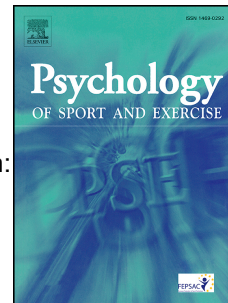# Journal Pre-proof

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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.

Acknowledgements

1   **Abstract**

2   The goals of this study were to examine factors that may affect the mental health of elite athletes during their

3   junior-to-senior transition and to explore the types and frequency of facilitators and challenges athletes encounter

4   during this transition. Using a cross-sectional, embedded QUAN(qual) mixed methods study design, we

5   surveyed two samples for the study goals. All participants completed demographic data (e.g., gender, age,

6   sports). Sample one ($N = 394$, $M_{age} = 18.46$ years, $SD = 2.2$) consisted of current transitioning athletes which

7   completed questionnaires on stress, anxiety, depression, well-being, self-compassion, and social support.

8   Mediation and moderation analyses revealed that stress leads to resource depletion, and that self-compassion can

9   be an important resource for young athletes to draw upon to maintain their mental health. Regarding social

10   support results were less conclusive. Sample two ($N = 371$, $M_{age} = 27.70$ years, $SD = 8.3$) consisted of athletes

11   that have passed the transition. They responded to open questions about helpful strategies and challenges faced

12   during their junior-to-senior transition, which were analyzed using thematic content analysis. Results showed

13   that during the junior-to-senior transition, external resources were more frequently mentioned than internal

14   resources when it came to facilitators. Furthermore, external challenges were perceived as hindering more

15   frequently than internal challenges. These findings can guide practitioners by providing potential starting points

16   for improving the mental health of transitioning elite athletes, as well as information on helpful strategies and

17   barriers during the transition.

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

19

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   Gouttebarge 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.

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*
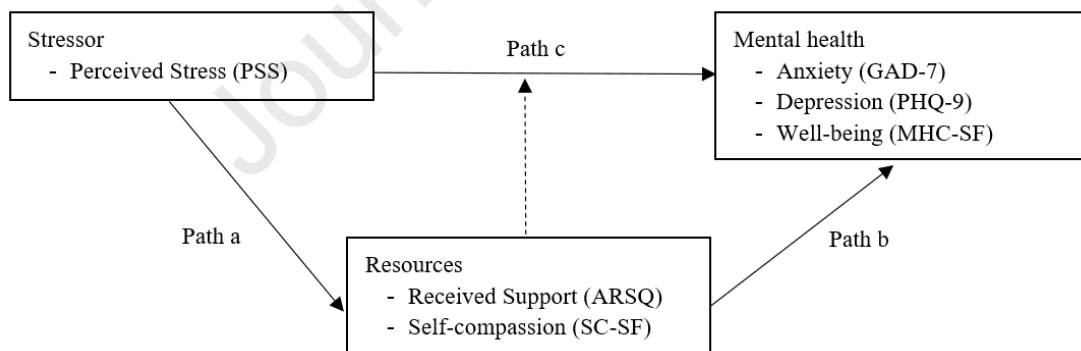
136

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   **Methods**

140   **Research Philosophy and Design**

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

142   philosophical underpinning (Ryba et al., 2020). The authors conducted this study from a post-positivistic

143   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).

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 (α = .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 $\geq$ 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 (α = .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 (α = .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 (α = 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 (α = .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 (α = 0.85).

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).

Statistical analyses

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*
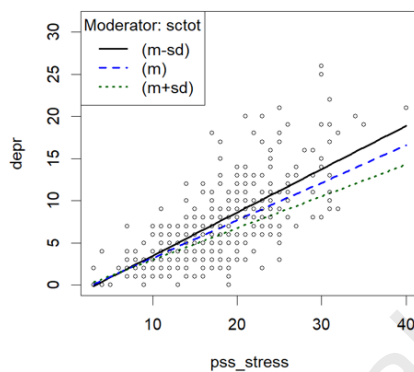
338

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.

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 & Leiggener, 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.

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.

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.

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.

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/

CRediT author statement

499 **XXX**: Conceptualization, Methodology, Formal analysis, Investigation, Writing – Original Draft,

500 Visualization. **XXX**: Conceptualization, Methodology, Writing – Review, Project Administration, Funding

501 acquisition. **XXX:** Conceptualization, Methodology, Writing – Review, Project administration.

506

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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	t	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: