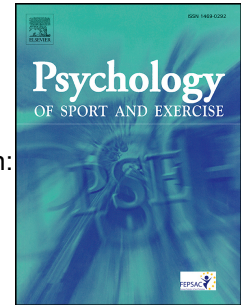


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A Mixed Methods Study

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**Factors Contributing to Elite Athletes' Mental Health in the Junior-to-Senior Transition: A
Mixed Methods Study**


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Declaration of Competing Interests

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

Data accessibility statement

This study is part of a three-year research project on mental health in competitive sports. The data will be made available upon completion of the project (12/2024) in a form that ensures the anonymity of the participants under this link [https://doi.org/10.17605/ OSF.IO/](https://doi.org/10.17605/OSF.IO/)

CRediT author statement

Nadja Ackeret: Conceptualization, Methodology, Investigation, Writing – Original Draft, Visualization. **Philipp Röthlin:** Conceptualization, Methodology, Writing – Review. **Stephan Horvath:** Conceptualization, Methodology, Writing – Review, Project administration.

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Abstract

The goals of this study were to examine factors that may affect the mental health of elite athletes during their junior-to-senior transition and to explore the types and frequency of facilitators and challenges athletes encounter during this transition. Using a cross-sectional, embedded QUAN(qual) mixed methods study design, we surveyed two samples for the study goals. All participants completed demographic data (e.g., gender, age, sports). Sample one ($N = 394$, $M_{age} = 18.46$ years, $SD = 2.2$) consisted of current transitioning athletes which completed questionnaires on stress, anxiety, depression, well-being, self-compassion, and social support. Mediation and moderation analyses revealed that stress leads to resource depletion, and that self-compassion can be an important resource for young athletes to draw upon to maintain their mental health. Regarding social support results were less conclusive. Sample two ($N = 371$, $M_{age} = 27.70$ years, $SD = 8.3$) consisted of athletes that have passed the transition. They responded to open questions about helpful strategies and challenges faced during their junior-to-senior transition, which were analyzed using thematic content analysis. Results showed that during the junior-to-senior transition, external resources were more frequently mentioned than internal resources when it came to facilitators. Furthermore, external challenges were perceived as hindering more frequently than internal challenges. These findings can guide practitioners by providing potential starting points for improving the mental health of transitioning elite athletes, as well as information on helpful strategies and barriers during the transition.

Keywords: anxiety, depression, well-being, social support, self-compassion, mixed methods

Factors Contributing to Elite Athletes' Mental Health in the Junior-to-Senior Transition: A Mixed Methods Study

Adolescent athletes experience major cognitive, social, physiological, and emotional developmental changes with the onset of puberty, a period of great developmental plasticity (Holder & Blaustein, 2014). Åkesdotter et al. (2020) found that the peak age of the onset of mental disorders in Swedish athletes is 19 years, indicating that adolescence and young adulthood are stressful and vulnerable times. On the route to being a senior elite athlete, young athletes have to master a further important and decisive developmental challenge: the junior-to-senior transition (JST). The JST is considered the most difficult transition in an athlete's career, as evidenced by the fact that only 20–30% of athletes pass the JST, and the majority drop out or switch to recreational sports (Franck et al., 2018; Stambulova et al., 2009; Vanden Auweele et al., 2004). With the everyday challenges of adolescence, this is compounded by additional, sport-specific mental and physical challenges. Among these are the social adaptation to new coaches and teams, increasing demands in training and competitions, selection pressure, and the compatibility of studies and sports (Franck et al., 2018; Stambulova et al., 2021; Wylleman, 2019; Wylleman et al., 2013). Therefore, it seems important to identify factors that promote mental health (i.e., the absence of mental disorders and the presence of well-being [WHO, 2014]) of athletes in the JST. The present study aims to contribute to this goal.

In most cases, the JST occurs between the ages of 18 and 24 years (Bennie & O'Connor, 2006) and lasts between 1 and 3 years (Stambulova et al., 2012). Because of sports, gender, and individual differences, it is difficult to make a universal prediction for the beginning of the JST. Stambulova (2009; 1994) defined the onset of the transition as when individual athletes begin to compete in senior competitions and team athletes begin to train with a senior team. On the one hand, this means that the JST does not have to start at the same time for different athletes of the same club. On the other hand, it also means that, depending on the age when the JST starts, athletes have to deal with different development challenges, both of which are additional potential sources of stress (Swainston et al., 2020; Wylleman et al., 2013).

Given the complexity of the changes that young athletes undergo, it is evident that a holistic perspective, which means considering all areas of an athlete's life, not just the athletic area, is essential to promote long-term mental and physical health (Wylleman et al., 2013). A positive change in one area of life can lead to positive changes in other areas, but equally, strains on one area; for example, a mental health disorder, can lead to strain and developmental delay in other areas. Recently, Stambulova (2020) introduced the concept of career excellence, which refers to an athlete's ability to sustain a *healthy, successful, and long-lasting career* in sports and life. To that end, mental health should not only be considered a resource, but also an outcome of the

athlete's career development (Stambulova, 2020). Drew et al. (2019) emphasized that a successful JST should not solely rely on athletic performance, but also consider the athlete's mental health. Consequently, it's essential to transition from mere career effectiveness (e.g., achieving JST success at any cost) to career excellence (e.g., attaining JST success while preserving mental well-being; Larsen et al., 2021; Stambulova et al., 2021). Deepening our insight into the mechanisms linking stress to mental health issues in JST athletes is a critical step in this direction.

The direct impact of stress on athletes' mental health is well-documented (e.g., De Francisco et al., 2016; McLoughlin et al., 2021; Poucher et al., 2021; Spielberger, 1990). The Stress Process Model (SPM; Pearlin et al., 1981), a framework for understanding the relationship between stress and mental health, outlines two further mechanisms through which stress affects mental health, using personal and social resources. Firstly, these resources can mediate the effects of stress, meaning they are altered by stressors, potentially exacerbating negative outcomes. Alternatively, they can moderate the stress effects, influencing the severity or direction of the stress-health relationship. The SPM not only offers a foundation for forming hypotheses about stress's impact on mental health but has also garnered empirical support (Aneshensel & Avison, 2015) across various contexts, from caregiving and family research to student populations and sports (e.g., Poucher et al., 2021; Reed et al., 2015; Wang, 2022; Yu et al., 2020).

