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An ecological momentary assessment of the stress and coping experiences of dual-career badminton athletes.

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Abstract

A dual-career that combines academic and sporting pursuits can be stressful, as such, it is of importance to explore how dual-career athletes appraise and cope with stress. Existing dual-career literature is limited by retrospective methodologies. In seeking to address these limitations, this study utilized ecological momentary assessment three days a week for four consecutive weeks to explore the stress and coping experiences of six highly trained dual-career student badminton athletes aged between 18 and 26 years ($M^{\text{age}} = 20.75$, $SD = 2.4$). Deductive thematic analysis of EMA diaries highlights that dual-career athletes experience various competitive, organizational, and personal stressors. Situational characteristics underpinning identified stressors were novelty, ambiguity, imminence, duration, and timing, which aligned predominantly with threat and harm appraisals and occasionally with challenge appraisals. The applied implications of study findings are discussed, particularly regarding EMA methodology for future dual-career research and coping interventions for dual-career student-athletes.

Keywords: Stress, coping, dual-career, ecological momentary assessment

Lay Summary: This study explored the stressor, primary appraisal, and coping experiences of six dual-career badminton athletes using ecological momentary assessment. Findings highlight the various stressors that dual-career athletes' experience which predominantly aligned with threat and harm appraisals.

IMPLICATIONS FOR PRACTICE

- Ecological momentary assessment can serve as a helpful methodology for increasing personal reflections supportive of increased coping flexibility.
- Student dual-career athletes should be supported in identifying coping dispositions and developing their ability to explore coping effectiveness.

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Introduction

Whether through personal choice or financial necessity, an increasing number of high-performance athletes are pursuing their sporting ambitions alongside an educational qualification or alternative career pathway (e.g., coaching role, trade, business). Defining a dual-career athlete can be complex as there is considerable heterogeneity with respect to performance level, financial status, and time (Örencik et al., 2023). To provide a more holistic understanding of athletes' lives, five different dual-career athlete typologies have been identified: (1) working dual-career athletes; (2) high-income professional athletes; (3) medium-income professional athletes; (4) family-supported athletes; and (5) student dual-career athletes (Örencik et al., 2023). Örencik et al. (2023) discussed the complexity of dual-career athletes noting that they should not be regarded as a single population due to the diversity of their life stressors. Combining university education and athletic performance has become an increasingly popular dual-career pathway as it can offer several social (e.g., expanded social support systems), psycho-social (e.g., broader identity), and financial (e.g., enhanced future career prospects) benefits (Harrison et al., 2022). While similarities in the

stressors experienced by student dual-career athletes exist (e.g., identity tensions, Van Rens et al., 2019; and fatigue, Cosh & Tully, 2015), it is important to consider contextual differences in constraints and facilitators that can impact performance, well-being, and mental health (Hallman & Weustenfeld, 2024). For example, student athletes demonstrating an education or vocation prioritization; as compared to student dual-career athletes balancing education and their sporting career; and finally, athlete students showing sport prioritization. Subsequently, this may explain why the combination of stressors for student dual-career athletes can become more challenging the higher the level of education combined with elite training (Harrison et al., 2022). In order to assist dual-career student athletes it is important to consider the typology of the student athlete and ensure that career support programs are contextually appropriate (Nyberg et al., 2023).

Within the United Kingdom (UK), university programmes provide high specification sport facilities whilst also offering support from various sport (e.g., nutritionist, strength and conditioning coach) and academic support personnel (e.g., scholarship managers, performance lifestyle support; Harrison et al., 2022). Universities have also sought to integrate strategies to monitor student-athlete mental health and promote awareness and reduce the stigma around mental health whilst ensuring data privacy (Morris et al., 2021). Despite such provisions, UK high-performance athletes undertaking university study alongside training and competition continue to report high levels of stress derived from perceived or actual sport and or academic demands and standards (Thompson et al., 2022). One rationale could be that while some student-athletes may have access to a plethora of coping resources, athletes may experience barriers to accessing these resources (e.g., poor coach-athlete relationships, lack of time, or negative attitudes toward help-seeking; Cosh et al., 2023). Therefore, understanding the stress and coping experiences of student dual-career athletes is of importance in helping to inform student-athlete provision and to continue to

develop support structures targeting the promotion of both performance and mental health (Kegelaers et al., 2023). Additionally, given the temporal nature of dual-career stressors it is also important to consider how these experiences manifest over extended periods of time (Hallmann & Weustenfeld, 2024).

Stress, when viewed from a transactional perspective, is an ongoing and dynamic transaction between environmental demands and an individual's coping resources (Lazarus & Folkman, 1984). Stress transactions involve appraisal of stressors; and the identification, selection, and use of coping strategies to manage these stressors. The process of appraising is a cognitive process whereby stressors are evaluated and relational meanings constructed (Didymus & Jones, 2021). During a primary appraisal the underlying situational properties of a stressor are evaluated. These situational properties, as proposed by Lazarus and Folkman (1984), provide a taxonomy of factors that, alongside various individual factors, determine the potential for a stressful evaluation of a demand. Situational properties include novelty, imminence, event uncertainty, duration, temporal uncertainty, ambiguity, and timing of events in relation to the life cycle (Lazarus & Folkman, 1984; Thatcher & Day, 2008). If following primary appraisal an individual perceives an encounter to be stressful, there are four possible cognitive appraisals (Lazarus, 2000). Harm/loss appraisals occur when damage to the individual has already occurred and threat appraisals occur with the potential of damage occurring, with both appraisals being associated with unpleasant emotions (Dixon et al., 2017) and threat appraisals, in particular, being associated with poorer mental and physical health (McLoughlin et al., 2023). However, stressors are not always appraised negatively. When stressors are appraised as a challenge (i.e., where the stressor provides an opportunity for mastery or growth) or benefit (i.e., where the stressor has provided some form of benefit to the individual), athletes may experience an adaptive approach to a motivated situation (e.g., a personally relevant situation such as a competition) and experience pleasant emotions

(Dixon et al., 2017). The study of coping is fundamental to an understanding of how the appraisal of stress effects may impact athletes, for better and for worse (Skinner et al., 2003). Developing an understanding of dual-career athletes' stress experiences should be considered across various time points (Hallmann & Weustenfeld, 2024) and that of a homogeneous group due to developmental and contextual differences between sports typologies (Debois et al., 2015). One sport that explicitly advocates for and promotes a dual-career, in particular a student dual-career is badminton (Badminton World Federation, 2023). The Badminton World Federation promote an academic dual-career to empower athletes to maximise their education and employment opportunities following deselection or retirement (Badminton World Federation, 2023). Student dual-career badminton athletes have been identified as a specific population that may experience poor sleep quality (Wang et al., 2024), challenges in balancing 'life and sport' (Adam & Cogan, 2019) and fatigue (Santos et al. 2021).

Current literature exploring dual-career students' athletes stress often overlooks the transactional appraisal process (e.g., De Subijana et al., 2015) and failing to account for an individual's perceptions of the context and the personal significance of environmental demands (i.e., the primary appraisal; Lazarus, 1999) presents several limitations (Didymus & Jones, 2021). For example, previous research exploring the stress (e.g., Brown et al., 2015) and coping experiences (e.g., Linner et al., 2021) of dual-career athletes has typically utilized retrospective reports, suggesting that individuals are capable of accurate recall of stress and coping experiences. Whilst retrospective reports have enabled the identification of stressors encountered, including stressors that can have implications for physical and mental well-being and performance (e.g., challenges with time-management and work-life balance; Astridge et al., 2021), retrospective reports are delimited in accurately accounting for the transactional appraisal process. With the passage of time, people do not and, perhaps, cannot provide accurate accounts of the intensity of stressors, appraisals, and coping responses

(Weckesser et al., 2019). For example, knowing a stressor was effectively resolved may bias recollection of the stressor and coping effectiveness (Stone et al., 1998). If we are to work towards a better understanding of dual-career athletes' experiences and develop interventions that are aligned with the timing, intensity, and frequency of stress occurrence, we must utilize research methods that can capture dynamic and moment-to-moment stress transactions.

