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Merlin Örencik, Michael J. Schmid, Julia Schmid, Jürg Schmid, Achim Conzelmann

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Overcoming adversity during the COVID-19 pandemic: Longitudinal stability of psychosocial resource profiles of elite athletes and their association with perceived stress

Merlin Örencik¹, Michael J. Schmid¹, Julia Schmid¹, Jürg Schmid¹, and Achim Conzelmann¹

University of Bern

Author Note

¹Institute of Sport Science, University of Bern, Switzerland

Correspondence concerning this article should be addressed to Merlin Örencik,

Institute of Sport Science, University of Bern, 3012 Bern, Switzerland. E-Mail:

merlin.oerencik@unibe.ch

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6	Merlin Örencik ¹ , Michael J. Schmid ¹ , Julia Schmid ¹ , Jürg Schmid ¹ , and Achim Conzelmann ¹
7	University of Bern
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12	
13	Author Note
14	¹ Institute of Sport Science, University of Bern, Switzerland
15	Correspondence concerning this article should be addressed to Marlin Öreneik
15	Correspondence concerning this article should be addressed to Merrin Orencik,
16	Institute of Sport Science, University of Bern, 3012 Bern, Switzerland. E-Mail:
17	merlin.oerencik@unibe.ch
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25		Highlights
26	•	Latent profile analysis characterized psychosocial resources of elite athletes.
27	•	Four distinct profiles demonstrated individual and structural stability.
28	•	No changes in stress during the COVID-19 pandemic (period: June 2020-March
29		2021).
30	•	Significant differences in stress between psychosocial resource profiles.
31		Keywords
32		athletic identity, mental health, person-oriented approach, resilience, self-esteem,
33		social support

apport

Abstract 35 Previous research has demonstrated that psychosocial resources are associated with elite 36 athletes' perceived stress. However, these resources have mainly been studied separately. 37 Using a person-oriented approach, this study aimed to identify meaningful profiles of 38 athletes' psychosocial resources, their stability over time, and their relationship with 39 perceived stress during the COVID-19 pandemic. To identify such patterns, separate latent 40 profile analyses (LPA) at two measurement points T1 (June 2020) and T2 (March 2021) and 41 a subsequent latent transition analysis (LTA) were conducted with athletic identity, 42 resilience, perceived social support, and self-esteem for a sample of 373 Swiss elite athletes. 43 Perceived stress was analyzed at and between T1 and T2 with a mixed-design ANOVA. For 44 LPA, theoretical considerations and statistical criteria led to a solution of four profiles: (1) 45 Athletic Identifiers With Above-Average Resources ($n_{T1} = 235$; $n_{T2} = 240$), (2) Below-Average 46 Athletic Identifiers With Below-Average Resources ($n_{T1} = 84$; $n_{T2} = 90$), (3) Variable Athletic 47 Identifiers With Below-Average Internal and Clearly Below-Average External Resources (ntl 48 = 14; $n_{T2} = 7$), and (4) Athletic Identifiers With Below-Average Internal and Above-Average 49 *External Resources* ($n_{T1} = 40$; $n_{T2} = 36$). For LTA, both structural and individual stability was 50 demonstrated. A large and significant main effect of perceived stress was observed for 51 resource profiles, while there was no significant main effect for measurement point nor 52 interaction effect. Direct comparisons revealed that Athletic Identifiers With Above-Average 53 *Resources* perceived significantly less stress than the other profiles at both time points. In 54 conclusion, regardless of psychosocial resource profile, the perceived stress of elite athletes 55 was stable during the COVID-19 pandemic, but exhibiting a pattern with high psychosocial 56 resources seems to buffer against stress compared to a lack of specific resources. Therefore, 57 sport federations and practitioners should provide tailored support programs to help athletes

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59 **Overcoming adversity during the COVID-19 pandemic: Longitudinal stability of** 60 psychosocial resource profiles of elite athletes and their association with perceived stress 61 Perceived stress among elite athletes has received considerable interest recently 62 (Johnston et al., 2021; Lin et al., 2022; Wahl et al., 2020), not least because participation in high-performance sport and its prevailing demands have frequently been linked to 63 64 detrimental consequences on athletes' well-being (Arnold & Fletcher, 2021; Madigan et al., 65 2020). Coping successfully with these demands and paving the way to athletic excellence is not only an important task for the individual athlete but also for the surrounding support 66 67 system (e.g., federations, coaches, peers, and family). Based on typical yet individual 68 trajectories within high-performance sport careers (Wylleman et al., 2013), several factors 69 potentially impacting stress perception have been identified. Prevalent stressors include 70 leadership and personnel issues (e.g., relationships and expectations), cultural and team issues 71 (e.g., group dynamics), logistical and environmental issues (e.g., facilities, travel, training, 72 and competition conditions), performance and personal issues including career transitions 73 (e.g., from junior to elite level and out of high-performance sport), and injuries (Arnold & 74 Fletcher, 2012). Thus, athletes must be well-equipped to deal with these challenges to launch 75 and maintain a successful high-performance sport career.