For athletes in the JST, two valuable resources may be self-compassion and social support (Cormier et al., 2023; Sheridan et al., 2014). Self-compassion is a coping mechanism that refers to one's compassion and benevolence toward oneself when confronted with failings or difficulties (Neff, 2015). It has been found that stress is negatively related to self-compassion in young adults (Zhang et al., 2016; Model 1; path a). Furthermore, self-compassion goes along with higher well-being (Ferguson et al., 2014) and less psychological distress (Walton et al., 2020) in women athletes and is positively related to mental health in student athletes (Stamatis et al., 2020; Model 1; path b). In a sample of college students of comparable age, self-compassion has been found to buffer the relationship between stress, anxiety, and depression (Stutts et al., 2018). A stress buffering effect has also been identified in a sample of athletes (Röthlin et al., 2022). Moreover, self-compassion was reported as amenable to change in athletes (Mosewich et al., 2013; Röthlin & Leiggener, 2021), which is an important indication for potential interventions.

Another known essential resource in athletes is social support. Social support has been defined as "social interactions aimed at inducing positive outcomes" (Bianco & Eklund, 2001, p. 85). Social support is a multifaceted construct encompassing structural elements, such as relationship types and count, and functional components (e.g., perceived and received support). In a sample of Canadian athletes, Poucher et al. (2021) found

that increased stress was associated with less social support (Figure 1; Path a). Furthermore, athletes' mental health is at risk when they are in new environments and lack social support (Dean & Reynolds, 2017; Gouttebargue et al., 2015; Rice et al., 2016; Model 1; path b). This is also reflected in qualitative studies that have reported that social support is a great resource, especially during transitions (Drew et al., 2019; Siekanska & Blecharz, 2020; Swainston et al., 2020). Social support was also found to be an important moderator of stress and its potential impact on mental health (John et al., 2019; Savage et al., 2017).

The impact of stress on mental health in competitive sports is well established (e.g., Arnold & Fletcher, 2021; Kuettel et al., 2019; Simpson et al., 2021). Expanding this knowledge on the specific group of athletes in the JST is deemed necessary. Unraveling how resources modulate the relationship between stress and mental health can shape future interventions and research directions for this specific group of athletes. Therefore, this study investigates the interplay between stress, resources, and mental health in transitioning athletes. In this regard, it is also vital to expand our current understanding of the factors that facilitate or challenge athletes' adaptation to the demands of the JST. Much of our current knowledge on this topic stems from smaller qualitative samples (e.g., Andronikos, 2018; Franck & Stambulova, 2020) or given answer choices (e.g., Stambulova et al., 2012). Therefore, a qualitative investigation in a broader sample provides a more comprehensive view of perceived barriers and useful strategies and also allows to get a sense of the number of times these resources or barriers are mentioned. The insights derived from our two study aims can inform initiatives to either bolster mental health during this phase of adaptation or equip practitioners to support athletes during challenging periods.

Present study

Based on a mixed methods approach (Creswell & Plano Clark, 2011), the first objective of the current study was to better understand differences in the expression of mental health disorders and well-being by considering two potential resources—self-compassion and social support—in the stress process. We used a general stress indicator that examines the degree to which athletes find their lives unpredictable, uncontrollable, and overloading as a predictor variable in the SPM. We used social support as an external social resource and self-compassion as an internal coping factor. It is not clear how resources work in the stress process in athletes undergoing the JST. Possibly, resources are mobilized during stressful situations and therefore diminish the occurrence of mental disorders (mobilization model; Barrera, 1988), or stress leads to a depletion of resources, which may enhance the occurrence of mental disorders (Aneshensel & Avison, 2015). Furthermore, considering the moderating effect, athletes with higher resources may have fewer mental health disorders than athletes with lower resources (stress-buffering hypothesis; Cohen et al., 2000). Knowing more about for whom and under

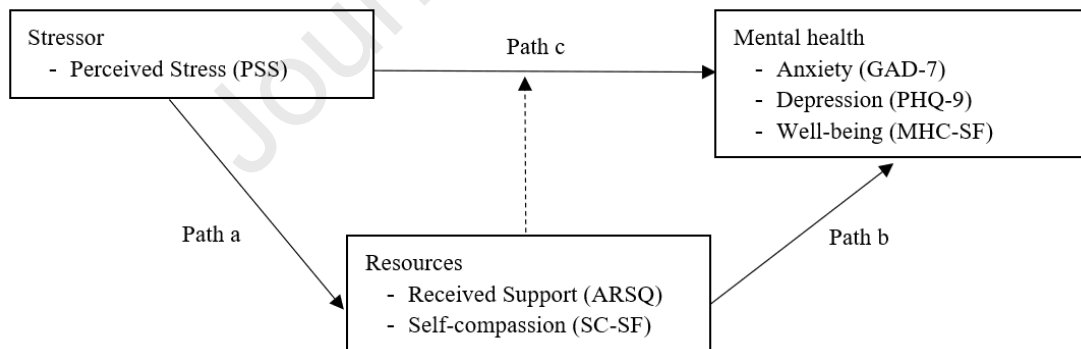
what conditions self-compassion and social support act as resources is of great interest for planning future interventions. We focused on outcomes at the psychological level and investigated two common mental health disorders—anxiety and depression—and well-being in athletes (Figure 1).

We hypothesize that (A) stress is positively related to mental health disorders and negatively related to well-being. This relationship is mediated by (B) self-compassion and (C) social support, such that stress reduces social support and self-compassion and thus predicts more mental health problems and less well-being. In addition, we hypothesize that the relationship between stress and mental health is moderated by (D) self-compassion and (E) social support, implying that these two variables buffer the relationship between stress and the outcome variables anxiety, depression, and well-being.

The secondary goal was to gain insight into the challenges athletes encountered during the JST and what resources they called upon, as well as the frequency with which specific challenges and resources were mentioned. By utilizing qualitative methods to explore this issue, we can obtain a deeper and more nuanced understanding. This enriched knowledge would help tailor future interventions in the applied sports field and may be informative for researchers, as this issue has, to our knowledge, not been investigated in a representative sample.

Figure 1

Stress Process Model



Note. This diagram was adapted from the stress process model (Aneshensel & Avison, 2015). The mediator model is represented by the fixed lines, and the moderator model by the dashed line.

Methods

Research Philosophy and Design

To foster transparency and methodological integrity, we will begin by elucidating the study's philosophical underpinning (Ryba et al., 2020). The authors conducted this study from a post-positivistic position. Post-positivism permits a reflexive stance, accommodating an awareness of subjectivity in knowledge

production (Teddle & Tashakkori, 2003). This position recognizes that researchers have an influence on what the subject and object of a study is, but also seeks to reduce the degree of subjectivity in the research design process. Post-positivism puts emphasis on using both quantitative and qualitative approaches (Teddle & Tashakkori, 2003). Consistent with this philosophical position, we adopted a mixed methods design in which both quantitative and qualitative data were collected concurrently within a single study. More specifically, we implemented an embedded mixed methods design, with a primary focus on quantitative data (referred to as a QUAN (qual) design; Creswell & Plano Clark, 2011). Embedded research designs are typically chosen when the secondary method addresses a slightly different aspect of the research question than the primary method but contributes to a comprehensive understanding of the phenomenon under study (Creswell, 2014).

Quantitatively, we assessed the roles of social support and self-compassion on stress, anxiety, depression, and well-being among transitioning athletes. Qualitative data provided in-depth insights into facilitators and challenges for passing the JST and the prevalence of the emerged facilitators and challenges in this specific population. This combined approach facilitated a comprehensive, holistic exploration of factors that may affect athletes' mental health during the JST (Creswell & Plano Clark, 2011).

Participants and procedure

This study is part of a broader research project on elite athletes' mental health in XXX. Two studies emerged from this project. The first study aimed to assess the state of mental health of XXX elite athletes (XXX), whereas the current study aimed to investigate ways to improve the mental health of athletes in the JST. To collect data for both studies, an online questionnaire was sent to all XXX athletes ($N = 4,873$). XXX are the best XXX athletes in their respective sports. Athletes older than 16 received a letter and athletes older than 18 received an email with a brief description, a QR-code/link, and a personal code for the online survey. After scanning/clicking on the link, they were informed about their rights and the purpose of the study, and were asked to give their consent to participate. For the first study, athletes were surveyed for common mental health problems such as depression, anxiety, disordered eating, sleep problems, and levels of well-being. A total of 1,003 athletes ($M_{age} = 21.69$, $SD_{age} = 7.09$ range = 16-62 years, 54% women, 37% team sports) completed the questionnaire. In the current study, we identified two specific sub-samples: athletes undergoing the JST and those who have completed the JST, aligning with our study's primary and secondary objectives. Athletes in the JST, based on our inclusion criteria, received supplementary questionnaires addressing stress, self-compassion, and social support. Conversely, athletes who confirmed they had navigated past the JST were presented with two open-ended questions concerning both hindering and facilitating factors for passing the JST. This dual data

collection approach not only enabled us to locate JST athletes across various sports but also minimized the risk of overwhelming respondents with excessive survey content.

Identification of the quantitative sample

The identification of the sample for the quantitative part was based on Stambulova et al. (2012) and was adapted to the Swiss sports system. After presenting a short definition of what was meant by the JST and by “the highest national age category”, the participants were presented two identification questions: “Do you compete in the highest national age category in your sport?” for individual athletes and “Do you train with a team that competes in the highest age category?” for team athletes. If the participants answered in the affirmative, they were asked how long they had been training/competing in the oldest age category of their respective sports. Answers were collected on a six-month basis for up to 3.5 years or longer. As noted, the JST is a phase rather than a single event. Therefore, we included athletes who had been training/competing in the highest age category of their sports for a maximum of three years (Stambulova et al., 2012). An a priori power analysis was conducted using G*Power version 3.1.9.6 (Faul et al., 2007) to determine the minimum sample size required to test the study hypotheses of the primary goal of the study. The results indicated that the required sample size to achieve 80% power for detecting a small effect, at a significance criterion of $\alpha = .05$, was $N = 395$ for moderation (F-test, family, test for linear multiple regression with a fixed model and a R^2 increase) and mediation analyses (t tests family, test for linear multiple regressions with a fixed model and a single regression coefficient).

A total of 394 athletes completed the questionnaires (55.33% female, 0.25% other), which was adequate for testing the study hypotheses. The mean age was 18.56 years ($SD = 2.22$, $range = 16-26$). The athletes trained for 14.78 hours per week on average ($SD = 6.20$) and participated in 28.31 competitions per year ($SD = 19.05$). Fifty-eight different sports were represented, among which most of the athletes were from track and field (8.38%), ice hockey (7.10%), soccer (6.85%), cycling sports (6.10%), and alpine skiing (6.09%).

Identification of the qualitative sample

The sampling for the secondary aim of the study comprised all athletes that were no longer in the transition phase (the start of the transition more than three years ago). This led to 371 participants (52.56% female), with a mean age of 27.70 years ($SD = 8.25$, $range = 17-62$). On average, athletes trained for 16.12 hours per week ($SD = 7.49$) and participated in 25.42 competitions per year ($SD = 19.32$). Seventy-six different sports were represented, among which most of the athletes were from alpine skiing (6.74%), horse sports (5.94%), cycling sports (4.86%), track and field (4.85%), and ice hockey (4.31%). In line with our studies' goal, we did not meet a decision regarding a determined sample size or to halt data collection.

