate their age (in years), the gender they identified with (female/male/non-binary/other/prefer not to say), their nationality and current country of residence. They were asked what sport they competed in and to what extent they felt that the pandemic had impacted their sport on a 5-point scale from 0 (*no impact*) to 4 (*strong impact*). Participants were asked at what level they had been competing prior to COVID-19 restrictions (club/regional/national/international), for how long they had participated in their sport (in years), and whether they planned on competing again. Participants indicated

² As indicated above, during the study development phase, we were unsure to what extent burnout levels may differ to previous research due to the COVID-19 context. At the time of the pre-registration, we thus assumed the EPE and RSA dimensions would be less applicable, which is why the option of “not applicable” was provided for the associated items. It should be noted that this addition has not been previously validated. However, by the time of data collection for wave 1, athletes were training, and most were competing again. This was reflected in the percentage of athletes who responded to these items (EPE: 97%; RSA: 98%). As such, these dimensions were included in the final analyses.

what effect COVID-19 had had on their training and competition (only training/only competition/both training and competition/no effect). Where participants had spent lockdown (country and whether it was different to their prior residence) was determined as well as who they had spent lockdown with (family/friends/flatmates/colleagues/other). Participants were asked to indicate their interaction with their social network compared to before lockdown on a 5-point scale from 0 (*a lot less*) to 4 (*a lot more*).

3.3.6. Procedure

For an overview of the two-wave study see [supplemental Figure A](#). Ethical approval was given by the University of Stirling’s ethics board. Participants were invited to take part in an online study that was investigating “athletes’ current thoughts and feelings and perceptions of their social network”. After following the link, participants first read through the information on the study, including its purpose, before they signed the electronic informed consent form. Participants then completed the measures in partially randomised order. Partial randomisation was selected, because the platform that was available to the researchers (JISC online surveys) did not support full randomisation at the time of the study. Accordingly, five versions with different orders were developed to reduce order effects when interpreting data. After completing all five questionnaires, participants were asked to provide demographic information. At the end of the first survey, participants were informed about the second wave of the study and asked to provide their consent for the researchers to reach out to them for the purpose of the second survey.

Participants who indicated their consent were emailed with the link to the second wave survey. Participants completed all measures apart from demographics again in partial randomised order. Once they completed all questionnaires, participants were thanked for participating, fully debriefed and told to contact the researcher if they wanted to receive the results of the study. No incentives were provided to participants. The first wave of the survey was available in a window of six weeks. This was followed by a three-week window during which no data collection took place. The second wave of the survey was then available in a window of three weeks. Accordingly, the maximum time between Wave 1 and 2 for a single participant was twelve weeks, while the minimum time between Wave 1 and 2 for a single participant was three weeks.

3.4. Statistical analyses

All statistical analyses were carried out using R and R Studio (version 4.1.4; R Core Team, 2021; see supplementary materials for script). Assumptions of normality were found to be violated due to skewness. Thus, robust descriptive statistics such as trimmed means, medium absolute deviations (MADs), and Spearman correlations were used. For path analyses, a robust estimator that is asymptotically equivalent to the Yuan-Bentler estimator (1998) was chosen. This estimator has been shown to appropriately correct for skewed data and calculate missing values (Yuan & Zhang, 2012) such as those in the EPE and RSA dimensions of the ABQ in this study. Importantly, the SIQS was excluded from analysis as its distribution violated parametric assumptions to the extent that it could not be corrected sufficiently for confident analysis.

3.4.1. Preliminary analyses

In line with recommendations by Anderson and Gerbing (1988), Confirmatory Factor Analyses (CFAs) were computed prior to evaluating the proposed relationships to confirm the measures’ factorial structure and subsequently strengthen the analysis. For the FIS1 and the BPSSQ, one-factor solutions were examined. For the PSS, a one-factor solution was compared to a two-factor solution to validate the PSS’ revision. For the ABQ, a three-factor solution was evaluated. This approach differed from the pre-registration as further research showed it to be more rigorous (Yuan & Zhang, 2012).