Ecological momentary assessment (EMA) is one methodological approach that can be helpful in reducing recall bias and improving the validity and reliability of data whilst increasing transparency of the stress process (Yang et al., 2018). Using EMA aims to capture both quantitative (e.g., Chan et al., 2018) and qualitative experiences as they occur and tracked over subsequent days or weeks (Weber et al., 2024). EMA can encompass several types of data-collection method each tailored to different research needs (Chan et al., 2018). These include time-based assessment which prompts participants to provide data at regular intervals, such as every hour. Event-based, which is triggered by a specific event such as eating. Hybrid, which combines both time-based and event based. Finally, passive assessments which is typically quantitative data collected automatically through sensors or devices without active input from participants, such as heart rate. A challenge with active EMA data collection is participants' engagement and adherence to the methodology, subsequently time-based assessment methods offer advantages of consistency and routine integration which can make it easier to maintain engagement and reduce participant burden (Chan et al., 2018). In recent years, advanced mobile phone technology has enabled researchers to capitalize on real-time assessments using an EMA methodology which has been noted to address limitations encountered by traditional assessment methods of dynamic variables, such as stress and facilitate higher-quality data collection (Gromatsky et al., 2022). EMA can attain participants' lived experiences and contextual understandings when using flexible and open-ended methods, such as interpretive and exploratory approaches (Chan et

al., 2018). Therefore, the present study utilizes EMA to explore the stressors, primary appraisals, and coping experiences of UK dual-career badminton athletes. In doing so, this study aims to address two research questions; a) what are the stressors, situational properties of stressors, and associated appraisals as perceived by dual-career badminton athletes? b) what coping strategies do dual-career use to manage stressors and maintain or enhance their performance and well-being?

Methodology

Philosophical assumption and study design

This study is informed by critical realism which contends that a reality exists that is differentiated, structured, and changing (Danermark et al., 2019). Critical realism also posits that there are deep structures in the world that can be represented by scientific theories (Fletcher, 2017), and that deductive logic can and should be used in analyses of all scientific argument, regardless of what methodology is applied (Danermark et al., 2019). Recognizing that reality is shaped by multiple values (e.g., social and political) and by an individuals' subjective experiences (Lincoln et al., 2011), EMA was used to explore the stress experiences of dual-career badminton athletes.

Participants

Following institutional ethical approval from the first named author's host institution purposeful sampling was used to recruit dual-career badminton athletes currently participating in 'gold standard' competitions alongside academic study, who met the classification of "highly trained" athletes (see McKay et al., 2021, p. 319). Within the England badminton system, players obtain ranking points through competitive performance and are then graded to help them select the appropriate level of competition (i.e., Gold, Silver, Bronze, Copper). Gold standard competitions are entered by those athletes who have placed

highly in several national level tournaments (Badminton England, 2023). Six dual-career badminton athletes (three women; Alyssha, Hayley, and Samantha; and three men; Angelo, Jamie, Frank;) aged between 18 and 26 years ($M^{\text{age}} = 20.75$, $SD = 2.4$) provided informed consent and took part voluntarily in the study. Four were undergraduate students (Alyssha, Hayley, Frank, and Angelo), one Master of Science student (Samantha), and one a Doctor of Philosophy Student (PhD) (Jamie). Within the UK, the quality assurance guides the notional learning hours associated with qualifications which are based on a broad agreement across institutions that students can expect to spend 10 hours learning on average to gain one academic credit unit. With undergraduate and postgraduate students accruing 120 credits of per academic year. It is also important to consider that the timing of prioritizing sport (and higher visibility of athletic identity) or studies (and higher visibility of student identity) during a dual-career can be distinguished by observed variables (i.e., gender, type of sport and year of attendance; Cartigny et al., 2021). Subsequently, the accounts of individuals studying across various degree pathways were sought to capture a broad range of dual-career experiences (Cartigny et al., 2021). Pseudonyms are used throughout this manuscript to protect the athletes' identities. At the time of data collection, all athletes were competing in their respective sports in the UK. It is important to consider that the EMA methodology will provide large volumes of mixed-method participant data over several time-points, subsequently six participants will provide substantial data for a rich understanding of the stress process but also allow the researchers to provide depth to the unique experience of that participant, within their context (Vasileiou et al., 2018).

Procedure

Intake

Following ethical consent, the intake process was to briefly discuss with participants the methodology of the study and determine the best days for EMA entries across the period of

four weeks. There was consensus among participants that Monday, Wednesday, and Sunday were most suitable for EMA data gathering. This was due to Monday being a training day, Wednesday including a competitive university fixture, and Sunday as either a rest, travel, or tournament fixture day. Data collection took place during February (British University Championships) and March (The YONEX All England Open badminton championships). This was to capture intense periods of academic study, training, competition, and recovery. The lead author prompted each athlete participant to record EMA data in the morning (7am-10am), lunch (12pm-3pm) and evening (6pm-11pm) using a short message service (SMS).

Ecological momentary assessment

Ecological Momentary Assessment (EMA) is a methodological approach that involves repeatedly collecting data in an individual's normal environment. This study utilized a mixed methods, time-based assessment method which is advocated as supporting the accurate recall of stress and coping experiences and adherence to the protocol (Hulin et al., 2023). In completing EMA data entries, participants were presented with two fixed questions: (1) what stressors have you experienced and why? and (2) what stressors are you anticipating since your last diary entry? Identified stressors (which were clarified as experienced or anticipated) were then rated on a 7-point scale (1 = not at all to 7 = extremely) reflecting the perceived intensity of the stressor. For each stressor the participant identified, there were a further two follow-up questions: (1) can you describe what you did to try and cope with the stressor or are doing to cope with the anticipated stressor? and (2) how effective is this coping strategy in managing the stressor?

Participants were asked to audio record their EMA entries in response to the questions and share the audio recordings with the first named author via an end-to-end encrypted application (e.g., WhatsApp). The first named author then transferred the audio recordings to a protected and secure Microsoft OneDrive® folder thereafter deleting recordings from their

mobile device. A total of 36 diary entries were prompted to be collected from each participant across the three daily timepoints (*Mcompleted audio diaries* = 35.6; *Mcompleted stress intensity rating* = 30.3). Following the completion of EMA data collection, two weeks following data collection participants were contacted via SMS and asked to reflect on and respond to the following question “Did taking part in this study influence your stress and coping in any way?”

Data Analysis

Qualitative

EMA audio entries were transcribed verbatim and transferred to, sorted, and organized using NVivo® (NVivo; QSR International Pty Ltd. Version 12, 2019). Data were collected and analyzed by the first named author who is experienced with qualitative research. A qualitative descriptive approach was selected due to its suitability for studies such as this, which are descriptive in nature (Kim et al., 2016), and a deductive approach was adopted due to the pragmatic nature of the study; its purpose to describe dual-career badminton athletes lived experiences over time (Creswell & Poth, 2016). Deductive descriptive approaches are intended to aid an understanding of meaning in complex data through the development of summary themes or categories from the raw data with pre-identified themes that have been generated using previous stress and coping literature (e.g., Linner et al., 2021).

Methodological quality and rigor

In order for high-quality research to be conducted self-reflexive methods were used as part of the study design, to enhance the rigor of the research. Specifically, throughout the research the first author maintained an audit trail that comprised of notes and self-reflective commentary to enhance the trustworthiness of findings by accounting for own experiences during data interpretation and knowledge construction (e.g., position as an academic at a university and an athlete herself; Smith & McGannon, 2018). The third named author acted as

a “critical friend” by supporting the first named author to engage in critical dialogue whilst maintaining a reflective diary and enabling them to reflect upon and explore alternative explanations and interpretations in relation to the data (Ronkainen & Wiltshire, 2021; Smith & McGannon, 2018). To demonstrate that findings are grounded in the evidence, the use of student-athlete quotes and excerpts that captured the meaning of the themes were selected and reported (Levitt et al., 2018).

Results

The mixed methods reporting standards were used to structure and guide the presentation and inclusion of information within the results of this study (Levitt et al., 2018).