Measures

Quantitative data collection

Anxiety. Anxiety was assessed using the 7-item General Anxiety Disorder Questionnaire (GAD-7; Spitzer et al., 1999; Spitzer et al., 2006), which asks about seven core symptoms in the last two weeks (e.g., “I had not been able to stop or control worrying”). Participants answered the questions on a 4-point scale (0 = none, 3 = almost every day); the total score was formed by adding up the individual items. Higher scores reflect higher levels of anxiety. The diagnostic threshold of the GAD-7 has previously been reported to be 10 (Löwe et al., 2008), and we implemented the same in this study. The GAD-7 has been shown to be a valid measure for general anxiety (Löwe et al., 2008), and the internal consistency of the GAD-7 in the present study was good ($\alpha = .85$).

Depression. Depressive symptoms were assessed using the 9-item depression module of the Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001). Responses were given on the two weeks prior the assessment and ranged from *not at all* (0) to *nearly every day* (3) on a 4-point scale. Items (e.g., “I had little interest or pleasure in doing things”) were summed up to a total score. Prior research has shown good validity of the scale (Kroenke et al., 2001) and has reported the diagnostic threshold of the PHQ-9 to be ≥ 10 (Kroenke et al., 2001), which we adopted for this study as well. Higher scores indicate that athletes have higher levels of depression. In the present sample, Cronbach’s alpha was good ($\alpha = .84$).

Well-being. The 14-item Adult Mental Health Continuum – Short Form (Lamers et al., 2011) has been shown to be a reliable and valid instrument to assess well-being (Lamers et al., 2011). The overall well-being score was built by building the mean score of all items (e.g., “During the past month, how often did you feel interested in life?”) on a 6-point scale ranging from *never* (1) to *every day* (6). Higher scores correspond to higher levels of well-being. The internal consistency of the scale in the present sample was high ($\alpha = .90$).

Self-compassion. To assess self-compassion, we used the Self-Compassion Scale-Short Form (SCS-SF; Raes et al., 2011). Comprising 12 items (e.g., “I try to be understanding and patient toward those aspects of my personality I don’t like”), the SCS-SF is an adaptation of the original 26-item SCS. It shows high internal consistency and correlates almost perfectly with the original 26-item SCS (Neff, 2003). Studies have shown good validity for the SCS-SF (Huysmans & Clement, 2017; Raes et al., 2011). As Raes et al. (2011) recommended the use of an overall self-compassion index, negative subscale items were reversed, and the mean of all subscale scores was calculated to obtain an overall score for self-compassion. Items were rated on a 5-point scale ranging from *almost never* (1) to *almost always* (5). Higher scores reflect that an athlete is more self-compassionate. The internal consistency of the total scale score was good ($\alpha = 0.80$).

Social support. To measure social support, we used the overall score of the 22-item sport-specific Athletes’ Received Support Questionnaire (ARSQ; Freeman et al., 2014). Items (e.g., “Over the course of the

past week, how many times did someone boost your confidence”) were rated on a 5-point scale ranging from *not at all* (0) to *seven or more times* (5), with higher scores indicating higher levels of received support. The overall support score was derived from the average scores of the four subscales: informational, tangible, emotional, and esteem support. The overall score of the ARSQ is considered a valid measure to operationalize social support in athlete populations (Freeman et al., 2014). The internal consistency was excellent ($\alpha = .92$).

Stress. Perceived stress was measured using the Perceived Stress-Scale-10 (PSS-10; Cohen et al., 1983). Comprising 10 items, the PSS was developed to measure the degree to which situations in one’s life are considered stressful. Items (e.g., “In the last month, how often have you felt nervous and stressed?”) were rated on a 5-point scale ranging from *never* (0) to *very often* (4). Higher scores indicate more perceived stress. Positively stated items were reversed to build the total mean score. The internal consistency of the scale was good ($\alpha = 0.85$).

Qualitative data collection

Open-ended questions were used to explore facilitators and challenges encountered during the transition by athletes who have passed the transition successfully. The questions were: (a) “What/who has helped you the most during the JST?” and (b) “What have you found difficult during the JST?”. Open-ended response boxes were provided. There was no specific instruction on how to provide the information (e.g., no complete sentences or a minimum of words required).

Statistical analyses

Quantitative data

Data were analyzed using JASP (version 0.14.1; JASP-Team, 2020) and the PROCESS macro for R (Hayes, 2012). Data were screened for systematic outliers, missing data, and normal distribution for study variables. We identified eight outliers based on z-scores greater or less than 3.29, with two for anxiety, depression, and well-being, and one each for self-compassion and stress. We chose not to eliminate these data since we couldn’t attribute the variations to systematic issues; instead, they appeared to result from natural variation. Furthermore, no missing data was observed.

To address the research questions framed by the SPM, for each resource, we calculated three mediation and three moderation models. In all models, stress was used as a predictor variable, and anxiety, depression, and well-being were used as outcome variables. Self-compassion and social support were used as either mediators or moderators. Using multiple regression analyses, we tested for regression assumptions. No autocorrelation, multicollinearity or heteroscedasticity were observed, and the linearity of the partial scatterplots was given in every analysis. Given that the normal distribution of the residuals was slightly violated in all analyses, we used

bootstrapping with 5,000 replicates for moderation and mediation analyses to obtain more robust confidence intervals (CIs). For the moderation analysis, we centered the independent and moderator variables and used unstandardized scores. We used JASP to run hierarchical regressions with the dependent variable and the moderator in the first step and the interaction term in the second step. Graphics were plotted with the PROCESS-macro for R. Effect sizes (f^2) were considered small (0.02), medium (0.15), and large (0.35; Cohen, 1988). We used the RPROCESS-macro to calculate the mediator models. Mediation was estimated according to the bootstrapped mediation method (Preacher & Hayes, 2004), in which a CI of the indirect effect is computed by using resamples of the data. If the CI does not include zero, then there is a significant mediation effect. Effect sizes (R^2) were considered small (0.02), medium (0.13), and large (0.26; Cohen, 1988).

