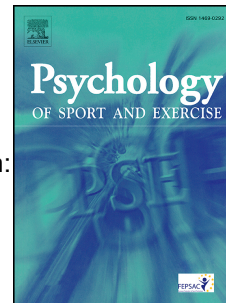


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A Mixed Methods Study

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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/>

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

20 **Factors Contributing to Elite Athletes' Mental Health in the Junior-to-Senior Transition: A** 21 **Mixed Methods Study**

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

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

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

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

57 The direct impact of stress on athletes' mental health is well-documented (e.g., De Francisco et al.,
58 2016; McLoughlin et al., 2021; Poucher et al., 2021; Spielberger, 1990). The Stress Process Model (SPM;
59 Pearlin et al., 1981), a framework for understanding the relationship between stress and mental health, outlines
60 two further mechanisms through which stress affects mental health, using personal and social resources. Firstly,
61 these resources can mediate the effects of stress, meaning they are altered by stressors, potentially exacerbating
62 negative outcomes. Alternatively, they can moderate the stress effects, influencing the severity or direction of the
63 stress-health relationship. The SPM not only offers a foundation for forming hypotheses about stress's impact on
64 mental health but has also garnered empirical support (Aneshensel & Avison, 2015) across various contexts,
65 from caregiving and family research to student populations and sports (e.g., Poucher et al., 2021; Reed et al.,
66 2015; Wang, 2022; Yu et al., 2020).

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

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

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

88 The impact of stress on mental health in competitive sports is well established (e.g., Arnold & Fletcher,
89 2021; Kuettel et al., 2019; Simpson et al., 2021). Expanding this knowledge on the specific group of athletes in
90 the JST is deemed necessary. Unraveling how resources modulate the relationship between stress and mental
91 health can shape future interventions and research directions for this specific group of athletes. Therefore, this
92 study investigates the interplay between stress, resources, and mental health in transitioning athletes. In this
93 regard, it is also vital to expand our current understanding of the factors that facilitate or challenge athletes'
94 adaptation to the demands of the JST. Much of our current knowledge on this topic stems from smaller
95 qualitative samples (e.g., Andronikos, 2018; Franck & Stambulova, 2020) or given answer choices (e.g.,
96 Stambulova et al., 2012). Therefore, a qualitative investigation in a broader sample provides a more
97 comprehensive view of perceived barriers and useful strategies and also allows to get a sense of the number of
98 times these resources or barriers are mentioned. The insights derived from our two study aims can inform
99 initiatives to either bolster mental health during this phase of adaptation or equip practitioners to support athletes
100 during challenging periods.

101 **Present study**

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

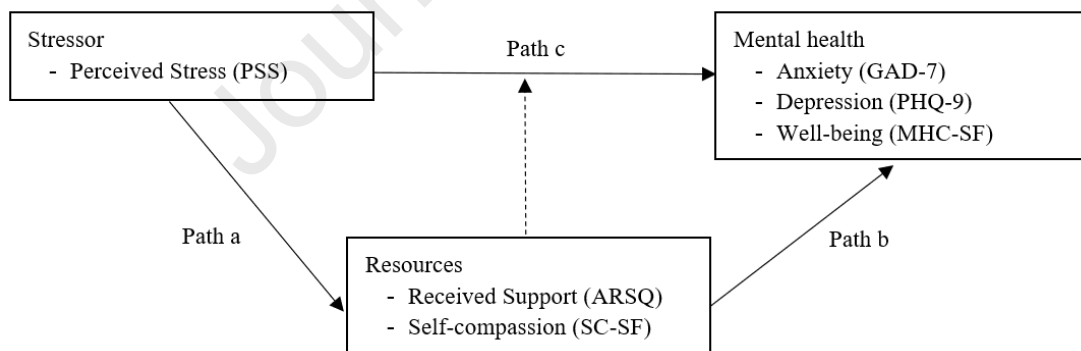
113 what conditions self-compassion and social support act as resources is of great interest for planning future
 114 interventions. We focused on outcomes at the psychological level and investigated two common mental health
 115 disorders—anxiety and depression—and well-being in athletes (Figure 1).