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COVID-19: An unprecedented stressor

In late 2019, the Coronavirus disease 2019 (COVID-19) rapidly spread and shortly after, the World Health Organization declared it a global pandemic and public health emergency of international concern (World Health Organization, 2020). To control infection rates, national and local governing bodies enforced health policies and sanitary measures. General restrictions (e.g., social distancing, lockdown, and travel bans) as well as sportspecific consequences (e.g., limited access to training facilities and cancellation or postponement of major competitions) posed a novel situation for elite athletes. On the one

84 hand, the infection with COVID-19 might be a stressor in itself. Prevalence data 85 demonstrated that Swiss elite athletes tested positive more often than the general population 86 (Schmid et al., 2022). Most of these athletes, however, reported merely mild to moderate 87 symptoms and adverse effects on athletic performance. On the other hand, the indirect effects of the pandemic can be a stressor. In particular, potential implications of restrictions like 88 89 experiencing uncertainty, isolation and as a result elevated stress levels were discussed in the 90 initial stage of the COVID-19 related literature (Schinke et al., 2020; Taku & Arai, 2020). In 91 support of these claims, subsequent empirical studies found raised dysfunctional 92 psychobiosocial states and stress levels compared to pre-pandemic data (Di Fronso et al., 93 2022). A recent systematic review by Jia et al. (2023) underlined the increase in athletes' 94 stress perception during the pandemic dependent on individual differences (e.g., gender, type 95 of sport, performance level, and training substitution) or COVID-19 exposure (Petrie et al., 96 2023). However, there is a lack of longitudinal studies investigating the development of 97 perceived stress during the fluctuant course of the pandemic (in terms of restrictions) as well 98 as adaptations to novel circumstances.

99 Protective factors: Psychosocial resources

100 Psychosocial resources seem to be a crucial factor in the successful coping process 101 with stressful situations. There are two types of resources that individuals may possess and 102 draw upon (Rowe, 1996). On the one hand, internal resources are primarily associated with 103 an individual's personal qualities. These resources are inherent to the individual and reside 104 within their psychological constellation such as personality traits (e.g., resilience, self-esteem, 105 and optimism). External resources, on the other hand, refer to supportive factors that exist in 106 an individual's environment and provide individuals with external assistance such as the 107 various forms of social support (i.e., emotional, esteem, informational, and tangible; Rees & 108 Hardy, 2000). In his review of social and psychological resource models, Hobfoll (2002)

109 identified common elements underlying the protective effects of psychosocial resources. 110 Firstly, accumulating resources reduces the risk of encountering stressors in the first place. 111 Secondly, when facing stressful events, having various resources at one's disposal increases 112 the likelihood of meeting the situational demands. This buffering mechanism of psychosocial resources against perceived stress is integrated in one of the most prominent stress theories: 113 114 the transactional stress model (Lazarus & Folkman, 1984). It posits that, when individuals 115 experience a state in which their resources are overwhelmed or insufficient, stress is generated, and appraisal processes and coping mechanisms are initiated. While the primary 116 117 focus of Lazarus and Folkman's model is on appraisal and coping, they acknowledged that 118 individuals' internal and external resources play a crucial role in shaping these processes. In 119 particular, the model states that, after a primary evaluation of the threat of a stressor, the resources available to an individual decide what coping strategies to employ to effectively 120 121 address the challenge.

In light of these theoretical considerations, it becomes evident that even though elite 122 123 athletes share many stressors across their athletic career, appraising and facing them is highly 124 specific to the individual. A plethora of sport-environmental as well as individual differences 125 have been identified as either protective or risk factors for elite athletes' stress perception 126 (Kuettel & Larsen, 2020). In particular, domain-general internal resources such as personality 127 traits (e.g., self-esteem; Lundqvist & Raglin, 2015, resilience; Sarkar & Fletcher, 2014) as 128 well as domain-general external resource factors like social relations (e.g., positive social 129 relationships or social support; Freeman, 2021) were found to be linked to stress perception. 130 As Watson's (2016) study shows, this is also true for the domain-specific construct of athletic 131 identity which has received substantial attention in the field of athletic career research. 132 Despite not perfectly aligning with the conventional conceptualization of psychosocial 133 resources, athletic identity can and will be included here because it is described as a cognitive

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structure that guides and organizes processing of self-related information (Brewer et al.,135 1993).

136 While the nature of the association with perceived stress is evident for most of the 137 aforementioned factors, it is not in the case of the relationship between athletic identity: On the one hand, higher levels of athletic identity can protect against burnout (Edison et al., 138 139 2021). On the other hand, adverse outcomes can be observed when the sporting environment 140 is disrupted. In particular, increased levels of perceived stress have been found among injured 141 athletes with a strong athletic identity (Renton et al., 2021). When transitioning out of high-142 performance sport, athletic identity and potential identity foreclosure have been linked to 143 adjustment difficulties (Park et al., 2013). Thus, a strong athletic identity does not always 144 have protective effects.

145 In addition to the findings on protective and risk factors for perceived stress in the 146 regular sporting context, studies conducted early in the COVID-19 pandemic seem to 147 corroborate these relationships: Associations between elite athletes' stress perception and 148 social support (Hagiwara et al., 2021; Yamaguchi et al., 2021), self-esteem (Poucher et al., 149 2022), and resilience (Gupta & McCarthy, 2021) were demonstrated during the COVID-19 150 pandemic. Moreover, maintaining athletic identity during the sporting break was linked to 151 more positive outcomes than giving up one's athletic identity (Graupensperger et al., 2020). 152 Thus, the aforementioned domain-general resources and domain-specific factor seem not 153 only crucial for the relationship between general stressors and stress perception, but also for 154 the relationship between specific, that is pandemic-related, stressors and perceived stress.

155 **The present research**

156 The protective effects of individual psychosocial resources have been identified both 157 in the context of general stressors as well as in dealing with challenges specific to the 158 COVID-19 pandemic. The complexity of the diverse relationships between these resources

159 and the outcome variable of perceived stress requires adopting a dynamic-interactionist perspective. It proposes that human development and functioning is a continuous process 160 161 with reciprocal interactions and potential compensation of relevant factors (Gariépy, 1996). 162 The person-oriented approach (Bergman et al., 2003), which provides methods for identifying homogenous subgroups from a heterogenous population, integrates these postulates. 163 164 However, rather than establishing linear relationships between independent and dependent 165 variables that fail to account for complex human development from a dynamic-interactionist 166 perspective (Lerner, 2006; Magnusson & Stattin, 2006; Overton, 2015), the person-oriented 167 approach allows to identify distinct profiles with similar constellations on key indicators 168 (e.g., psychosocial resources). Here, the psychosocial constellation of a person is not 169 composed of aggregated scores of isolated factors (variable-oriented approach; Bergman & 170 Trost, 2006). Additionally, the stability of profiles across time can be examined through 171 developmental trajectories on an individual level (individual stability) and the similarity of 172 profiles on a group level at different measurement points (structural stability; Bergman et al., 173 2003).

174 Consequently, the first aim of the study was to find meaningful profiles based on 175 psychosocial resource indicators (athletic identity, resilience, perceived social support, and self-esteem) of elite athletes and to test on an exploratory basis individual and structural 176 177 stability as psychosocial resource profiles might alter due to influences of the COVID-19 178 pandemic. In order to further characterize the identified profiles, they were described in terms 179 of age, gender, and type of sport (i.e., Olympic winter sport, Olympic summer sport, non-180 Olympic sport). In line with the explorative nature of the person-oriented approach, no 181 hypotheses about the composition of the profiles were formulated.

182 The second aim was to examine the relationship between the identified profiles and 183 perceived stress. Specifically, the study sought to explore differences in perceived stress of

184 psychosocial resource profiles (between-group), the development of perceived stress during the COVID-19 pandemic (within-group), as well as the relationship of that development with 185 resource profiles (interaction effect). After determining the psychosocial resource profiles, it 186 187 becomes possible to formulate theory-driven hypotheses pertaining to the between-group differences of stress perception exhibited by these profiles. However, it could be expected a 188 189 priori already that perceived stress during the early stages of the pandemic with its severe 190 restrictions into the daily and sporting lives of elite athletes to be higher than in the later 191 stages when things returned to normality (hypothesis 1, H1).

192

Methods

193 **Participants**

194 In total, 1387 Swiss elite athletes met the inclusion criteria for both measurement 195 points and were invited to the survey. First, they had to be national squad members from Olympic sports, floorball, or orienteering. The latter two sports were included because the 196 197 Swiss Olympic Association ranks them in the top two categories based on their level of 198 international competitiveness and popularity in Switzerland (Swiss Olympic Association, 199 2022). Second, athletes competing exclusively in junior competitions and participants with 200 incomplete data (more than 50% of the total data of each measurement point) were omitted, 201 resulting in a sample of 384 athletes, among them multiple Olympic and world championship 202 medalists, from 62 sports. Based on demographic and sport-related characteristics, a direct 203 binary logistic regression was conducted to investigate response behavior. In particular, study 204 participation was regressed on age, gender, type of sport (i.e., Olympic summer sports, 205 Olympic winter sports, and non-Olympic sports), and performance level. The overall model was statistically significant, $\gamma^2(7) = 187.50$, p < .001, Nagelkerke $R^2 = .18$, n = 1387, 206 207 indicating a systematic difference between respondents and nonrespondents. Inspection of 208 individual predictors revealed that gender was not significantly associated with participation.

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However, young athletes, Olympic winter sports as well as respondents with high
performance levels were slightly overrepresented. The increased participation rate of winter
sport athletes might be due to both surveys being conducted in their off-season. Additionally,
the overrepresentation of athletes with an elevated performance level might be attributed to
the fact that this study was supported by the Swiss Olympic Association and the Swiss Sport
Aid Foundation. As a result, successful athletes who benefit most from these institutions
might have felt particularly motivated to participate.