Qualitative data

For the exploratory part of the study on helpful strategies and challenges encountered during the JST, we used thematic content analysis with an inductive approach (Braun & Clarke, 2006). According to Braun and Clarke (2006), this approach “is essentially independent of theory and epistemology, and can be applied across a range of theoretical and epistemological approaches” (p 78). Thus, it is considered more suitable to our study design as their newer reflexive thematic analysis approach which is situated in a qualitative paradigm. Patterns or themes were analyzed on a semantic level. Following this assumption, the research was not driven by the ideas or theoretical interest of the researcher in the field but was data driven (Braun & Clarke, 2006). The data analysis proceeded according to the following six steps recommended by Braun and Clarke (2006): (1) the data were reread multiple times to gain familiarity with the answers and to get some first analytic notes; (2) the data were manually coded by referring to the most basic segments or elements; (3) when all data have been systematically coded, codes were combined to themes; (4) themes were reanalyzed with regard to internal homogeneity and external heterogeneity (Patton, 1990); (5) themes were defined and refined for (6) writing the report. Steps 1–5 were carried out by two independent researchers, with iterative phases of individual work, discussions, and critical, thoughtful, reflections (Korstjens & Moser, 2018; Steinke, 2007). When the analysis was done, we involved a tallying of the number of responses for each code to give a sense of how common particular codes and themes were across the participants’ responses.

Methodological rigor

We ensured the methodological integrity of the qualitative data by aligning our philosophical foundation with our research objectives, data collection, analysis, and result presentation, as guided by Levitt et al. (2018). To highlight, the integration of qualitative data collection into the online questionnaire was a conscious choice to uphold the coherence of our philosophical stance by minimizing researcher-participant

interactions, thereby striving for minimizing biases in knowledge production. This approach also improved the adequacy of the data, as the sample size suggests that diversity of responses could be captured. Furthermore, targeting participants who are undergoing or have passed the JST optimized the utility of our study, providing profound insights into the studied phenomenon (Levitt et al., 2017). Overall, we believe our study covers a relevant, timely and significant topic and makes a practically significant contribution by extending knowledge about factors influencing mental health in transitioning athletes (Tracy, 2010).

Results

Quantitative results

Descriptive statistics

The means and Pearson's correlations between the study variables can be found in Table 1. As expected, stress correlated positively with anxiety and depression and negatively with well-being, self-compassion, and social support. Self-compassion and social support were positively correlated with well-being and negatively correlated with anxiety and depression. As the GAD-7 and the PHQ-9 allow for clinical cut-offs, we calculated the prevalence symptoms of anxiety and depression. Approximately 14.97% of the athletes self-reported moderate to severe symptoms of anxiety, with women reporting more (21.56%) than men (6.86%). Depression symptoms were reported by 22.34% of athletes, with women reporting more (28.9%) than men (13.71%).

Mediation Analysis

The total effects in Table 2 show that stress is positively related to depression and anxiety (moderate effect) and negatively related to well-being (small effect) in both mediator models (Hypothesis A). Stress was negatively related to self-compassion in all analyses (small effect; Path a). Self-compassion had a significant negative effect on anxiety and depression and a significant positive effect on well-being (Path b). Self-compassion partially mediated the relationship between the predictor variable stress and the outcome variables depression, anxiety, and well-being (small effects; Hypothesis B), as in all models, the direct and indirect effects were significant. Stress was negatively related to social support in all three models (small effect; Path a), but social support only had a significant positive effect on well-being (small effect; Path b) and no significant effect on anxiety and depression. Social support significantly partially mediated stress and well-being (small effect), but not stress and anxiety or depression (Hypothesis C).

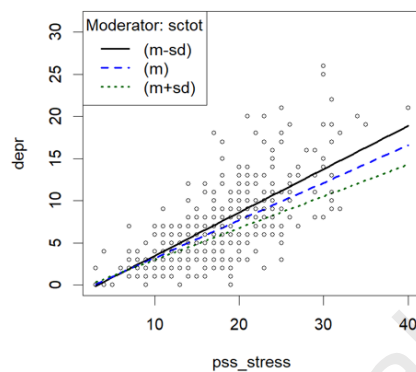
Moderation Analysis

A series of multiple regressions was conducted to test for Hypotheses D and E. The results in Table 3 show a significant moderate positive effect of stress on anxiety and depression and a significant small negative effect on well-being (Hypothesis A). Self-compassion had a significant negative effect on anxiety and depression

and a significant positive effect on well-being. In addition, significant interaction effects were found; self-compassion acted as a moderator between stress, anxiety, and depression but not between stress and well-being (Hypothesis D). As expected, when self-compassion was high, the relationship between stress and depression or anxiety decreased. Figure 2 shows the moderation effect on depression. Social support did not significantly predict anxiety, depression, or well-being; the interaction effect of stress and social support did not account for more variance in all three outcome variables. Therefore, social support had no stress-buffering effect on the outcomes (Hypothesis E).

Figure 2

Moderating Effect of Self-compassion on the Relationship between Stress and Depression



Note. depr = Depression, pss_stress = Perceived stress, sctot = Self-compassion.

Qualitative results - Facilitators versus challenges during the JST

The open questions revealed several resources and challenges for the JST. Regarding resources that helped athletes with the transition, 29 raw data categories were identified, which subsequently resulted in four higher-order categories (physiological and sport-specific resources, psychological resources, sport-related support, and significant other's support). These four higher order categories were further classified into two general categories: internal and external resources (Table 4). For challenges during the transition, the content analysis revealed 73 raw data themes, resulting in 10 higher-order categories (physiological and sport-specific skills, psychological challenges, lack of knowledge, higher performance demands, lack of support, lack of integration/challenges with new relationships, unethical behaviors from others, systematic and structural challenges, sport-life conflicts, and no challenges). These 10 higher-order categories were classified into three general categories: internal, external, and no challenges (Table 5).