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

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

128 **Figure 1**

129 *Stress Process Model*



136

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

139

140 **Methods**

141 **Research Philosophy and Design**

142 To foster transparency and methodological integrity, we will begin by elucidating the study's
 143 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

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

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

158 **Participants and procedure**

159 This study is part of a broader research project on elite athletes' mental health in XXX. Two studies
160 emerged from this project. The first study aimed to assess the state of mental health of XXX elite athletes
161 (XXX), whereas the current study aimed to investigate ways to improve the mental health of athletes in the JST.
162 To collect data for both studies, an online questionnaire was sent to all XXX athletes ($N = 4,873$). XXX are the
163 best XXX athletes in their respective sports. Athletes older than 16 received a letter and athletes older than 18
164 received an email with a brief description, a QR-code/link, and a personal code for the online survey. After
165 scanning/clicking on the link, they were informed about their rights and the purpose of the study, and were asked
166 to give their consent to participate. For the first study, athletes were surveyed for common mental health
167 problems such as depression, anxiety, disordered eating, sleep problems, and levels of well-being. A total of
168 1,003 athletes ($M_{age} = 21.69$, $SD_{age} = 7.09$ range = 16-62 years, 54% women, 37% team sports) completed the
169 questionnaire. In the current study, we identified two specific sub-samples: athletes undergoing the JST and
170 those who have completed the JST, aligning with our study's primary and secondary objectives. Athletes in the
171 JST, based on our inclusion criteria, received supplementary questionnaires addressing stress, self-compassion,
172 and social support. Conversely, athletes who confirmed they had navigated past the JST were presented with two
173 open-ended questions concerning both hindering and facilitating factors for passing the JST. This dual data

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

176 *Identification of the quantitative sample*

177 The identification of the sample for the quantitative part was based on Stambulova et al. (2012) and was
178 adapted to the Swiss sports system. After presenting a short definition of what was meant by the JST and by “the
179 highest national age category”, the participants were presented two identification questions: “Do you compete in
180 the highest national age category in your sport?” for individual athletes and “Do you train with a team that
181 competes in the highest age category?” for team athletes. If the participants answered in the affirmative, they
182 were asked how long they had been training/competing in the oldest age category of their respective sports.
183 Answers were collected on a six-month basis for up to 3.5 years or longer. As noted, the JST is a phase rather
184 than a single event. Therefore, we included athletes who had been training/competing in the highest age category
185 of their sports for a maximum of three years (Stambulova et al., 2012). An a priori power analysis was conducted
186 using G*Power version 3.1.9.6 (Faul et al., 2007) to determine the minimum sample size required to test the
187 study hypotheses of the primary goal of the study. The results indicated that the required sample size to achieve
188 80% power for detecting a small effect, at a significance criterion of $\alpha = .05$, was $N = 395$ for moderation (F-test,
189 family, test for linear multiple regression with a fixed model and a R^2 increase) and mediation analyses (t tests
190 family, test for linear multiple regressions with a fixed model and a single regression coefficient).

191 A total of 394 athletes completed the questionnaires (55.33% female, 0.25% other), which was adequate
192 for testing the study hypotheses. The mean age was 18.56 years ($SD = 2.22$, $range = 16-26$). The athletes trained
193 for 14.78 hours per week on average ($SD = 6.20$) and participated in 28.31 competitions per year ($SD = 19.05$).
194 Fifty-eight different sports were represented, among which most of the athletes were from track and field
195 (8.38%), ice hockey (7.10%), soccer (6.85%), cycling sports (6.10%), and alpine skiing (6.09%).

196 *Identification of the qualitative sample*

197 The sampling for the secondary aim of the study comprised all athletes that were no longer in the
198 transition phase (the start of the transition more than three years ago). This led to 371 participants (52.56%
199 female), with a mean age of 27.70 years ($SD = 8.25$, $range = 17-62$). On average, athletes trained for 16.12
200 hours per week ($SD = 7.49$) and participated in 25.42 competitions per year ($SD = 19.32$). Seventy-six different
201 sports were represented, among which most of the athletes were from alpine skiing (6.74%), horse sports
202 (5.94%), cycling sports (4.86%), track and field (4.85%), and ice hockey (4.31%). In line with our studies' goal,
203 we did not meet a decision regarding a determined sample size or to halt data collection.