216 Measures

217 Demographic and sport-specific information was collected. Additionally, four 218 validated questionnaires were used to assess psychosocial resources and stress for both 219 measurement points. For reasons of data analysis (see below), the overall scales were used: 220 (a) Athletic identity was assessed using the short version of the Athletic Identity 221 Measurement Scale (AIMS; Brewer et al., 1993), which consists of 7 items (e.g., "I consider 222 myself an athlete"). Participants responded to these items using a 7-point Likert scale ranging 223 from 1 (strongly disagree) to 7 (strongly agree). The internal consistency of the scale was 224 found to be acceptable, with a Cronbach's alpha coefficient of .71 at T1 and .74 at T2. Mean 225 scores were used in subsequent analyses with high scores indicating a strong identification with the athletic role. 226

(b) *Resilience* was measured via the Brief Resilience Scale (BRS; Smith et al., 2008), a questionnaire - designed to evaluate an individual's capacity to recover from adversity. Participants rated their agreement with six statements such as "*I tend to bounce back quickly after hard times*" on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The BRS demonstrated satisfactory internal consistency (T1 α = .78, T2 α = .80) and high mean scores indicated pronounced resilience.

233 (c) *Perceived social support* was evaluated using the Multidimensional Scale of 234 Perceived Social Support (MSPSS; Zimet et al., 1988), which is a 12-item questionnaire 235 designed to determine respondents' perceptions regarding the sufficiency of support they 236 receive. It is scored on a 7-point Likert scale ranging from 1 = strongly disagree to 7 *strongly* 237 *agree*) and internal consistency of the scale was found to be excellent (T1 $\alpha = .92$, T2 $\alpha =$ 238 .91). High mean scores reflected a high degree of perceived social support.

(d) *Self-esteem* was assessed via the Rosenberg Self-Esteem Scale (RSES; Rosenberg,
1965), which measures an individual's overall sense of self-worth based on perceptions about
oneself (e.g., "*I feel that I have a number of good qualities*"). The RSES consists of 10 items,
with participants responding on a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6
(*strongly agree*). The internal consistency of the RSES was satisfactory with Cronbach's
alpha coefficients of .76 at T1 and .81 at T2. To obtain a total score, the mean score across all
items was computed. High values were indicative of high self-esteem.

(e) *Perceived stress* was measured using the 10-item Perceived Stress Scale (PSS; Cohen et al., 1983). Participants indicated on a 5-point Likert scale (0 = never to 4 = very*often*) how often they felt or thought a certain way during the past few weeks (e.g., "*How often have you found that you could not cope with all the things that you had to do?*"). Again, internal consistency can be rated as good (PSS T1 $\alpha = .81$, T2 $\alpha = .81$). A high mean score indicated a high amount of perceived stress.

252 **Procedure**

This online survey (programmed on the software LimeSurvey, version 2.50) was sent out in June 2020 (T1) when severe restrictions to everyday and sporting life were in effect and uncertainty of future developments was present. Participants were invited to the second measurement nine months later, in March 2021 (T2). Both internationally and particularly in Switzerland, restrictions were either loosened or abolished partly because of vaccination

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258 availability. Response periods were one month for both measurement points and depending 259 on their first language, German or French versions of the survey were presented. Separate 260 analyses of the central constructs of this study revealed similar and satisfactory internal 261 consistencies, with no evidence of violation in terms of homoscedasticity of variance as determined by Levene's test. This study accords with the recommendations of the ethical 262 principles of psychologists and the code of conduct and thus was approved by the ethics 263 264 committee of the Faculty of Human Sciences of the University of Bern. All participants gave 265 their written informed consent before participation.

266 Of the eligible sample, partially missing data were observed for seven athletes at T1 (1.8%) and three athletes at T2 (0.8%). Using the expectation maximization algorithm of 267 268 IBM SPSS MVA (IBM Corp., 2021), missing data were singly imputed based on available 269 demographic, athletic, vocational, financial, and psychological information. Additionally, a multivariate outlier analysis comparing Mahalanobis distance with the χ^2 distribution at $\alpha =$ 270 271 .001 (Tabachnick & Fidell, 2019) led to the non-consideration of 11 cases with anomalous 272 patterns of indicator variables. Thus, the final sample consisted of 373 elite Swiss athletes 273 $(M_{age} = 25.55 \text{ years}, SD = 4.71; 44.8\% \text{ female}, 55.2\% \text{ male}; Olympic summer sports =$ 274 59.5%, Olympic winter sports = 35.1%, non-Olympic sports = 5.4%).

Data analysis

In accordance with the first aim of the study, latent profile analyses (Masyn, 2013) were conducted separately for T1 and T2 to identify psychosocial resource profiles. Considering that highly correlated indicators in LPA can result in unstable estimates, an arbitrary weighting of constructs, and challenges in interpretation when distinguishing specific profile characteristics, the decision was made to use total scales for subsequent analyses. This approach in selecting only a few indicators is recommended to ensure greater interpretability and avoid potential issues associated with indicator overlap. Both statistical

283 indices as well as theoretical considerations (i.e., parsimony, replication, interpretability) were considered to determine the final profile solution. Statistical indicators consisted of the 284 285 Bayesian information criterion (BIC), the adjusted BIC (aBIC), Akaike's information 286 criterion (AIC), the Bootstrapped likelihood test (BLRT), and entropy. Lower values of BIC, aBIC, and AIC and higher entropy indicated better model fit. As for the BLRT, a *p*-value of 287 288 less than .05 indicated a better fit for the k-pattern solution compared to k-1 patterns (Morin 289 & Wang, 2016). Standardized scales were used to ease interpretability and comparability. To 290 test for differences in patterns on demographic and sport-related factors (e.g., age, gender, 291 type of sport), Wald's-tests were used (Bakk & Vermunt, 2016). 292 Subsequently, a latent transition analysis was conducted to examine pattern stability. 293 On an overall level, structural stability was investigated through measurement invariance of 294 patterns across measurement points (Morin, Meyer, et al., 2016). A configural similarity 295 model with freely estimated indicator means was compared to a structural similarity model with equal indicator means using a χ^2 difference test with restricted maximum likelihood 296 297 estimation and Satorra-Bentler scaling correction (Morin, Meyer, et al., 2016; Olivera-298 Aguilar & Rikoon, 2018). On a specific level, an indicator of structural stability (SSi) was 299 calculated by averaging the squared Euclidian distance between corresponding patterns 300 (lower values indicating greater similarity; Bergman et al., 2003). Individual stability was 301 evaluated by estimating transitional probabilities from T1 to T2. 302 To investigate the relationship between the identified profiles and perceived stress and 303 thus to answer the second research question, a mixed-design ANOVA was performed. This 304 approach was indicated because Wald's test was not feasible due to a singular covariance

matrix caused by an inadequate sample size for the longitudinal analysis (Tanaka, 1987). The
analysis focused on three key effects: the main effect for profile differences in perceived

307 stress (between-group), the main effect of measurement point for observing changes in

308 perceived stress over time (within-group), and the interaction effect that examines the within-

309 group development of perceived stress across different profiles.

310 LPA and LTA were carried out in Mplus Version 8.7 (Muthén & Muthén, 1998–

311 2017), while descriptive statistics, imputation, and the mixed-design ANOVA were

312 conducted with SPSS Version 28 (IBM Corp., 2021). The significance level was set at $\alpha =$

- 313 .05.
- 314

Results

315 **Psychosocial resource profiles of elite athletes**

316 Descriptive statistics for the scores of the indicators can be found in Table 1. For each 317 measurement point, two- to six-profile solutions were evaluated. As shown in Table S1 318 (Supplementary Material), an improvement in BIC, aBIC, and AIC was observed with each 319 increment in the number of profiles. Looking at the elbow criterion, improvements in 320 statistical criteria flattened out after the four-profile solution suggesting only negligible better 321 fit in models. BLRTs were significant for all models indicating a better fit by the addition of 322 another profile, whereas entropy values pointed to an optimal solution between four to six 323 profiles. Last, theoretical considerations in terms of parsimony, replicability, interpretability, 324 and profile size led to the selection of the four-profile solution as the most appropriate for 325 both T1 and T2 (the posterior probabilities can be found in Table S2 of the Supplementary 326 Material).

327

[Please insert Table 1 near here]

Descriptive statistics (mean raw and *z*-standardized scores) for the four-profile solutions are given in Table 2 and displayed in Figure 1. In addition, demographic and sportrelated information for further characterization of the profiles is summarized in Table 3. Regarding the labeling of profiles, the approach proposed by Rowe (1996), which involves categorizing internal and external resources, was followed. Participants scoring above- or

333 below-average compared to the entire elite athlete sample were classified as having "above-334 average" or "below-average" respective resources. The particular significance of this relative 335 interpretation lies in the specificity of the current sample, composed of elite athletes. Notably, 336 elite athletes typically exhibit higher absolute scores on some resources, such as athletic identity, compared to athletes with lower performance levels or the general population norms 337 338 of the questionnaires. Thus, above-/below-average labels of the profiles must be interpreted 339 in the context of the current elite athlete sample. Additionally, when participants' scores 340 deviated more than two standard deviations from the mean, the adverb "clearly" was added. 341 Most athletes belong to Profile 1, which can be labeled as Athletic Identifiers With Above-Average Resources (T1: n = 235, 63%; T2: n = 240, 64%). This profile is 342 343 characterized by a pattern of high values on all indicators. Exploratory analyses relative to the 344 total sample based on demographic information revealed a balance in age, gender, sports 345 category, and weekly hours invested in the three activities (i.e., sport, education, vocation) while earning the highest annual income. Moreover, the hours invested in sport almost 346 347 doubled from 14.99 at T1 to 27.46 at T2. The Below-Average Athletic Identifiers With Below-348 Average Resources represent the second most numerous profile (T1: n = 84, 22%; T2: n = 90, 349 24%). Compared to the sample, they scored below-average on all indicators with a 350 particularly low value on perceived social support and a slight overrepresentation of male 351 athletes from Olympic summer sports was observed. The number of sport hours was also 352 twofold at T2 for this profile. A comparatively small fraction of athletes (T1: n = 14, 4%; T2: 353 n = 7, 2%) resembled the pattern of Variable Athletic Identifiers With Below-Average 354 Internal and Clearly Below-Average External Resources. Similar to the Below-Average 355 Athletic Identifiers With Below-Average Resources, this profile had low values on all 356 indicators except for a relatively high level of athletic identity at T2. Especially low were the 357 values for external resources (i.e., perceived social support approximately three standard