Quantitative

Descriptive statistics provide average ratings and standard deviation of perceived stress (calculated from across the four-week period) as reported for each of three days on a morning, lunch, and evening (Tables 1-6 and Figures A-F). It is important to note that whilst there was an opportunity to provide 36 audio entries across the data collection period (i.e., three entries per day, three days a week, for four weeks), not all entries were returned, and of those that were, not all contained a rating of perceived stress intensity (*Mintensity*). As such, the number of audio entries and ratings of perceived stress intensity are reported for each dual-career participant, for each day of EMA within the athlete's respective table.

Qualitative

EMA data are presented athlete-by-athlete offering insight into participants' unique experiences of stressors, primary appraisals, and coping. To help draw meaning from large quantities of data, and allows the subjective experiences of each participant, data is combined into days and time of collection and within a participant table (see Table 1-6). Where stressors are duplicated (e.g., Monday mornings) data is combined enabling an examination of common stressors experienced and coping strategies used at this time. The qualitative data

provides rich detailed quotes, situational properties and subsequent and primary appraisals of each dual-career athlete. Finally, dual-career athletes' reflection of the EMA process is presented.

Alyssa

Morning stress for weeks one and two was attributed to mental and physical fatigue which could evoke threat appraisals with respect to training performance illustrated as *"I think I might get stressed today... I'm quite tired and I've got quite a long day at uni... I have training [for BUCS] so that might be a little bit stressful to my performance"*. To cope with fatigue, Alyssa described *"take[ing] each lecture at a time"*. During week one, university stressors were also identified, specifically, *"I still haven't received those emails regarding job placements"*. These were appraised as threatening due to the lack of clarity. To cope with this, Alyssa utilized perspective taking noting *"I just need to remember that I have the whole week to receive those emails... the fact that they're not here at 9:00am on a Monday is not the end of the world"*. Reflecting on the morning and lunch entries, Alyssa perceived her coping to be effective in managing her emotions and cited no additional stressors within Monday evening entries. Rather, Monday evening entries described anticipated stressors resulting from a need to manage academic work, training, and competition preparation (reported in weeks one, two, and three). To cope with these anticipated stressors, across all three weeks Alyssa described the importance of getting good sleep as reflected in the following week two EMA entry *"I have a really long day on campus, so that's 9:00am till 8:00pm. So, it is important to try and get a good sleep and then, yeah, just get stuck in tomorrow, do my lectures and train well"*.

Wednesday

Competitive badminton stressors (BUCS quarter final; week one; cup semi-final; week three) were identified across the two Wednesday mornings which were competition days, with

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stressor intensity increasing as the competition drew closer. The stress of transport to the competitive fixture on week three was appraised as threatening due to weather impacting upon delays to transportation. Illness (week two) was also appraised as a harmful stressor noting the impact upon academic performance “*stress is that I have now have to get better, and I’m going to fall behind on some work as well, and I was already behind after missing the whole weekend [due to a tournament].*” To cope with these stressors, adequate nutrition and sleep (week one, two), organizing alternate travel (week three), and planning for university deadlines (week two, four) was discussed. During week four, social time with friends was also described as helpful to “*get my mind off the looming sort of deadlines for my coursework.*”

Sunday

All Sunday timepoint entries referred to university work stressors and the challenge of performing to high standards across academic and competitive commitments. For example, Alysha discussed how “*I’ve just worried about my coursework...it’s not a new stress since earlier really...I have just under a week to finish my coursework and I’ve got two coursework’s that are due on the same week... pressure with getting it all done as well as managing normal lectures and training.*” Sunday evening entries also described apprehension regarding competition preparation (week two, three) and coursework (week four) on Monday. Alysha felt preparation was important for all Monday’s and tried to ensure adequate sleep and nutrition (all weeks). A reduced training schedule and no badminton competitions during weeks one and four facilitated greater confidence in academic achievement as this presented more time for study.

In reflecting on her experiences in taking part in this study Alysha discussed how the

EMA allowed her “*to think why I might have felt stress*” and improve her coping repertoire “*[EMA] got me to develop better coping methods such as thorough planning and getting good sleep before games so was helpful*”.

Place Table 1 and Figure 1A HERE

Samantha

Transport was an anticipated stressor discussed across all Monday morning and lunch entries due to the threat of arriving late to either lectures, training, coaching commitments, or a competitive event. To cope with the anticipated stress of traveling, leaving on time, or communicating the possibility of being late to relevant individuals was important. The week two Monday morning entry described ‘*physical and mental*’ fatigue from the weekend tournament appraised as threatening due to the subsequent impact on the quality of engagement in academic studies. Lecture cancellations in week three reduced travel stress and fatigue with an opportunity to nap after lectures and before coaching and training appraised as a helpful. Anticipated stressors for the following day included the potential stress of travel between venues (weeks one, three, and four) and organizational commitments with the badminton university committee (week three).

Wednesday

Wednesday mornings (weeks one and three) comprised of competitive and organizational stress appraised to be low in intensity due to adequate preparation (e.g., confidence, transport). However, during both competitive events, performance pressures imposed by self and teammates increased the threat appraisal and the intensity of stress reported. This was illustrated as follows: “*there was pressure, we knew we were a set down, me and my doubles partner had to win both of our doubles games in order for the team to stand a chance of*

winning.” To manage this stressful period, Samantha discussed the importance of social support in maintaining task cohesion with her doubles partner during competition.

Anticipated stressors reported on Wednesday evenings pertained to weekend tournaments, including travel and performance demands across all weeks. To cope, Samantha discussed planning (e.g., organizing kit the night before competition) as an important strategy for managing the anticipated stressors cited.

Sunday

Sunday mornings and lunchtimes comprised of a second day of competition which evoked stress (weeks one, two, and four). Preparation in relation to packing her kit the night before was discussed as an important coping resource alongside the importance of “*focusing on her own game*”, “*being consistent with tactics*”, “*communicating to her partner effectively*” and “*enjoying the experience.*” Sunday evening stress resulted from leaving items at a hotel (week one) and anticipated travel demands that threatened Samantha’s planning (all weeks), all organizational stressors appraised as harmful. To cope with such stressors, preparation and planning (e.g., leaving earlier to pick up the missing items) and social support from her mother regarding nutrition were deemed important.

In reflecting on their experiences in taking part in this study Samantha discussed how “*breaking up what I think during the morning, lunch and evening days helped.*” Samantha also noted how assigning a quantitative value to the stressor “*could help her compare and put stressful situations into perspective.*”. However, Samantha believed that being a “*crack on and get it done person*” did limit her ability to articulate a variety of coping strategies.

Place Table 2 and Figure 1B HERE

Frank

Monday

Monday morning stress (all weeks) was derived from anticipating a busy training and lecture day. Frank reported poor quality sleep (weeks two and three) this increased the intensity of morning stress; *“this morning has been quite a stressful one... waking up at six after not much sleep, and heading to training seven till nine”*. Across lunch and evening recordings for week three and four, Frank appraised the stress he was experiencing to be threatening because of *“being anxious this evening ...due to a minor injury in my knee... and I want it to be in good enough form to train two sessions tomorrow.”* To cope, Frank discussed the importance of remaining focused in lectures and being dedicated to his academic targets (all weeks). Finally, in Monday evening recordings for weeks one and two, Frank noted how breaking his racquet evoked stress because of the time required to restring the racket for the following days training session. Coping with this racquet repair stressor was not discussed, but the importance of sleep and nutrition alongside stretching and icing across all evenings was shared when coping with fatigue and injury. To cope with managing the emotions associated with badminton and academic stress seeking support from a sports psychologist was discussed in lunch and evening entries across weeks three and four.