In line with [Byrne's \(2001\)](#) recommendations, model fit was evaluated with a combination of absolute fit indices – Root Mean Square Error of Approximation (RMSEA) and Standardised Root Mean Square Residual (SRMR), and incremental fit indices – Tucker-Lewis Index (TFI) and Comparative Fit Index (CFI). What is considered an appropriate range for these indices is still highly debated with some scholars suggesting cut-off criteria are inappropriate ([Marsh et al., 2004](#)). Nonetheless, following similar previous research ([Madigan et al., 2015](#)), we determined ranges for acceptable (CFI and TFI > .90; SRMR < .10; RMSEA < .08) and excellent fit (CFI and TFI > .95; SRMR < .08; RMSEA < .06).

Following these analyses, composite scores were computed. On the FIS1 and the BPSSQ, all item responses were summed to create total scores. For the PSS dimensions, negatively worded items (4, 5, 7, 8) were reverse-coded, then item responses were summed to create dimensional scores. For the ABQ dimensions, negatively worded items (1, 14) were reverse-coded, then item responses were averaged to provide dimensional scores.

3.4.2. Path models

To test whether team identification predicted athlete burnout through a mediation of perceived support and stress, we planned a path analysis. In this path analysis, team identification (T1) served as the predictor, perceived support (T1) and stress (T1) as serial mediators in this order, and athlete burnout (T2) as the outcome. The plan was to create latent variables of stress and athlete burnout based on the results of the CFAs. Although we planned to control for competition level, age, gender, sport type and athlete burnout (T1) in the pre-registration, we decided to only control for athlete burnout (T1). This is because there was no theoretical basis to include competition level, age, gender and sport type and no evidence these variables influence the predictor, mediator, and outcome variables ([Avanzi et al., 2018](#)). Because previous research suggests that the stage of pandemic had no impact on burnout and stress in athletes in the UK ([Woods et al., 2022](#)), it was also not included as a control variable. These were important criteria to consider as adding unnecessary controls can cause misspecification and identification errors ([Becker et al., 2015](#)).

4. Results

Participants indicated that the COVID-19 pandemic had had a strong impact on their sport ($M = 3.41$; $SD = 0.81$; $Min = 1$; $Max = 4$). Most participants stated that the pandemic affected both training and competitions (93%), while few stated it only affected training (3%) or competitions (3%) or had no effect (1%). Overall, participants experienced fewer social interactions since the start of the pandemic ($M = 1.49$; $SD = 1.35$; $Min = 0$; $Max = 4$). While these variables on the impact of the pandemic were examined, they were not used for data screening as we did not expect to find a difference in the hypothesised relationships based on these variables. As such, all COVID-19 impact variables were solely used for descriptive statistics and not used analytically.

4.1. Preliminary analyses

The CFA on the FIS1 (T1) showed excellent fit ($\chi^2(2) = 2.24$; $p = 0.33$; CFI = 0.99; TLI = 0.98; RMSEA = 0.060; SRMR = 0.034, *nos parameters* = 8, see [Supplementary Table E](#)) and good composite reliability ($\omega = 0.81$). The CFA on the BPSSQ (T1) showed acceptable fit ($\chi^2(9) = 13.08$; $p = 0.16$; CFI = 0.93; TLI = 0.89; RMSEA = 0.078; SRMR = 0.056, *nos parameters* = 12, see [Supplementary Table F](#)) and good composite reliability ($\omega = 0.73$). The performed model comparison showed the one-factor and two-factor PSS (T1) solutions to be significantly different ($\chi^2 diff(1) = 13.28$; $p < 0.005$) and the two-factor solution showed better fit indices ($\chi^2(34) = 58.09$; $p < 0.05$; CFI = 0.94; TLI = 0.92; RMSEA = 0.086; SRMR = 0.051, *nos parameters* =

20, see supplementary Table G) with good composite reliabilities for each dimension (PD: $\omega = 0.87$; PCI: $\omega = 0.80$).