The most frequently mentioned helping resources for athletes were of an external nature, namely, sport-related support (59.2%; e.g., coaches, team cohesion/integration), followed by support from significant others (22.5%; e.g., family, friends). These two higher-order categories accounted for 81.7% of the responses given

regarding the facilitators of the JST. Internal resources were identified in only 18.2% of the responses and consisted of physiological and sport-specific resources (6.2%; e.g., hard work, technical knowledge) as well as psychological resources (12%; e.g., self-belief, determination). The most frequently mentioned challenges for the JST were also of an external nature, namely, higher performance demands (19.9%; e.g., physical requirements, pressure from others), lack of support (17.1%; e.g., from coaches, from team athletes), systematic and structural challenges (12.6%; e.g., lack of structure, transition too fast/too early), lack of integration/challenges with new relations (6.6%; e.g., difficulties with integration, age gap), unethical behaviors from others (5.5%; e.g., lack of respect, lack of consideration for age and needs), and sport–life conflicts (4.5%; e.g., dual-career, sport, and family). These external challenges emerged in 66.2% of the answers. Internal challenges were reported noticeably less (20.1%), with psychological challenges contributing slightly more (9.4%; e.g., lack of self-belief, too high expectations) than lack of knowledge (8.9%; e.g., unclear what it takes to manage the transition, nutrition) and physiological and sport-specific skills (1.8%; e.g., injuries). Approximately 13.6% reported that the transition was good and that they did not meet any challenges.

Discussion

This study is one of the two studies resulting from the research project on athletes' mental health in Switzerland. In fact, the purpose of the present study was twofold. First, two potential resources—self-compassion and social support—were investigated using the SPM as a theoretical framework to better understand stress mechanisms and, thus, how to support athletes' mental health during the JST by asking a sample of current JST athletes. For the second objective, qualitative data were used to learn more about facilitators and challenges athletes encountered during the JST by asking a sample who had already passed the JST. In accordance with previous studies (e.g., McLoughlin et al., 2021), this study highlights that stress in JST athletes is associated with poorer mental health. Both self-compassion and social support yielded mixed findings for their roles in the stress process. Self-compassion was found to partially mediate between stress and anxiety, depression, and well-being and to moderate anxiety and depression. Social support mediated stress and well-being, and no other significant results were found. Below, we propose some preliminary interpretations, review the results in relation to the previous literature, discuss the results from the qualitative section, and offer some practical implications and limitations of the study.

Self-compassion seems to act as a valuable resource in the stress process of young athletes in two different ways. First, self-compassion is a possible explanation for the link between stress and mental health. Our results show that beyond the direct effect, athletes are also vulnerable to increased anxiety, depression, and decreased well-being, as stress translates into lower self-compassion, which in turn contributes to decreased

mental health. Accordingly, athletes who are under high stress tend to neglect their self-kind and benevolent attitude toward themselves. This can lead them to be more dissatisfied with their performance, to be more self-critical, or to worry more about perceived mistakes and failures, which in turn leads to poorer mental health (Neff, 2015). These findings align with previous studies that also found a negative relationship between stress and self-compassion (Zhang et al., 2016). This is why athletes who manage to be self-compassionate despite stress could potentially benefit from better mental health. Moreover, to partially explain the relationship between stress and mental health, self-compassion acts in another way in the stress process, namely, as a stress buffer. Athletes with higher levels of self-compassion appear to respond more positively to stressful situations than athletes with lower levels of self-compassion. This is evidenced by the fact that the relationship between stress and mental health problems, such as anxiety or depression, is smaller for athletes with high self-compassion compared to those with lower self-compassion. This effect was not found for well-being. A potential reason may for this distinction may be the inherent nature of self-compassion which mainly functions to alleviate distress rather than amplify well-being. Although the buffer effect was small in this study, these results possibly indicate that self-compassion is more important when it comes to buffering the adverse effects of stress in mental illness symptoms than in well-being (Keyes, 2002). This finding is consistent with previous evidence demonstrating the potency of self-compassion as a mitigator of negative outcomes (Röthlin et al., 2022).

In addition to self-compassion, we examined social support as a possible explanation for the relationship between stress and mental health. Our results show that more stress is associated with less social support, which in turn is associated with lower well-being but surprisingly not with more symptoms of anxiety and depression. Unlike self-compassion, social support was not a buffer to the negative effects of stress on mental health, as was the case in other studies (Mitchell et al., 2014; Rees & Freeman, 2007). We assume that this is due to the operationalization of social support. Most studies finding the positive effects of social support on mental health outcomes have operationalized social support as perceived (e.g., Sullivan et al., 2020), in contrast to the present study, where social support has been operationalized as received. Studies have reported perceived social support to be a stable rather than a modifiable characteristic and as independent of the behavior of a particular network member (e.g., Newcomb, 1990; Sarason et al., 1987). In contrast, received social support is the retrospective report of actual support transactions from specific network members (Knoll & Kienle, 2007; Uchino, 2009) and therefore may be a more suitable indicator for supportive interactions (Knoll & Kienle, 2007). Studies have shown that the expectation of being supported (i.e., perceived social support) does not inevitably correspond with the concrete support received in a challenging situation (Uchino, 2009). In addition, Freeman et al. (2014) argued that the effectiveness of social support may be determined not only by quantity, but also by a

variety of other factors, such as timing, the provider of support, or the matching of needs and type of support. Social support can even have negative effects by interfering with the recipient's experience of competence and autonomy, for example, if more support is given than is desired, or if the type of support does not meet needs (e.g., Hassell, 2010; Schwarzer & Leppin, 1991). Hence, on the one hand, received support may be less related to mental health than perceived support; on the other hand, athletes may benefit from social support only when it fits. This may be a reason for the rather low associations between social support, stress, and mental health in our study.