Wednesday

Pressure to perform well was discussed on all mornings of scheduled matches. However, an increase in stress intensity and associated threat appraisals in respect of performance quality were recorded in weeks one and two where Frank felt fatigued from poor sleep. A reduction in stress intensity occurred during lunch recordings of weeks two and three where Frank appraised physical rest as beneficial for recovery; *“I’m just taking [training] off to do things at my own pace to get my lecture out of the way because I was slightly burnt out yesterday”*. By contrast, Frank felt that missing lectures was beneficial for emotion regulation and recovery in the short-term, could evoke future stress by *“I just needed the sleep today which I do feel better for, but now I am missing lectures that I have to catch up on”*. Across all

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Wednesday evenings, Frank appraised personal training expectations, competition demands, and university work as threatening due to increased fatigue. To cope, across weeks one, two, and three, Frank utilized lifestyle management techniques (e.g., getting physical rest, not training, and eating good food). During week four Frank identified a need to make some academic notes and then prioritize social activities with the latter offering a source of distraction “*this evening I’m just going to write down some notes and things but be social with friends, just to take my mind off it...probably not all that productive to be overthinking*”.

Sunday

Frank cited Sunday morning and lunch stressors related to the competitive demands of watching teammates in a final he did not qualify for (week one) and watching the final match of the season (week four). Frank appraised such stressors as a challenge due to the opportunity for learning:

Today is the final...I think it will be quite tough because I will be watching a lot of people play and not playing myself...wishing that I was taking part... to cope with it I’ve just got to learn and remind myself that there will be a time where I might be able to have the same thing as them.

During weeks three and four approaching exam deadlines were appraised as threatening. To cope, Frank discussed the importance of not procrastinating and completing work; “*I know that I need to get back and not to procrastinate, and to get on with – just get on with it and get it out the way as soon as possible*”. Across all Sunday evenings, Frank discussed anticipated stress regarding fatigue, injury, and training, particularly with competition in mind. To cope, he opted to miss training sessions in order to rest and attain a balance of performance and well-being across academic and sporting contexts.

In reflecting on their experiences in taking part in this study Frank stated, *“it made me conscious on what could help me have a more or less productive day through lots of trial and error...[EMA] helped me in balancing studying, training and managing my time.”*

Place Table 3 and Figure 1C here

Angelo

Monday

Angelo discussed poor sleep quality as a threat to his motivation to attend gym sessions across all weeks. To cope, Angelo reflected on the importance of *‘just turning up’* irrespective of motivation. Lunchtime stressors varied across weeks and included observing others competing in a tournament (week two) perceived *“as stressful because I wanted them to win...but it’s not a negative stress, like ‘I’m so stressed because I care”*. The organizational stressor of team members withdrawing from tournament competitions (week three) and injury (week four) were appraised as threatening as Angelo perceived this could threaten the team’s badminton league performance. To cope, social support was used across all weeks as discussed by Angelo *“I think my coping strategies were pretty useful...I surrounded myself with my friends...my body was pretty painful from the tournament surrounding myself with friends kind of kept my mind off it.”*

Monday evening entries reported the anticipated stressors of deselection and underperformance (week two) and issues with train travel to a competition, each perceived as threatening. Angelo shared how the imminence of the team selection coupled with forthcoming exam results increased the intensity of stress across the day. Angelo engaged in avoidance coping by suggesting that waiting and tackling tomorrow would be most beneficial.

Wednesday

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Morning stressors varied across weeks and related to anticipated exam results (week one), competition (week two), and injury (week four). To cope, good nutrition, hydration, warming up, and social support were utilized, as illustrated within this extract *“to cope it’ll be about the best preparation for myself for the game...so that will involve doing a good warm-up and ensuring everyone’s there on time, having a bit of a team chat before we play.”* Lunch stressors included competition (week two) and late arrival of teammates (week two) appraised as threatening due to the potential detriment to being late for travel plans. During week two’s evening recording, Angelo described the disappointment of losing *“don’t know what I’ll do to cope with this. I am deflated after that loss.”* In week three, injury was described as an *“inconvenience”* because of the impact on performance and the threat it posed to the following day’s competition. Angelo explained *“I am hoping my tennis elbow does not flare up tomorrow but there is nothing more I can do apart from stretches in the morning.”*

Sunday

During morning and lunch entries discomfort following a social event in week one and Angelo’s *“body in agony”* following a competition in week four were appraised as harmful stressors. Watching teammates perform in a competition final was an anticipated stressor noted on Sunday morning in week one. This was appraised as stressful should he observe others perform to a standard that exceeded his own. To cope, Angelo noted that irrespective of performance outcome, observation could serve as an opportunity to increase his motivation within training; *“to reflect on the club and how good the group of people we have is”*.

Perceived evening stress was only reported during weeks two and three aligned to the anticipation of a busy Monday consisting of multiple lectures and training sessions. To cope, Angelo discussed the importance of sleep and maintaining a motivated attitude on the court.

In reflecting on his experiences in taking part in this study Angelo felt *“I don’t think it was related to the diary entries but I have become more aware of enjoying badminton.”* He attributed this increased enjoyment to his studies where he was completing a sport and exercise science degree.

Place Table 4 and Figure 1D HERE

Hayley

Monday

Monday morning entries for weeks one and three captured how a busy an academic and training day coupled with inadequate sleep quality was appraised as threatening; *“I didn’t get a lot of sleep last night and that could become quite stressful, especially later on if I’m tired and I’ve got lots to do”*. To cope, Hayley cited the importance sleep in the evening. During lunch recordings across weeks two and three, to prepare for assignments and lectures Hayley sought advice from her lecturer, which was perceived as important in managing academic stress to help with the threat appraisal related to underperforming and not meeting university work deadlines. In addition, *“taking a break and exercising were good coping strategies... [when walking to university] I listened to some podcasts and music...that just kind helped me clear my head.”* During all evening recordings, a busy day was perceived as stressful due to the feelings of fatigue experienced, and Hayley appraised this as potentially threatening to her concentration for academic tasks she needed to complete in the evening. Across weeks one to four, the use of a greater range of problem-solving coping strategies were reported; specifically in weeks one and two the use of nutrition was reported, whilst in weeks three and four; nutrition, sleep, regular breaks, social support, and engagement in academic work were noted:

Tomorrow, again I’ve got a busy day, badminton in the evening and trying to catch up on lectures, to cope I’m going to try and do it [academic work] as quick as I can ...it

will be important to eat a good meal and go to sleep [after training] to get ready for our important cup final (week three)

Wednesday

All Wednesday morning stressors described the stress of forecasting unpleasant emotions if Hayley was to underperform which was appraised as threatening. Additionally, university work was appraised as threatening due to time constraints. To cope, Hayley described the importance of preparing her kit and planning university work the night prior, using social support (weeks one and two), and taking breaks (e.g., week one; tv and cooking; weeks two, three, and four; exercise and walking). Lunch time entries for weeks two and four reported a badminton fixture cancellation as a stressor appraised as both beneficial due to the additional time this gave Hayley to work on her university work, but also threatening due to the uncertainty of court availability to train. Lunch recordings on days where competitions took place (weeks one and three) evoked stress resulting from Hayley's own expectations, the crowd, and league position. She also noted that university work was also a stressor that could detract from her performance focus (week one). These competitive stressors were appraised as threatening due to the anticipated anxiety aligned with underperformance. Hayley cited the importance of hydration, deep breathing, and social support as helpful coping strategies:

There'll be moments today which are quite stressful...I will just try and forget about [academic work] and focus on badminton...but you do get a lot of time [at a match] to think about work you have not done, so to cope I think take deep breaths whilst playing today, and my partner will just talk as well...have some water... I think that's going to help me.

During evening recordings, Hayley appraised the difficulty of academic assessments (weeks one, two, and three) or missing lectures (week four) as threatening to her academic

performance goals. Social support from her lecturer (week two) and peers (weeks one, two, and three) was discussed by Hayley as a helpful way to cope.

Sunday

University deadlines were stressors noted and appraised as threatening across all Sunday mornings. Coping strategies varied from increasing sleep (week one), watching television and tidying her room (week two), and goal setting (week four). Across lunch and evening entries for weeks two, three, and four Hayley shared how planning and completing university work had reduced perceived stress *“I think just keeping planned and organized and catching up on lectures I’ve missed. That always makes me less stressed, the more organized I am.”*

Hayley only reported anticipated stress once during week four. In reflecting on this she illustrates a co-occurring appraisal of threat and benefit:

Our lecturer is going on strike tomorrow; he is not going to re-do the lecture so we’ve got to teach ourselves some of the course, which will be stressful...but it means we can have lunch [at home] and not spend money, because that can stress me out when I’m having to buy lunch [at university]

Hayley reflected how EMA completed as part of this study allowed her *“to think why I might have felt stress”* and improve her coping repertoire; *“[EMA] got me to develop better coping methods such as thorough planning and getting good sleep before games so was helpful”*.

Place Table 5 and Figure 1E HERE

Jamie

Monday

Across morning and lunch recordings for weeks one and three Jamie reported anticipated stressors associated with the upcoming weekend competition. The competition was appraised as threatening by Jamie because he did not know anything about his opposition. To cope,

across both morning and lunch time recordings he reflected on his plan to *“keep using exercise and the gym, just to keep me relaxed over the next couple of days”*. In week two Jamie reflected on the potential benefit of engaging in breathing techniques, *“but I’ve not really been exposed to much, like sort of stress release techniques”*. Subsequently, during evening recordings Jamie described increasing training intensity and effort in future training as a means of coping in week two. Finally, during the week three evening recording Jamie also discussed both badminton and university work stressors, whereby planning was recognised to be a helpful coping strategy to manage both stressors.

Wednesday

Across morning recordings of weeks two, three, and four; badminton, university, and work commitments were identified as a stressor due to the challenges of fitting everything in, with adequate sleep discussed as a helpful coping resource. In weeks one and two Jamie reported competitions for the forthcoming weekend to be a stressor that was appraised as challenging. This stressor was anticipated to increase perceived stress throughout the day due to building *‘excitement’* in receiving competition seedings. To cope with competition related stressors, talking to his teammates about non-badminton topics was helpful across all weeks. During weeks one, two, and three, weight training exercises in the morning and lunchtime were perceived by Jamie as helpful in managing his emotions. In week two Jamie’s strength and conditioning coach recommended yoga as a means to *“relax and work on some different areas, rather than intense performance.”* Jamie then cited yoga as a coping strategy during week three and perceived it as helpful for emotional regulation; *“I’ll use the exercise [yoga and stretching] to relax and take the stress away, which I think will be a nice break from the heavy lifting.”* During all lunch recordings, work commitments were identified as stressful, particularly following a PhD supervision meeting in week two. To cope with ongoing PhD demands, Jamie used an online planning software programme (Trello) to prioritize tasks and

create goal setting plans for different project milestones. Across all lunch time recordings, the coping strategies described that were used to reduce unpleasant emotions associated with badminton performance demands included seeking social support (all weeks) and driving to the competition (week two). During weeks two and three planning was discussed during lunch recordings in order to reduce academic stress in the evening. Wednesday evening recordings during weeks one and four reported increased anticipated stress associated with the upcoming weekends competition: *“Tomorrow I think the pressure will ramp up because it’s our last full day of training, our last chance to sort of fine-tune what we’ve got, going into the weekend.”*

Sunday

Across weeks two, three, and four, coaching, academic, and work commitments were appraised to be threatening due to imminent deadlines. To cope, seeking social support from badminton team players was perceived as helpful. During weeks one and four self-imposed expectations to win a tournament, the crowd, and the presence of scholarship managers increased his perceived pressure to perform. Jamie anticipated that a good warm-up, speaking to teammates and his coach, and music would help him cope. However, during his lunch recordings, Jamie reported negative and unpleasant physiological responses *“I don’t think any strategy used this morning helped at all. I felt quite calm after the log this morning and then literally five minutes before [competition], nervous, I had no composure.”* (Week One).

Academic and paid work stress was identified in all Sunday evening recordings. During the evening of week four engaging in re-appraisal enabled Jamie to view a performance loss as beneficial as it allowed a shift of focus from Badminton to university commitments. The potential use of exercise during week two and the importance of nutritional strategies during weeks two, three, and four were reflected upon in evening entries as important coping resources for anticipated training stress on Monday mornings.

In reflecting on their experiences in taking part in this study Jamie had discussed:

It had helped me a lot...some of the techniques I tried and used I drew back on when things got stressful in prep weeks/camps...the study made me think and be more aware...sometimes when I feel stress building, I do think back to some of the things I did in the study.

Place Table 6 and Figure 1F here

Discussion

Although research has sought to explore the stressful experiences of dual-career athletes (Cosh & Tully, 2015), this study has aimed to address the limitations of retrospective stressor, primary appraisal, and coping research. Utilizing EMA may reduce bias and increase the accuracy of recall and interpreting primary appraisal, intensity of stressors, means of coping, and coping effectiveness.

This study captured a range of organizational, competitive, and personal stressors with common stressors relating to academic and badminton-specific performance demands. This included stressors associated with transport to and from university, paid work, badminton training, and competition. Quantitative findings complement those of Sallen et al. (2018) who also found that dual-career athletes show high indicators of stress intensity. In relation to the primary appraisal of stressors, this study indicates that dual-career badminton athletes experienced threat appraisals across each time point for which data was collected. This tendency to appraise stressors as threatening or harmful, as opposed to challenging or beneficial, may be reflective of preconceived ideas regarding stress. That is, the possible adaptive benefits of stress (e.g., increased focus and motivation) were rarely considered; with participants equating stress with distress and being detrimental (Crum et al., 2017).

Psychoeducation could be undertaken with dual-career athletes to help develop a ‘stress is enhancing’ mindset, thereby recognizing the adaptive outcomes of stress and appraising the stress response in positive and functional ways (Crum et al., 2017).

The EMA method used allowed an exploration of stress intensity and stress themes on different days and across different time points. The findings indicate that stress intensity was typically highest during lunchtime recordings. All athletes identified anticipated stressors on Monday mornings that were associated with fatigue or a lack of sleep resulting from the weekend tournaments. Fatigue has been cited as a stressor across dual-career research (Harrison et al., 2022). However, fatigue within this study was not just about physical demands, but also the mental demands associated with their university studies. To cope, an organizational resource that has been documented within student-athlete literature that could have been better utilized by dual-career athletes in the present study is help-seeking. Throughout this study, only two athletes discussed help-seeking with academic staff and one with a sport psychologist. It is important to consider that an effective dual-career is not only about meeting any training and academic demands outlined within a weekly timetable, but also in negotiating extensions and allowances (in sport or study) as necessary around important competitions, or assignment submission dates. Help-seeking could provide valuable coping resources that could have reduced perceived demands, for example seeking academic flexibility. Academic flexibility includes special considerations for assessments and exam deadlines and modified timetables.

Participants reported more performance-related stress on Wednesdays, which is expected given that this is the day typically associated with university competition. For some individuals, the intensity of performance-related stress could increase days before the competition and be appraised as a threat. However, threat appraisals are not necessarily detrimental to performance where the athlete perceives they have sufficient resources (e.g.,

fitness, tactics, information about an opponent, self-efficacy) to meet the perceived demands (Meijen et al., 2020). In situations where the athlete may perceive high motivational relevance and low goal-congruence (e.g., opponents are highly ranked) they may perceive unpleasant emotions (e.g., anxiety) as facilitative (Meijen et al., 2020). However, prolonged experience of unpleasant emotions, particularly associated with a threat appraisal, can be indicative of poor well-being (e.g., physical tension; McLoughlin et al., 2023).

On Sundays, participants typically reported university stressors in isolation or a combination of university and performance stressors. Despite known deadlines for completing assignments around badminton commitments, many dual-career athlete's discussed procrastination (e.g., tidying room) which was perceived as producing unpleasant or challenging outcomes (Klingsieck, 2013). Data indicates that assessment properties could increase the use of procrastination, such as novelty of the assignment format (e.g., group work) or high academic demands (Thatcher & Day, 2008). For some dual-career athletes, the imminence of an upcoming deadline, or threat appraisals could serve as a 'trigger' to initiate engagement with scholarly activities, which was deemed beneficial to goal attainment.