204 **Measures**

205 **Quantitative data collection**

206 **Anxiety.** Anxiety was assessed using the 7-item General Anxiety Disorder Questionnaire (GAD-7;
207 Spitzer et al., 1999; Spitzer et al., 2006), which asks about seven core symptoms in the last two weeks (e.g., “I
208 had not been able to stop or control worrying”). Participants answered the questions on a 4-point scale (0 = none,
209 3 = almost every day); the total score was formed by adding up the individual items. Higher scores reflect higher
210 levels of anxiety. The diagnostic threshold of the GAD-7 has previously been reported to be 10 (Löwe et al.,
211 2008), and we implemented the same in this study. The GAD-7 has been shown to be a valid measure for general
212 anxiety (Löwe et al., 2008), and the internal consistency of the GAD-7 in the present study was good ($\alpha = .85$).

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

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

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

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

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

241 **Stress.** Perceived stress was measured using the Perceived Stress-Scale-10 (PSS-10; Cohen et al.,
242 1983). Comprising 10 items, the PSS was developed to measure the degree to which situations in one’s life are
243 considered stressful. Items (e.g., “In the last month, how often have you felt nervous and stressed?”) were rated
244 on a 5-point scale ranging from *never* (0) to *very often* (4). Higher scores indicate more perceived stress.
245 Positively stated items were reversed to build the total mean score. The internal consistency of the scale was
246 good ($\alpha = 0.85$).

247 ***Qualitative data collection***

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

253 **Statistical analyses**

254 **Quantitative data**

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

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

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

276 **Qualitative data**

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

293 **Methodological rigor**

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

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

304 **Results**

305 **Quantitative results**

306 *Descriptive statistics*

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

314 *Mediation Analysis*

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

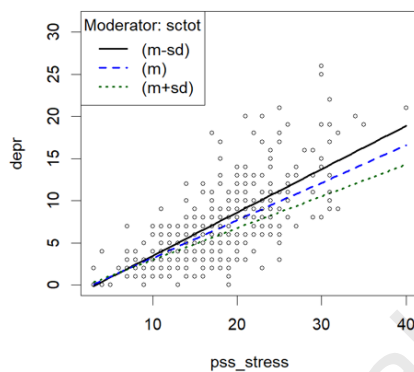
325 *Moderation Analysis*

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

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

336 **Figure 2**

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



338

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

340 **Qualitative results - Facilitators versus challenges during the JST**

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

351 The most frequently mentioned helping resources for athletes were of an external nature, namely, sport-
 352 related support (59.2%; e.g., coaches, team cohesion/integration), followed by support from significant others
 353 (22.5%; e.g., family, friends). These two higher-order categories accounted for 81.7% of the responses given

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

367 **Discussion**

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

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

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

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

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

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

440 **Practical implications**

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

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

455 **Limitations and future studies**

456 Studying a representative sample allowed us to draw some generalizable conclusions on how stress
457 impacts resources and mental health in athletes in the JST. Through the mixed methods design, we could gain
458 some further insight into the resources and challenges met during the JST, which is interesting for tailoring
459 adequate support. The present study also has some limitations that should inform future research. The JST is a
460 phase that takes up to three years. With a cross-sectional design, we were only able to catch a snapshot. While
461 the cross-sectional design offers a first impression of mediating effects, it also has been critically discussed
462 because of the missing opportunity to establish a direction of causality (e.g., Maxwell, 2011; O'Laughlin et al.,
463 2018). Future researchers should consider applying either a sequential mediation design as a lower cost-option or
464 a multilevel longitudinal mediation design (Cain et al., 2018). Such models would allow to inform about
465 direction of casual mechanisms, possibly confounding variables, and stability or age effects on athletes' mental
466 health, as evidence suggests that states of mental health fluctuate (Belz et al., 2018; Keyes, 2002).

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

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

479 **Conclusion**

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

491 **Declaration of competing interests**

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

494 **Data accessibility statement**

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

498 **CRediT author statement**

499 **XXX**: Conceptualization, Methodology, Formal analysis, Investigation, Writing – Original Draft,
500 Visualization. **XXX**: Conceptualization, Methodology, Writing – Review, Project Administration, Funding
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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>	R² 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.

Journal Pre-proof

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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