358	deviations below the mean). This profile had the highest mean age with an overrepresentation
359	of male and Olympic summer sport athletes. Furthermore, the invested hours into their sport
360	career approximately tripled from 10.46 at T1 to 30.16 at T2. Last, the Athletic Identifiers
361	With Below-Average Internal and Above-Average External Resources (T1: $n = 40, 11\%$; T2:
362	n = 36, 9%) demonstrated a pattern of high athletic identity, high perceived social support
363	(external resource) and low values on resilience and self-esteem (internal resources).
364	Furthermore, this profile had the youngest mean age with an overrepresentation of female
365	athletes, Olympic summer sports, and low annual income. The volume of sport hours
366	increased from 14.49 at T1 to 30.70 at T2.
367	By combining these profiles with the findings of previous research on the relationship
368	between psychosocial resources and perceived stress, the following hypotheses for the second
369	research question can be made: H2) Athletic Identifiers With Above-Average Resources
370	perceive significantly less stress than all other profiles. H3) Athletic Identifiers With Below-
371	Average Internal and Above-Average External Resources perceive significantly less stress
372	than Variable Athletic Identifiers With Below-Average Internal and Clearly Below-Average
373	External Resources and Below-Average Athletic Identifiers With Below-Average Resources.
374	[Please insert Table 2 near here]
375	[Please insert Figure 1 near here]
376	[Please insert Table 3 near here]
377	Structural and individual stability of psychosocial resource profiles across measurement
378	points
379	Structural measurement invariance testing by comparing configural and structural
380	similarity models indicated no statistically significant violation of profile stability,
381	$\chi^2(16) = 16.08$, $p = .45$. However, an inspection of the average squared Euclidian distances

between the profiles across measurement points revealed that the structural stability of Profile

- 1

383 3 (Variable Athletic Identifiers With Below-Average Internal and Clearly Below-Average 384 *External Resources*; SS_i = 0.29) was slightly lower than the one of the other profiles (SS_i \leq 385 0.03). Inspecting individual stability, 92.7% (n = 346) of all elite athletes stayed in the same 386 psychosocial resource profile across measurement points. The athletes of Profile 1 (Athletic Identifiers With Above-Average Resources) and Profile 4 (Athletic Identifiers With Below-387 Average Internal and Above-Average External Resources) remained in their respective 388 389 profile most often (94%). Some transitions from Profile 3 (Variable Athletic Identifiers With 390 Below-Average Internal and Clearly Below-Average External Resources) at T1 to Profile 2 391 (Below-Average Athletic Identifiers With Below-Average Resources; 14%) and Profile 4 392 (Athletic Identifiers With Below-Average Internal and Above-Average External Resources; 393 11%) at T2 were observed. However, none of the across-profile transitions exceeded 15%

394 indicating individual stability.

395 Relationship of perceived stress with psychosocial resource profiles

396 Figure 2 depicts perceived stress levels by resource profiles (at T1) and measurement 397 point. The mixed-design ANOVA revealed a large and statistically significant main effect for resource profiles, F(3, 369) = 21.79, p < .001, $\eta_p^2 = .150$, no significant main effect for 398 measurement point, F(1, 369) = 2.71, p = .10, $\eta_p^2 = .007$, and no interaction between resource 399 profiles and measurement point, F(3, 369) = 2.55, p = .06, $\eta_p^2 = .020$. In order to better 400 401 understand the main effect for resource profiles, post-hoc comparisons were calculated using 402 Gabriel's method. It is considered particularly suitable in situations in which population 403 variances are homogeneous and sample sizes differ across groups (Field, 2018). The analysis 404 disclosed that Profile 1, Athletic Identifiers With Above-Average Resources, reported 405 significantly $(ps \le .001)$ lower perceived stress than all other profiles comprising athletes 406 lacking either internal or external resources or both: Profile 2 (Below-Average Athletic 407 Identifiers With Below-Average Resources; $M_{\text{Difference}} = -3.50$, SE = 0.58), Profile 3 (Variable

408 Athletic Identifiers With Below-Average Internal and Clearly Below-Average External

409 *Resources*; $M_{\text{Difference}} = -4.00$, SE = 1.26), and Profile 4 (*Athletic Identifiers With Below-*

410 Average Internal and Above-Average External Resources; $M_{\text{Difference}} = -4.71$, SE = 0.78). No

411 significant differences were observed in the other pairwise comparisons.