This study lends support to previous research which highlights the importance of being able to utilize multiple coping strategies flexibly depending on stressor properties, primary appraisals, and coping resources (Didymus & Jones, 2021). To illustrate, planning was a particularly helpful problem-solving coping strategy when used to manage stressors associated with assessment deadlines, understanding tasks, and being prepared for early morning travel to competitions or lectures. However, an individual's capability to use problem-solving during stressful encounters is informed by the coping resources available to them or, more precisely, their appraisal of these (Didymus & Jones, 2021). This highlights the importance of self-confidence with planning resources (e.g., knowing and being familiar with

a useful software tool to assist with planning), which could increase a dual-career athlete's ability to utilize this method of coping. Furthermore, whilst problem-solving may aim to directly manage the stressor, when used in isolation it may not be an effective way of managing stress (Simpson et al., 2021). For instance, Frank independently used 'injury management' techniques (e.g., icing and, stretching) rather than seeking physiotherapy support, and thus the management of this stressor was less effective.

To cope with the situational demands of competition, social time with friends and task cohesion with other badminton athletes were discussed. Social support networks are a vital resource to mitigate the negative effects of stressors on mental health (Norris et al., 2022). For example, social support can act as a stress-buffering mechanism (e.g., via emotional disclosure or tangible support; Cohen & McKay, 2020) that can reduce burnout and enhance subjective well-being among athletes (DeFreese & Smith, 2014). However, successfully maintaining and making the most of their relationships with these groups requires athletes to approach them for advice actively and possess high emotional intelligence (Brown et al., 2015). In the present study, when seeking social support, participants did not describe seeking social support from scholarship staff, either in the form of emotional, informational, or tangible support. Previous research has shown that communication between student-athletes, schools, and coaches is vital to succeed with a dual-career (Morris et al., 2021). One plausible reason for this could be social stigma and a lack of trusted close relationships which are core reasons for reducing the likelihood of dual-career athletes seeking help (Gulliver et al., 2012). Therefore, it could be helpful to educate dual-career athletes on the types of social support resources available, and how to effectively utilize these resources, including scholarship staff. Finally, this study identified an increased range of coping strategies used across weeks three and four. Arguably, some athletes may have developed coping flexibility as a result of the EMA, a research process which encourages reflection. Reflection is a type of self-reliance

coping that can also improve the individual's coping repertoire, variation, and goodness of fit (Kent et al., 2022). Additionally, the process of EMA can encourage reflection before action is taken as well as reflection in action (during the event), on action (after the event) and beyond action (considering the impact the experiences have had on them; Edwards, 2017). This may explain why across weeks three and four athletes disclosed actual or intended use of a wider range of coping strategies, for example, psychological skills (e.g., breathing techniques) and the type of exercise utilized as an escape coping strategy (e.g., yoga instead of additional weight training sessions to reduce injury risk). However, confidence in the application of these strategies (e.g., breathing techniques) could delimit their use.

Implications for Practice

This study supported the importance of dual-career athletes' abilities to flexibly apply their coping strategies depending on primary appraisals, and coping resources (e.g., confidence in coping effectiveness; Skinner et al., 2003). Participants high engagement with EMA and the perceived benefits they identified, could suggest reflective practice to be an efficacious psychological intervention for developing coping flexibility. However, relying on athletes' own thoughts and perceptions alone does not always provide accurate reflective accounts (Partington & Cushion, 2013). Specifically, the repetitive nature of questions that are asked during assessments may not encourage true reflective engagement (Gromatsky et al., 2022). In addition, it is also important to consider the participants psychological comfort in disclosing uncomfortable experiences of unhelpful coping. Subsequently, while it is important individuals take an active role in reflection, learning about coping is facilitated by the provision of a collaborative and supportive context (Partington & Cushion, 2013). Within a review of EMA methodology, Gromatsky et al. (2022) identified how participants have expressed interest in the ability to review responses to their EMA, either to personally monitor changes and observe behavior patterns or share information with others. Participants

within Gromatsky et al. (2022) study believed this could potentially improve their EMA adherence and engagement as well as identification, management, and disclosure of their thoughts, feelings, and behaviors. Furthermore, practitioners could seek to provide dual-career athletes with a review of their EMA diary entries and assist dual-career athletes with check and challenge questioning that can develop coping flexibility (Lopez-Flores et al., 2021).

This study also highlights the importance of understanding coping styles or dispositions that characterize individuals' habitual interactions with their environment (Moos & Holahan, 2003). Support staff, such as a strength and conditioning coach or a scholarship manager, could help raise awareness of the dual-career current coping dispositions. The findings of this study also indicate a lack of help-seeking among participating dual-career athletes. Therefore, we advocate proactive coping workshops that aim to increase help-seeking behaviors for engagement in provisions made available via sport governing bodies and higher education institutions (Gulliver et al., 2012). This study also highlights the potential value of increasing a dual-career athletes understanding of the stress mindset. Stress mindset interventions can help empower individuals to adopt a stress-is-enhancing mindset, even actively and deliberately when they face conflicting messages about the benefits and harm of stress (Goyer et al., 2022).

Strengths, limitations, and future directions

EMA when used in health research has typically attained quantitative data (Stone et al., 1998; Weber et al., 2024). However, with stress it is important to consider an individual's interpretation of the stressor (i.e., appraisal) which influences whether the associated emotions are perceived to be helpful or unhelpful. Acknowledging the challenges of studying the coping process, in part due to individuals often being unaware of their appraisals (Didymus & Jones, 2021), EMA as a means of exploring the stress and coping experiences of dual-career badminton athletes

proved to be a useful means of supporting self-reflection and learning in respect of stress and coping for some participants. For example, EMA helped participants to reflect upon and establish the context in which stress transactions unfolded. As such, EMA as used in the present study to attain qualitative data as well as quantitative data represents a strength of the work presented.

Despite the notable strengths, this study has potential methodological limitations in relation to the disclosure of sensitive stressful experiences information. In accordance with Giacobbi et al. (2004), the strengths of qualitative research are reliant on establishing trust and rapport between the researcher and the participant. Therefore, some dual-career athletes may not have felt comfortable in sharing unpleasant experiences, difficulties in managing stressful encounters, or unsuccessful methods of coping. Additionally, findings from the present study align with those of Thatcher and Day (2008) in that when athletes are asked to 'discuss a stressful experience', this research question may lead to the discussion of more 'negative' experiences due to the individual's understanding of stress.

Drawing upon the methodological strengths of this study, future research could utilize EMA to overcome the limitations of retrospective methodologies and quantitatively examine within person variability in stress and coping experiences. For example, on days/times when athletes report higher stress than usual for them, are they more likely to subsequently engage in certain coping strategies? The present study was conducted within the UK population and is therefore context-bound to the UK higher education system. Other countries (e.g., Denmark) have identified dual-career badminton athletes as expressing high stress levels related to the educational and sport domain (Wang et al., 2024). Therefore, future research should seek to explore dual-career experiences across diverse countries and cultures. Dual-career literature is limited by the lack of inclusion of key stakeholders (Weckesser et al., 2019). Involving key stakeholders (scholarship managers, academic tutors) in research is

important if we are to work towards developing systems that are inclusive and facilitate more positive experiences for dual-career athletes which are beneficial for both health and performance. Finally, a further area for future research is to develop and evaluate psychoeducation workshops that aim to increase dual-career athletes' understanding of help-seeking behaviors and a stress-is-enhancing mindset.

Conclusion

Utilizing an EMA methodology, this study explored the stressor, primary appraisal, and coping experiences of dual-career badminton athletes. Dual-career athletes discussed various competitive, organizational, and personal stressors that were underpinned by novelty, ambiguity imminence, and duration with the most frequently cited stressors rated as most intense relating to transport and performance demands (both academic and sport performance). In relation to the appraisal of stress, dual-career athletes most commonly identified threat and harm appraisals across each time point. With regards coping, this study captured the importance of dual-career athletes' coping resources (e.g., confidence) and abilities to flexibly apply coping strategies. Future research should explore stressful experiences using EMA within other dual-career populations (e.g., work-athlete) and interventions intended to facilitate coping flexibility and help-seeking behaviors.