The CFA on the ABQ (T2) did not compute, so the dimensions were evaluated separately. The CFA on the EPE dimension showed mixed fit indices ($\chi^2(5) = 15.18$; $p < 0.01$; CFI = 0.95; TLI = 0.90; RMSEA = 0.19; SRMR = 0.039, *nos parameters* = 10, see supplementary Table H), but good composite reliability ($\omega = 0.92$). Similarly, the CFA on the devaluation dimension showed mixed results for fit ($\chi^2(5) = 28.97$; $p < 0.01$; CFI = 0.91; TLI = 0.81; RMSEA = 0.23; SRMR = 0.082, *nos parameters* = 10, see [Supplementary Table I](#)), but good composite reliability ($\omega = 0.87$). The CFA on the RSA dimension showed predominantly poor fit ($\chi^2(5) = 31.32$; $p < 0.01$; CFI = 0.88; TLI = 0.76; RMSEA = 0.24; SRMR = 0.060, *nos parameters* = 10, see supplementary Table J), but reasonable composite reliability ($\omega = 0.87$).

4.2. Descriptive statistics

Descriptive statistics of the FIS1, PSS, BPSSQ, and ABQ were examined. [Table 1](#) shows 20% trimmed means, MADs, and ranges of the variables by wave. Spearman correlations between all variables on each wave are shown in supplementary Table K. Team identification (T1) showed small significant positive correlations with perceived support and small significant negative correlations with devaluation and RSA. Perceived support (T1) showed small significant negative correlations with PD, RCI, RSA (T1) and EPE (T2). PD and PCI showed small significant positive correlations with devaluation, EPE (T2), and RSA (T2). The athlete burnout dimensions showed small significant correlations among each other at T1. EPE (T1) showed a small significant positive correlation with RSA (T2) and RSA (T1) showed small significant positive correlations with devaluation (T2) and EPE (T2).

4.3. Path models

Following the results from the preliminary CFAs, adjustments to the planned path analyses were made. As the CFA on the ABQ showed poor fit to data, the latent variable of athlete burnout was not created from the ABQ dimensions. Thus, separate path analyses for each dimension were computed instead. Based on the individual CFAs, the RSA dimension was excluded due to its poor fit to data. The EPE and devaluation dimensions were used as they showed acceptable to excellent fit to data on some indices. Poor fit was only indicated on the RMSEA and TLI, which simulation studies have shown to be negatively biased in small samples ($n < 200$; [Shi et al., 2019](#)). As the current study had a small sample, the EPE and devaluation dimension were deemed appropriate for the confirmatory analyses. Lastly, since the PSS has been revised as a

Table 1
Descriptive statistics of absolute values of FIS1, BPSSQ, PSS and ABQ dimensions by wave.

Variable	Wave 1			Wave 2		
	20%-TM	Mad	Range	20%-TM	Mad	Range
Team identification	24.49	4.45	13–28	23.53	4.45	4–28
Perceived Support	26.58	2.96	14–30	26.56	2.97	14–30
Stress						
PD	11.90	5.93	0–24	11.00	5.93	0–24
PCI	6.33	2.97	0–16	5.88	2.97	0–16
Athlete athlete burnout						
Deval	1.10	0.89	0–3.8	1.29	0.89	0–3.6
EPE ^a	1.21	0.89	0–4	1.30	0.89	0–3.8
RSA ^b	1.67	0.89	0–4	1.64	0.89	0–4

Note. 20%-TM = mean of values after cutting off lower and upper 20%, MADs = median absolute deviations, Ranges = minimum and maximum values, PD = Perceived Distress, PCI = Perceived Coping Inability, Deval = Devaluation, EPE = Emotional and Physical Exhaustion, RSA = Reduced Sense of Accomplishment

^a 89 (Wave 1 and 2) participants responded to this dimension

^b 90 (Wave 1) and 88 (Wave 2) participants responded to this dimension

two-factor model (Chiu et al., 2016) and the two-factor solution was found to fit our data significantly better, we created a latent variable of stress from the PD and PCI dimensions. This was the only latent variable that was created.