- 412
- 413

Discussion

[*Please insert Figure 2 near here*]

The study had two aims: The first aim was to find meaningful psychosocial resource patterns of elite athletes based on key indicators (i.e., athletic identity, resilience, perceived social support, and self-esteem), to test structural and individual stability, and to describe the profiles. The second aim was to investigate the development of perceived stress during the COVID-19 pandemic and the association of perceived stress development with psychosocial resource profiles.

420 Identification of four stable psychosocial resource profiles

Both at the initial stage of the pandemic as well as a year after its initial outbreak, four 421 422 distinct psychosocial resource profiles demonstrating individual and structural stability were 423 found. Most athletes were allocated to the Athletic Identifiers With Above-Average Resources 424 exhibiting high psychosocial resources in dealing with potential stressors. This profile not 425 only receives external resources (i.e., perceived social support) through their immediate 426 environment (e.g., significant others, family, friends, coaches, teammates), but is also 427 endowed with internal resources (i.e., resilience and self-esteem) and exhibits a strong 428 athletic identity. All other profiles lack at least one psychosocial resource. The Below-429 Average Athletic Identifiers With Below-Average Resources were the second most common 430 profile. Relative to the sample, they have low values on all internal resource indicators with a 431 particularly low value on the external resource of perceived social support. The Variable 432 Athletic Identifiers With Below-Average Internal and Clearly Below-Average External

Resources demonstrate even lower values on psychosocial resources. Strikingly, these
athletes perceive limited access to social support and an increase in athletic identity was
observed at T2, which might be explained by the return to their regular daily lives and their
respective sporting hours almost tripling compared to T1.

Even though the size of this profile is small (T1: n = 14; T2: n = 7), this constellation 437 of psychosocial resources is still statistically, theoretically, and practically meaningful in 438 439 high-performance sport. First, these athletes were not identified as unrealistic statistical outliers. Second, prior studies with similar analytical methods (LPA) but different 440 441 populations have also reported small groups of elite athletes with vulnerable profiles, highlighting the importance of not neglecting and practical occurrence of such observations 442 443 (Kuettel et al., 2021). Third, it is worth noting that the small sample size of Profile 3 was 444 already present in the 3-profile solution at T1, as indicated in Table S1. This 3-profile 445 solution does not resolve the issue of small profile sizes additional to demonstrating inferior statistical indicators. These findings further emphasize the statistical and meaningful 446 447 distinctiveness of this profile from the total sample of elite athletes and the rationale of 448 choosing the 4-profile solution because opting for a 2-profile solution would result in 449 information loss and compromise statistical properties. However, it is important to exercise 450 caution in transferring the findings of subsequent analyses to specific individuals due to the 451 limited profile size.

All aforementioned profiles illustrate level patterns meaning that *z*-standardized
values are either above, below- or at average for each indicator (except for the altering values
of athletic identity of Profile 3). In contrast, *Athletic Identifiers With Below-Average Internal and Above-Average External Resources* are characterized by alternating values (i.e., shape
pattern) of indicator variables (Morin, Boudrias, et al., 2016). Specifically, these athletes
indicate low internal resources (resilience and self-esteem), high values on external resources

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458 (perceived social support), and a strong athletic identity. The overrepresentation of female 459 athletes in this profile suggests a gender difference regarding the distribution of internal and 460 external resources. Relative to the sample, these athletes, mainly women, can draw on 461 external resources but have only limited internal resources. When interpreting the results, however, the distribution of values must be considered. 462 Indicators, especially athletic identity and perceived social support, slightly deviate from a 463 464 normal distribution and a ceiling effect was observed. The alleged insufficient perceived social support of the Below-Average Athletic Identifiers With Below-Average Resources and 465 466 the Variable Athletic Identifiers With Below-Average Internal and Clearly Below-Average External Resources must be interpreted in relation to the total sample. These athletes do not 467 perceive no social support in absolute terms as they indeed affirm several items of the 468 469 MSPSS (Zimet et al., 1988) but in comparison to other profiles significantly less items. 470 Moreover, the sample stems from a population of elite athletes. Hence, it is reasonable to assume a generally strong athletic identity as well as having sources of potential social 471 472 support from their sport environment (e.g., teammates or coaches; Chen, 2013). 473 The finding that available resources altered only negligibly during the nine-month 474 period supports the notion of structural and individual stability of the profiles and thus of 475 treating psychosocial resources as trait instead of variable state profiles (Schmitt & Blum, 476 2020). The overall high stability observed in these profiles may be explained by the 477 predominant usage of domain-general measures (i.e., resilience, perceived social support, and 478 self-esteem) in the assessment. Unlike domain-specific measures such as athletic identity, 479 which may be more susceptible to sport-related restrictions of the pandemic, the domain-480 general measures may be less influenced by a temporary disruption of high-performance sport. The relatively high occurrence of transitions from individuals belonging to Profile 3 to 481 482 other profiles may be attributed to the limited sample size (and thus unreliable estimates).