References

- Adam, R., & Cogan, N. (2019). The personal meanings and experiences of resilience amongst elite badminton athletes in the build-up to competition. *Journal of Qualitative Research in Sports Studies*, 13(1), 61-84.
- Astridge, D., Sommerville, A., Verheul, M., & Turner, A. P. (2021). Training and academic demands are associated with sleep quality in high-performance “dual career” student swimmers. *European Journal of Sport Science*, 21(12), 1675-1683.
- <https://doi.org/10.1080/17461391.2020.1857442>

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Badminton World Federation (2023). *Development World Badminton Federation*. (18th

October 2023) (<https://development.bwfbadminton.com/player/career-pathway-scholarships-opportunities/dual-career-resources>)

Brown, D. J., Fletcher, D., Henry, I., Borrie, A., Emmett, J., Buzza, A., & Wombwell, S. (2015). A British university case study of the transitional experiences of student athletes. *Psychology of Sport and Exercise*, *21*, 78-90.

<https://doi.org/10.1016/j.psychsport.2015.04.002>

Cartigny, E., Fletcher, D., Coupland, C., & Taylor, G. (2021). Mind the gap: A grounded theory of dual career pathways in sport. *Journal of Applied Sport Psychology*, *33*(3), 280-301.

<https://doi.org/10.1080/10413200.2019.1654559>

Chan, L., Swain, V. D., Kelley, C., de Barbaro, K., Abowd, G. D., & Wilcox, L. (2018).

Students' experiences with ecological momentary assessment tools to report on emotional well-being. *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies*, *2*(1), 1-20.

<https://doi.org/10.1145/3191735>

Cohen, S., & McKay, G. (2020). Social support, stress and the buffering hypothesis: A theoretical analysis. In *Handbook of Psychology and Health*, *4*, 253-267. Routledge.

Cosh, S., & Tully, P. J. (2015). Stressors, coping, and support mechanisms for student-athletes combining elite sport and tertiary education: Implications for practice. *The Sport Psychologist*, *29*(2), 120-133.

<https://doi.org/10.1123/tsp.2014-0102>

Cosh, S. M., McNeil, D. G., Jeffreys, A., Clark, L., & Tully, P. J. (2023). Athlete mental health help-seeking: A Systematic review and meta-analysis of rates, barriers and facilitators. *Psychology of Sport and Exercise*, 102-586.

<https://doi.org/10.1016/j.psychsport.2023.102586>

Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches*. Sage publications.

Crum, A. J., Akinola, M., Martin, A., & Fath, S. (2017). The role of stress mindset in shaping cognitive, emotional, and physiological responses to challenging and threatening stress. *Anxiety, Stress, & Coping, 30*(4), 379-395.

<https://doi.org/10.1080/10615806.2016.1275585>

Danermark B. (2019). Applied interdisciplinary research: A critical realist perspective. *Journal of Critical Realism, 18*(4), 368-382.

<https://doi.org/10.1080/14767430.2019.1644983>

Debois, N., Ledon, A., & Wylleman, P. (2015). A lifespan perspective on the dual career of elite male athletes. *Psychology of Sport and Exercise, 21*, 15-26.

<https://doi.org/10.1016/j.psychsport.2014.07.011>

DeFreese, J. D., & Smith, A. L. (2014). Athlete social support, negative social interactions, and psychological health across a competitive sport season. *Journal of sport and exercise psychology, 36*(6), 619-630. <https://doi.org/10.1123/jsep.2014-0040>

De Subijana, C. L., Barriopedro, M., & Conde, E. (2015). Supporting dual career in Spain: Elite athletes' barriers to study. *Psychology of Sport and Exercise, 21*, 57-64.

<https://doi.org/10.1016/j.psychsport.2015.04.012>

Didymus, F. F., & Fletcher, D. (2012). Getting to the heart of the matter: A diary study of swimmers' appraisals of organisational stressors. *Journal of Sports Sciences, 30*(13), 1375-1385. <https://doi.org/10.1080/02640414.2012.709263>

Didymus, F. F., & Jones, M. V. (2021). Cognitive appraisals. In *Stress, Well-Being, and Performance in Sport* (pp. 63-77). Routledge.

Dixon, M., Turner, M. J., & Gillman, J. (2017). Examining the relationships between

challenge and threat cognitive appraisals and coaching behaviours in football coaches.

Journal of Sports Sciences, 35(24), 2446-2452.

<https://doi.org/10.1080/02640414.2016.1273538>

Edwards, S. (2017). Reflecting differently. New dimensions: reflection-before-action and reflection-beyond-action. *International Practice Development Journal*, 7(1).

<https://doi.org/10.19043/ipdj.71.002>

Goyer, J. P., Akinola, M., Grunberg, R., & Crum, A. J. (2022). Thriving under pressure: The effects of stress-related wise interventions on affect, sleep, and exam performance for college students from disadvantaged backgrounds. *Emotion*, 22(8), 1755.

<https://doi.org/10.1037/emo0001026>

Giacobbi, P., Foore, B., & Weinberg, R. S. (2004). Broken clubs and expletives: The sources of stress and coping responses of skilled and moderately skilled golfers. *Journal of applied sport Psychology*, 16(2), 166-182.

<https://doi.org/10.1080/10413200490437688>

Gromatsky, M., Patel, T. A., Wilson, S. M., Mann, A. J., Aho, N., Carpenter, V. L., & Kimbrel, N. A. (2022). Qualitative analysis of participant experiences during an ecological momentary assessment study of nonsuicidal self-injury among veterans. *Psychiatry research*, 310, 114-437. <https://doi.org/10.1016/j.psychres.2022.114437>

Gulliver, A., Griffiths, K. M., & Christensen, H. (2012). Barriers and facilitators to mental health help-seeking for young elite athletes: a qualitative study. *BMC psychiatry*, 12, 1- 14. <https://doi.org/10.1186/1471-244X-12-157>

Hallmann, K., & Weustenfeld, N. H. (2024). Constraints and facilitators of elite athletes' dual careers: a systematic literature review. *International Journal of Sport Policy and Politics*, 1-18. <https://doi.org/10.1080/19406940.2024.2377546>

Harrison, G. E., Vickers, E., Fletcher, D., & Taylor, G. (2022). Elite female soccer players'

- dual career plans and the demands they encounter. *Journal of Applied Sport Psychology*, 34(1), 133- 154. <https://doi.org/10.1080/10413200.2020.1716871>
- Kegelaers, J., Wylleman, P., Kenttä, G., Vitali, F., Cecić Erpič, S., Regüela, S., Teller, C., & De Brandt, K. (2024). Recommendations to promote mental health in dual career development environments: an integrated knowledge translation approach. *Journal of Applied Sport Psychology*, 1-25. <https://doi.org/10.1080/10413200.2024.2334283>
- Kato, T. (2012). Development of the Coping Flexibility Scale: evidence for the coping flexibility hypothesis. *Journal of Counseling Psychology*, 59(2), 262-273. <https://doi.org/10.1037/a0027770>
- Kent, S., Devonport, T. J., Lane, A. M., & Nicholls, W. (2022). Implementing a pressure training program to improve decision-making and execution of skill among premier league academy soccer players. *Journal of Applied Sport Psychology*, 34(4), 691-712. <https://doi.org/10.1080/10413200.2020.1868618>
- Kim, H., Sefcik, J. S., & Bradway, C. (2017). Characteristics of qualitative descriptive studies: A systematic review. *Research in nursing & health*, 40(1), 23-42. <https://doi.org/10.1002/nur.21768>
- Klingsieck, K. B., Grund, A., Schmid, S., & Fries, S. (2013). Why students procrastinate: A qualitative approach. *Journal of College Student Development*, 54(4), 397-412. <https://dx.doi.org/10.1353/csd.2013.0060>
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer publishing Company.
- Lazarus, R. S. (1999). The cognition-emotion debate: A bit of history. In T. Dalgleish & M. J. Power (Eds), *Handbook of cognition and emotion* (pp. 3-19). Wiley.
- Lazarus, R. S. (2000). Toward better research on stress and coping.
- Levitt, H. M., Bamberg, M., Creswell, J. W., Frost, D. M., Josselson, R., & Suárez-Orozco, C.