The path analysis with team identification, perceived support and stress predicting EPE showed excellent fit ($\chi^2(3) = 4.31; p = .23$; CFI = 0.99; TLI = 0.95; RMSEA = 0.062; SRMR = 0.021, *nos parameters* = 17). The regression results (see Figure 1) showed hypothesis 1 was not supported as team identification was not significantly associated with perceived support ($p = .22$, CI[-0.06;.28]). Hypothesis 2 was supported as perceived support was significantly associated with stress ($p < .05$, CI [-0.71;-0.01]). Hypothesis 3 was supported as stress significantly predicted EPE ($p < .001$, CI[0.04;.14]). Hypothesis 4 was not supported as team identification did not predict EPE directly ($p = .82$, CI[-0.05;.06]) or indirectly ($p = .30$, CI[-0.01;.00]).

The path analysis with team identification, perceived support and stress predicting devaluation showed excellent fit ($\chi^2(3) = 3.1; p = .38$; CFI = 0.99; TLI = 0.99; RMSEA = 0.020; SRMR = 0.022, *nos parameters* = 17). The regression results were examined to evaluate the proposed hypotheses (see Figure 2). Hypothesis 1 was not supported as team identification showed no significant associations with perceived support ($p = .51$, CI[-0.12;.25]). Hypothesis 2 was supported as perceived support showed significant associations with stress ($p < .01$, CI[-0.73;-0.13]). Hypothesis 3 was not supported as stress did not significantly predict devaluation ($p = .07$, CI[0.07;-0.00]). Hypothesis 4 was not supported as team identification did not predict devaluation directly ($p = .28$, CI[-0.08;.02]) or indirectly ($p = .56$, CI[-0.01;.00]).

5. Discussion

The present study examined whether team identification predicted athlete burnout through a serial mediation of perceived support and stress. No significant direct or indirect effects were found for the relationships between team identification and EPE or devaluation dimensions after controlling for EPE and devaluation at Time 1. Associations of team identification with perceived support and stress were also nonsignificant. However, for the first time in sport and from longitudinal data, we found perceived support to significantly predict EPE through a mediation of stress.

5.1. Team identification and athlete burnout

The social identity approach suggests social identification is associated with athlete burnout through its effect on social support and stress. Recent research supports this idea as Avanzi et al. (2018) found social identification to be associated with athlete burnout through a serial mediation of social support and workload. Further, Franssen et al. (2019) reported a direct effect of social identification on athlete burnout in athletes. However, our findings contrast with this prior research as we

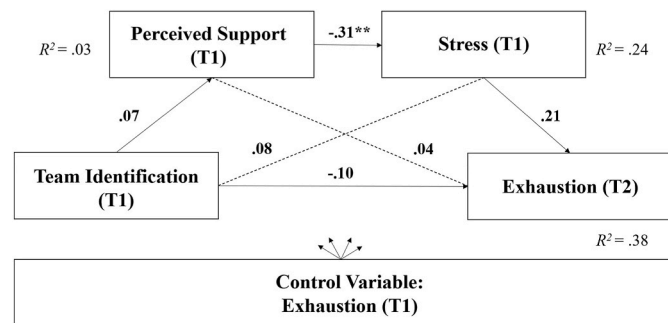


Figure 1. Visualisation of the path analysis for the serial mediation model of team identification (T1) on EPE (T2) through perceived support (T1) and stress (T1) after controlling for EPE (T1) Note. * $p < .05$; ** $p < .01$; *** $p < .001$

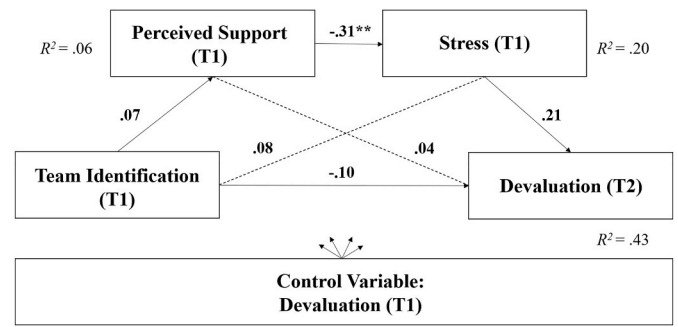


Figure 2. Visualisation of the path analysis for the serial mediation model of team identification (T1) on devaluation (T2) through perceived support (T1) and stress (T1) after controlling for devaluation (T1) Note. * $p < .05$; ** $p < .01$; *** $p < .001$