Interestingly, the results of the second part showed that external resources—that is, social support—were mentioned far more than internal resources when it comes to facilitators for the JST. Indeed, several qualitative studies have highlighted the value of social support, particularly in the context of the JST (Morris et al., 2017; Pehrson et al., 2017; Sanders & Winter, 2016). Armstrong and Oomen-Early (2009) stated that supportive coaches and team networks may be the most protective factors against mental health symptoms of college athletes, but conflicts with coaches have also been reported as independent predictors of mental health disorders among athletes (Shanmugam et al., 2014). Given that the second sample consisted of athletes who successfully managed the JST, we assumed that the support fit was predominantly present, whereas this could be a determining factor for passing the JST in the first sample. Regarding challenges, our results indicate that external challenges are perceived as hindering more often than internal challenges. In particular, the higher performance requirements, lack of support, and systematic and structural challenges were noted as challenging. The athletes reported gaining early insights into elite sport as a valuable resource, and that lacking information about what it needs to become an elite athlete is challenging. Therefore, along with other researchers, we suggest that coaches and stakeholders support athletes in terms of preparation, namely, knowledge about the JST and gaining experience in senior teams (Drew et al., 2019; Morris et al., 2015; Swainston et al., 2020). Finally, this study highlighted the importance of individualized approaches when it comes to training plans, recovery periods, and more general support needed by athletes.

Practical implications

The prevalence of anxiety and depression symptoms in our study indicates that a substantial proportion of JST athletes are affected by mental health problems. Therefore, it seems appropriate to improve the mental health of JST athletes, and our study leads to some practical implications for how this could be done. First, to improve the mental health of athletes, it seems important to work on an athletes' stress management. For example, one could work on a better compatibility between sports and school (Debois et al., 2015). Second, athletes with high stress levels could benefit from self-compassion interventions to promote their mental health.

In the sports context, self-compassion can be learned and is relatively stable (Ackeret et al., 2022; Mosewich et al., 2013; Röthlin & Leiggener, 2021). Third, our results showed that social support is of great importance when it comes to resources and challenges during the JST. Therefore, practitioners should address interpersonal relationships in terms of satisfaction and fit. Moreover, stakeholders in the sports system should be aware of the importance of fostering a culture of respectful interpersonal relationships between athletes and their entourage (Burns et al., 2022). Fourth, findings related to helping strategies and challenges during JST can guide practitioners when working with athletes who do not feel well or are experiencing difficulties in their road to elite sports.

Limitations and future studies

Studying a representative sample allowed us to draw some generalizable conclusions on how stress impacts resources and mental health in athletes in the JST. Through the mixed methods design, we could gain some further insight into the resources and challenges met during the JST, which is interesting for tailoring adequate support. The present study also has some limitations that should inform future research. The JST is a phase that takes up to three years. With a cross-sectional design, we were only able to catch a snapshot. While the cross-sectional design offers a first impression of mediating effects, it also has been critically discussed because of the missing opportunity to establish a direction of causality (e.g., Maxwell, 2011; O’Laughlin et al., 2018). Future researchers should consider applying either a sequential mediation design as a lower cost-option or a multilevel longitudinal mediation design (Cain et al., 2018). Such models would allow to inform about direction of casual mechanisms, possibly confounding variables, and stability or age effects on athletes’ mental health, as evidence suggests that states of mental health fluctuate (Belz et al., 2018; Keyes, 2002).

The present study has demonstrated that the SPM is a valid model for learning more about stress mechanisms in athletes. We motivate future researchers to include additional theoretically based variables to expand our knowledge of mental health enhancement resources for athletes in the JST. Moreover, in the present study, we exclusively surveyed athletes who were still in and those who had successfully completed the JST. A balance between resources and barriers often determines whether or not a transition is successful. Therefore, it is important to also look at stress–process mechanisms and their impact on mental health in unsuccessful environments to provide adequate support to athletes in or post crisis transitions. As it seems, social support is an important resource for JST athletes to rely on and is perceived as a barrier when missing. Nevertheless, the quantitative data from our study showed that social support, while positively correlated with well-being and negatively correlated with anxiety and depression, did not appear to be a stress buffer. Researchers should take

up these discrepant findings and shed light on the precise mechanisms of action of received and perceived support on mental health in athletes, including satisfaction and need fit.

Conclusion

Mental health is a significant resource for athletes as they make career decisions and manage various sport and non-sport transitions, whereas a mental health deficit is a barrier to effective decision making and transition coping (Schinke et al., 2017). The JST does not cause mental health problems per se, but can nourish or malnourish athlete mental health. A holistic and long-term-oriented promotion of an athlete is imperative to nourishing athlete mental health. This study extends the existing literature by identifying opportunities for change in the relationship between stress and mental health and also identifies helpful and hindering mechanisms during the JST in a large sample. Self-compassion seems to play an important role in the promotion of mental health in transitioning athletes. The effectiveness of social support should be carefully examined, as social support seems to act as a major resource but also a challenge when it is not adequately delivered. This study further offers an overview of facilitators and challenges met during the JST, which can help guide practitioners when working with athletes.

Declaration of competing interests

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 accessibility statement

This study is part of a three-year research project on mental health in competitive sports. The data will be made available upon completion of the project (12/2024) in a form that ensures the anonymity of the participants under this link <https://doi.org/10.17605/OSF.IO/>

CRediT author statement

XXX: Conceptualization, Methodology, Formal analysis, Investigation, Writing – Original Draft, Visualization. **XXX:** Conceptualization, Methodology, Writing – Review, Project Administration, Funding acquisition. **XXX:** Conceptualization, Methodology, Writing – Review, Project administration.

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Table 1*Means and Pearson's Correlations Between Study Variables*

	M (SD)	Anxiety	Depression	Well-being	Stress	Self-compassion	Social Support
Anxiety	5.5 (3.9)	-					
Depression	6.9 (4.6)	.76	-				
Well-being	4.4 (0.8)	-.51	-.58	-			
Stress	17.6 (6.2)	.72	.72	-.59	-		
Self-compassion	3.1 (0.6)	-.59	-.58	.52	-.68		
Social support	1.7 (0.8)	-.21	-.26	.41	-.30	.27	-

Note. $N = 394$, all $ps < .001$. Large effect sizes (i.e., correlations $> .5$) are written in bold, all other correlations are moderate or small.