- (2018). Journal article reporting standards for qualitative primary, qualitative metaanalytic, and mixed methods research in psychology: The APA Publications and Communications Board task force report. *American Psychologist*, 73(1), 26.
<https://doi.org/10.1037/amp0000151>
- Lincoln, Y. S., Lynham, S. A., & Guba, E. G. (2011). Paradigmatic controversies, contradictions, and emerging confluences, revisited. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (5th ed, pp. 108–150). Sage.
- Linnér, L., Stambulova, N., & Ziegert, K. (2021). Maintaining dual career balance: A scenario perspective on Swedish university student-athletes' experiences and coping. *Scandinavian Journal of Sport and Exercise Psychology*, 3, 47-55.
<https://doi.org/10.7146/sjsep.v3i.125734>
- McKay, A. K., Stellingwerff, T., Smith, E. S., Martin, D. T., Mujika, I., Goosey-Tolfrey, V. L., & Burke, L. M. (2021). Defining training and performance caliber: a participant classification framework. *International Journal of Sports Physiology and Performance*, 17(2), 317-331.
<https://doi.org/10.1123/ijsp.2021-0451>
- McLoughlin, E., Arnold, R., & Moore, L. J. (2023). The tendency to appraise stressful situations as more of a threat is associated with poorer health and well-being. *Stress and Health*, 18, e3358. <https://doi.org/10.1002/smi.3358>
- Meijen, C., Turner, M., Jones, M. V., Sheffield, D., & McCarthy, P. (2020). A theory of challenge and threat states in athletes: A revised conceptualization. *Frontiers in psychology*, 11, 126. <https://doi.org/10.3389/fpsyg.2020.00126>
- Moos, R. H., & Holahan, C. J. (2003). Dispositional and contextual perspectives on coping: Toward an integrative framework. *Journal of Clinical Psychology*, 59(12), 1387-1403.
<https://doi.org/10.1002/jclp.10229>

- Morris, R., Cartigny, E., Ryba, T. V., Wylleman, P., Henriksen, K., Torregrossa, M., ... & Erpič, S. C. (2021). A taxonomy of dual career development environments in European countries. *European Sport Management Quarterly*, 21(1), 134-151. <https://doi.org/10.1080/16184742.2020.1725778>
- Norris, L. A., Didymus, F. F., & Kaiseler, M. (2022). How can social support make coaching less stressful? A longitudinal inquiry with sports coaches. *International Journal of Sports Science & Coaching*, 17(6), 1258-1269. <https://doi.org/10.1177/174795412211057>
- Nyberg, C., Wagnsson, S., Gustafsson, H., & Stråhlman, O. (2023). Dual career support among world-class athletes in Sweden: Performance, education, and employment. *Frontiers in Psychology*, 13, 109-3562. <https://doi.org/10.3389/fpsyg.2022.1093562>
- Partington, M., & Cushion, C. (2013). An investigation of the practice activities and coaching behaviors of professional top-level youth soccer coaches. *Scandinavian Journal of Medicine & Science in Sports*, 23(3), 374-382. <https://doi.org/10.1111/j.1600-0838.2011.01383.x>
- Ptacek, J. T., Smith, R. E., Espe, K., & Raffety, B. (1994). Limited correspondence between daily coping reports and retrospective coping recall. *Psychological Assessment*, 6(1), 41-49. <https://doi.org/10.1037/1040-3590.6.1.41>
- Örencik, M., Schmid, M. J., Schmid, J., & Conzelmann, A. (2023). The differentiation of single and dual-career athletes falls short: of a person-oriented approach to characterize typical objective life situations of elite athletes. *International Journal of Sports Science & Coaching*, 18(3), 717-727. <https://doi.org/10.1177/1747954122109094>
- Ronkainen, N. J., & Wiltshire, G. (2021). Rethinking validity in qualitative sport and exercise psychology research: A realist perspective. *International Journal of Sport and Exercise*

Psychology, 19(1), 13-28. <https://doi.org/10.1080/1612197X.2019.1637363>

Sallen, J., Hemming, K., & Richartz, A. (2018). Facilitating dual careers by improving resistance to chronic stress: effects of an intervention programme for elite student athletes. *European Journal of Sport Science*, 18(1), 112-122.

<https://doi.org/10.1080/17461391.2017.1407363>

Sanchez, C., Grzenda, A., Varias, A., Widge, A. S., Carpenter, L. L., McDonald, W. M., ... & Rodriguez, C. I. (2020). Social media recruitment for mental health research: A systematic review. *Comprehensive Psychiatry*, 103, 152-197.

<https://doi.org/10.1016/j.comppsy.2020.152197>

Skinner, E. A., Edge, K., Altman, J., & Sherwood, H. (2003). Searching for the structure of coping: a review and critique of category systems for classifying ways of coping. *Psychological Bulletin*, 129(2), 216. <https://doi.org/10.1037/0033-2909.129.2.216>

Smith, B., & McGannon, K. R. (2018). Developing rigor in qualitative research: Problems and opportunities within sport and exercise psychology. *International Review of Sport and Exercise Psychology*, 11(1), 101-121. <https://doi.org/10.1080/1750984X.2017.1317357>

Simpson, R. A., Didymus, F. F., & Williams, T. L. (2021). Organizational stress and wellbeing in competitive sport: a systematic review. *International Review of Sport and Exercise Psychology*, 1-29. <https://doi.org/10.1080/1750984X.2021.1975305>

Stone, A. A., Schwartz, J. E., Neale, J. M., Shiffman, S., Marco, C. A., Hickcox, M., Paty, J., Porter, L. S., & Cruise, L. J. (1998). A comparison of coping assessed by ecological momentary assessment and retrospective recall. *Journal of Personality and Social Psychology*, 74(6), 1670–1680. <https://doi.org/10.1037//0022-3514.74.6.1670>

Thatcher, J., & Day, M. C. (2008). Re-appraising stress appraisals: The underlying properties of stress in sport. *Psychology of Sport and Exercise*, 9(3), 318-335.

<https://doi.org/10.1016/j.psychsport.2007.04.005>

- Thompson, F., Rongen, F., Cowburn, I., & Till, K. (2022). A case study of the features and holistic athlete impacts of a UK sports-friendly school: Student-athlete, coach and teacher perspectives. *Plos one*, *17*(11), 278-401.
<https://doi.org/10.1371/journal.pone.0278401>
- van Rens, F. E., Ashley, R. A., & Steele, A. R. (2019). Well-being and performance in dual careers: The role of academic and athletic identities. *The Sport Psychologist*, *33*(1), 42- 51. <https://doi.org/10.1123/tsp.2018-0026>
- Vasileiou, K., Barnett, J., Thorpe, S., & Young, T. (2018). Characterising and justifying sample size sufficiency in interview-based studies: systematic analysis of qualitative health research over a 15-year period. *BMC Medical Research Methodology*, *18*, 1-18.
<https://doi.org/10.1186/s12874-018-0594-7>
- Wang, H., Dai, Y., Li, X., & Yu, L. (2024). Associations of Training and Academic Stress with Sleep in Dual-Career Collegiate Badminton Athletes: A Preliminary Study. *Nature and Science of Sleep*, 43-52. <https://doi.org/10.2147/NSS.S432475>
- Weber, J., Heming, M., Apolinário-Hagen, J., Lizio, S., & Angerer, P. (2024). Comparison of the Perceived Stress Reactivity Scale with physiological and self-reported stress responses during ecological momentary assessment and during participation in a virtual reality version of the Trier Social Stress Test. *Biological Psychology*, *186*, 108-762. <https://doi.org/10.1016/j.biopsycho.2024.108762>
- Weckesser, L. J., Dietz, F., Schmidt, K., Grass, J., Kirschbaum, C., & Miller, R. (2019). The psychometric properties and temporal dynamics of subjective stress, retrospectively assessed by different informants and questionnaires, and hair cortisol concentrations. *Scientific Reports*, *9*(1), 10-98. <https://doi.org/10.1038/s41598-018-37526-2>
- Yang, Y. S., Ryu, G. W., Han, I., Oh, S., & Choi, M. (2018). Ecological momentary assessment using smartphone-based mobile application for affect and stress

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assessment. *Healthcare Informatics Research*, 24(4), 381-386.

<https://doi.org/10.4258/hir.2018.24.4.381>