found no significant direct or indirect effects of team identification on athlete burnout. These discrepancies could be explained by the contrast of designs used by previous work (cross-sectional) and the present study (longitudinal). By using a longitudinal design, the current study was able to temporally separate team identification and athlete burnout as well as control for baseline athlete burnout, which allowed to infer directionality in contrast to cross-sectional designs (Madigan et al., 2020). Alternatively, the time separation of the predictor and mediator variables from the outcome may not have been sufficient to discover a causal effect of team identification on athlete burnout over time (Madigan et al., 2015). Given these issues, rather than dismiss the role of team identification, future research should re-examine this relationship further with a greater time gap between the antecedents of athlete burnout and the athlete burnout measure itself (e.g., 3-months; Madigan et al., 2015).

5.2. Team identification, perceived support and stress

Previous work found team identification to be associated with perceived support and stress. For instance, shared social identities have been found to positively influence judgements of support (Lavalley et al., 2019) and developing social identity has been shown to reduce stress (Steffens et al., 2019). Haslam et al. (2005) also reported social identity to be associated with stress through a mediation of social support. These findings were not replicated in the present study as no significant associations were found between team identification and perceived support or stress. These discrepancies could be due to a difference in the samples as the previous studies were not conducted with athletes. Alternatively, the lack of temporal separation (Wang et al., 2016) between team identification and the mediators (perceived support, stress) could help explain these results. Thus, future research should separate team identification from perceived support and stress temporarily in a serial mediation model to further evaluate these relationships.

5.3. Perceived support, stress, and athlete burnout

Previous research has found social support to be a protective factor against stress and athlete burnout (Brown et al., 2018; Hartley & Coffee, 2019). Studies examining burnout in other contexts (e.g., schools) have also shown that social support predicts decreased stress and, in turn, burnout (Beausaert et al., 2016). The findings from the present study extend this evidence base to the sporting context by illustrating that perceived support reduced EPE via stress, and did so over time. As such, the present study further strengthens the evidence for the importance of social support in the context of mental health and wellbeing, and specifically in the development and possible prevention of burnout in sport.

The stress prevention model (Barrera, 1986) theorises social support reduces stress, and thus lowers burnout via mediation. Although this

model is athlete-specific model, Freeman and Rees (2009) showed perceived support to be associated with perceived situational control in a sample of golfers. Perceived situational control was then positively associated with appraising stressors as a challenge instead of a threat. As threat appraisal has been associated with emotional exhaustion in other studies (Palmwood & McBride, 2019), this supports contentions that perceived support is associated with athlete burnout through the stress appraisal process. The current findings fit with this idea as perceived support predicted EPE through a mediation of stress.

Smith's (1986) cognitive-affective model proposes that chronic stress underpins athlete burnout development. The present findings support this model and do so in the context of previous work that found stress to be a key variable in the development of athlete burnout. For instance, Lin et al.'s (2021) meta-analysis found significant correlations with medium effect sizes between stress and athlete burnout. While 47 of the 48 included studies in Lin et al.'s review (2021) were cross-sectional, the present study's longitudinal design supports a temporal relationship between stress and athlete burnout. Consequently, the present study extends the evidence for a temporal link between stress and athlete burnout.

5.4. The social identity approach to athlete burnout

The present study did not find significant associations between team identification and the outcomes. However, these findings do not necessarily refute propositions from the social identity approach. This approach is a recent development in the social support literature, which is why the exact type of relationship between social identification and social support is still somewhat speculative. Previous research suggested a mediation model by proposing team identification impacts social support, which then influences stress appraisal and thus burnout levels (Rees et al., 2015). While there is support for this model from organisational psychology (Avanzi et al., 2018), our hypotheses that were based on the same model were not supported. As such, there may be other models that are more appropriate in a sporting context.