Table 2*Regression Table for the Mediation Analysis*

Mediator Model	Outcome	Total effect (c)		Direct effect (c')		Effect of IV on mediator (a)		Unique effect of mediator (b)		Indirect effect (ab)		
		Effect (SE)	p	Effect (SE)	p	Effect (SE)	p	Effect (SE)	p	Effect (SE)	95% CI*	ES
Self-compassion	Depression	.54 (.03)	<.001	.46 (.04)	<.001	-.07 (.004)	<.001	-1.26 (.29)	<.001	.09 (.03)	.03 – .14	.16
	Anxiety	.46 (.02)	<.001	.38 (.03)	<.001	-.07 (.004)	<.001	-1.15 (.39)	<.001	.08 (.02)	.04 – .12	.20
	Well-being	-.08 (.01)	<.001	-.07 (.01)	<.001	-.07 (.004)	<.001	.28 (.08)	<.001	-.02 (.01)	-.03 – -.01	.25
Social support	Depression	.54 (.03)	<.001	.53 (.03)	<.001	-.04 (.01)	<.001	-.29 (.24)	.23	.01 (.01)	-.01 – .03	n.a.
	Anxiety	.46 (.02)	<.001	.46 (.03)	<.001	-.04 (.01)	<.001	.04 (.20)	.83	.002 (.01)	-.02 – .01	n.a.
	Well-being	-.08 (.01)	<.001	-.07 (.01)	<.001	-.04 (.01)	<.001	.26 (.04)	<.001	-.01 (.01)	-.02 – -.01	0.13

Note. IV = Perceived stress, SE = Standard Error, CI = Confidence interval, ES = effect size (ratio of the indirect effect to the total effect). All coefficients reported for paths a, b,

c, c' and ab are unstandardized slopes with the corresponding standard error of the slope in parentheses.

*Estimated on 5000 bootstrap sample

Table 3*Regression Table for the Moderator Analysis*

Moderator Model	Outcome		b ^a	SE _b ^a	95% bca ^b CI	<i>t</i>	R ² Change
Self-compassion	Anxiety						
	Step 1	Stress	.38	.03	[.30 – .46]	12.55	.53
		Self-compassion	-1.14	.29	[-1.94 – -.45]	-3.79	
	Step 2	Stress x self-compassion	-.10	.03	[-.17 – -.01]	-3.43	.01
	Depression						
	Step 1	Stress	.46	.04	[.36 – .56]	12.93	.53
		Self-compassion	-1.25	.39	[-2.32 – -.30]	-3.53	
	Step 2	Stress x self-compassion	-.11	.04	[-.24 – -.02]	-3.38	.01
	Well-being						
	Step 1	Stress	-.06	.01	[-.07 – -.04]	-8.04	.38
Self-compassion		.28	.07	[.13 – .43]	3.99		
Step 2		Stress x self-compassion	<.01	.01	[-.01 – .02]	.78	<.01
Social support	Anxiety						
	Step 1	Stress	.46	.02	[.40 – .53]	19.46	.51
		Social support	.06	.20	[-.46 – .54]	0.23	
	Step 2	Stress x social support	-.03	.03	[-.11 – .05]	-1.03	<.01
	Depression						
	Step 1	Stress	.53	.04	[.46 – .61]	19.35	.52
		Social support	-.30	.25	[-.91 – .38]	-1.29	
	Step 2	Stress x social support	-.07	.05	[-.18 – 0.7]	-1.99	<.01
	Well-being						
	Step 1	Stress	-.07	.01	[-.08 – -.06]	-12.55	.40
		Social support	.24	.05	[.14 – .33]	6.10	
	Step 2	Stress x social support	<.01	.01	[-.01 – .02]	.94	<.01

Note. N = 394, SE = Standard Error.^a Confidence intervals and standard errors are replicated via Bootstrapping based on 5000 replicates.^b Bias corrected accelerated

Table 4*Facilitators for the Junior-to-Senior Transition*

General category (% in total)	Higher-order theme	Examples of raw data themes	%*
Internal resources (18.2 %)	Physiological and sport specific resources	Hard work, more training, technical knowledge	6.2
	Psychosocial resources	Determination, patience, acceptance of failures and losses, self-belief	12.0
External resources (81.7%)	Sport-related support	Coaches, (older) team members, financial support, team cohesion/integration	59.2
	Significant other's support	Family, friends, psychologists	22.5

Note. * % is calculated as the total of the answers in relation to the answers in the higher-order topics. $N = 349$.

Table 5*Challenges Encountered During the Junior-to-Senior Transition*

General category (% in total)	Higher-order theme	Examples of raw data themes	%*
Internal challenges (20.1%)	Physiological & sport specific skills	Injuries, physical changes (puberty)	1.8
	Psychological challenges	Too high expectations, lack of motivation, lack of self-belief	9.4
	Lack of knowledge	Unclear what it takes to manage the transition, nutrition, lack of plans	8.9
External challenges (66.2%)	Higher performance demands	Physical requirements, new competition rules, pressure from others	19.9
	Lack of support	From coaches, from older (team) athletes, from federations	17.1
	Lack of integration/ challenges with new relations	Difficulties with integration, age gap, competitive feelings	6.6
	Unethical behaviors from others	Lack of consideration for age and needs, lack of respect, discrimination, lack of appreciation	5.5
	Systematical and structural challenges	Intermediate category missing, transition was too fast/ too early, lack of experience, lack of structure	12.6
	Sport-life conflicts	Dual-career, sport and family, lack of time	4.5
No challenges (13.6%)	No challenges	Transition was good, no difficulties	13.6

Note. * % is calculated as
the total of the answer

Highlights

- Opportunities for change in the relationship between stress and mental health are identified based on a representative sample of athletes in the JST using a mixed methods design.
- Self-compassion is helpful in shielding athletes from the negative effects of stress during the JST.
- During the JST, athletes frequently cited external resources over internal ones as facilitators, while external challenges were more commonly reported than internal ones as barriers for navigating through the JST.

Declaration of interests

☒ 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.

☐ The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

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