Drawing on another, more established, theoretical model to social support, the stress-buffering model, team identification may relate to athlete burnout through a moderation of perceived support rather than a mediation. This idea fits with Haslam and colleagues' (2011) model from general psychology on social identity and social support. This model suggests levels of social support are high and optimally interpreted when the provider and recipient share a social identity. If the provider and recipient do not share a social identity, social support levels are low, and the interpretation of this support is sub-optimal. Thus, the model proposes an interaction between team identification and social support. Similarly, Hartley and colleagues' (2020) first key point on the social identity approach in sport suggests a moderation by proposing shared social identities are a prerequisite for social support. Such moderating effects of team identification would further fit with previous suggestions that the interpretation of perceived support determines its effect (Pacewicz et al., 2019) and that this interpretation depends on the social context (Vangelisti, 2009).

Such an alternative moderation model could take different forms. While Hartley et al. (2020) suggest self-categorisation structures experiences of stress and social support, it remains unclear how exactly stress relates to social identification and social support. Team identification may interact with social support to lower stress, which would then link with athlete burnout. In this case, high perceived support may only reduce stress when team identification is high. Alternatively, team identification may interact with both perceived support and stress to lower athlete burnout. In such a case, team identification and perceived support may only reduce burnout under high stress, but not in other cases. As such, team identification may relate to burnout through a two-way interaction with social support or a three-way interaction with social support and stress.

There is some support for a moderating effect of social identification

from research in general psychology. Such studies found social support to primarily be effective at reducing stress when the source of support and the recipient shared a social identity (e.g., Frisch et al., 2014). These findings support the idea that team identification and social support interact to reduce stress and thus perceived support may only act as a stress coping resource when team identification is high. Therefore, further research could adopt moderation analyses to evaluate the applicability of the social identity approach to the relationship between perceived support and stress on athlete burnout.

5.5. Limitations

The present study has several limitations. First, due to the macro-level consequences of the COVID-19 pandemic, the option of "not applicable" was added to the ABQ. This approach had not been previously validated. Although this response was very rarely used by participants, it could have affected the study's measurements. This could in part explain why the preliminary CFA for the full ABQ failed to compute and the CFA for the RSA dimension demonstrated poor fit. Thus, the relationship between team identification, perceived support, stress, and the RSA dimension could not be evaluated. Future research should examine this further and determine what may underpin these psychometric issues. Second, the a priori power analysis and power considerations following Jackson's (2003) recommendations were not based on the final models that were computed. Among our computed models, the CFA of the perceived stress measure fell just under the minimum 1:10 ratio of parameters to observations and most of the other models did not meet the desired 1:20 ratio of parameters to observations. It would therefore be useful for future research to evaluate the proposed relationships in larger samples. Third, we examined team identification in both individual and team athletes. In doing so, we ensured instructions for measures were broad enough to refer to support teams for individual athletes (e.g., coach, physiotherapist etc). This approach has been adopted previously (Graupensperger et al., 2018) but further work should ensure athletes from different sports are interpreting the items in the correct manner. Finally, the present study also did not temporally separate all four variables. As such, relationships between the predictor and mediators that develop over time were not examined. Future research should further evaluate the relationships between the predictor and mediators and may wish to do so using a three-wave design.

6. Conclusion

The present study aimed to test the relationship between team identification, perceived support, stress, and athlete burnout with a two-wave longitudinal design. The findings showed that, while team identification did not predict athlete burnout, perceived support did predict emotional and physical exhaustion via stress. Based on these findings, interventions that facilitate perceived support may be able to protect athletes against the development of athlete burnout.

Further declarations

This submission fully follows the ethical publication standards and has received ethics approval by the University of Stirling's ethics board. We declare that this submission is our own original work, has not been published previously, and that it is not under consideration for publication elsewhere. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Author statement

Data were collected when the first author and second author were at the University of Stirling, UK. The following outlines the individual contributions of the authors to the paper using the relevant CRediT roles.

Hanna Glandorf: Conceptualisation, Methodology, Software,

Formal analysis, Investigation, Data Curation, Visualisation, Writing – original draft, Writing – review & editing.

Pete Coffee: Supervision, Writing – review & editing

Daniel Madigan: Writing – review & editing

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The data that has been used is confidential.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.psychsport.2022.102292>.

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