483 However, it is also plausible that these athletes experienced a temporary crisis in their

484 psychosocial resources, characterized by low levels of perceived social support, and that even

485 slight increments in social support facilitated a transition to a different profile.

486 Stable intraindividual stress perception but interindividual variability

Contrary to previous longitudinal research during the pandemic (Jia et al., 2023), the 487 488 overall perceived stress of the current sample did not change across measurement points. 489 Neither a worsening during confinement (Mehrsafar et al., 2021) nor potential adaption to 490 circumstances over time could be observed (Batalla-Gavalda et al., 2021; Rubio et al., 2021) 491 resulting in the rejection of H1. However, the measurement periods of those studies in the 492 initial phase of the pandemic only extended over a few weeks. The current study investigated 493 alterations in perceived stress over nine months, in which similar short-term fluctuations 494 might have occurred. Nevertheless, the stress levels of Swiss elite athletes at the early phase 495 of the pandemic (June 2020), when restrictions affected athletes' daily and sporting lives 496 most, did not differ from the later phase (March 2021), when restrictions loosened, and 497 athletes could return to their normal course of life. This return to normality was also 498 empirically supported as the training volume more than doubled over this period.

499 Comparing the four psychosocial resource profiles with respect to perceived stress 500 revealed profiles with increased vulnerability to experienced stressors. A pattern with high 501 and thus presumably sufficient values on all psychosocial resources, as it is exhibited by 502 Profile 1, seems to buffer against the adverse effects of the COVID-19 pandemic and its 503 concomitants, which is in line with H2. Moreover, those athletes not only demonstrate the 504 highest psychosocial resources but also socioeconomic resources (i.e., annual income) and 505 thus did not have to deal with financial hardship on top of the pandemic-related difficulties. If 506 athletes had external, but not internal resources at their disposal (Profile 4), this protective 507 effect was not noticeable (rejection of H3). The athletes of Profile 4 reported similar amounts

of stress during the pandemic as athletes with varying negative amplitudes on all resourceindicators (Profile 2 and Profile 3).

510 As a result and in line with the person-oriented approach (Bergman et al., 2003), 511 linear assumptions about the relationship between psychosocial resources and perceived 512 stress are inadequate. Specific meaningful patterns with potential interactions and 513 compensations lead to a more realistic depiction of elite athletes' experiences. Moreover, the 514 differential association has also been detected for athletic identity in previous research 515 (Edison et al., 2021; Graupensperger et al., 2020; Manuel et al., 2002; Park et al., 2013). This 516 finding also significantly contributes to the complex mechanisms of psychosocial resources 517 in the secondary appraisal of a stressor and the resulting coping options with stress proposed 518 by the transactional stress theory (Lazarus & Folkman, 1984). Previously the buffering 519 effects for perceived stress were attributed to the mere accumulation of psychosocial 520 resources. However, as demonstrated by the adoption of the person-oriented approach, specific interactions and potential compensation for the lack of resources play a crucial role 521 522 in shaping stress perception.

523 Linking the current findings to the dual career literature of combining a high-524 performance sport career with an academic or vocational one showed no differences in hours 525 invested into education nor vocation for psychosocial resource profiles. There is a balanced 526 distribution of dual career athletes in all profiles and consequently, dual career athletes did 527 not show any differences in perceived stress compared to single career athletes. Identified 528 internal (e.g., mental toughness; De Brandt et al., 2017; De Brandt et al., 2018) as well as 529 external resources (e.g., social support; Brown et al., 2015) to successfully cope with the 530 wide-ranging demands of a dual career (e.g., time management, academic or workplace 531 stressors; Brown et al., 2015; Harrison et al., 2022; Stambulova & Wylleman, 2019) are thus

not only relevant in a dual career context but also when dealing with other sources of

533 potential stress.

534 **Practical implications**

535 Translating the research findings into practical implications, while also considering inter-individual differences, enables tailoring targeted interventions for specific subgroups of 536 537 elite athletes (Gut et al., 2020). By identifying the vulnerable psychosocial resource profiles 538 of their athletes, sport federations, practitioners, and support providers can implement both 539 preventive measures before and interventions during times of crisis, thereby enhancing the 540 efficiency of their counseling services. To achieve this, it is crucial for them to recognize the 541 significance of psychosocial resources in facilitating effective coping with stress. In 542 particular, the immediate environment of elite athletes must be willing and ready to provide 543 social support, particularly during periods of heightened stress. Moreover, sport 544 psychological counseling should aid athletes in maintaining a balanced identity (Aston et al., 2022). Specific interventions should be directed towards enhancing resilience (Galli & 545 546 Gonzalez, 2015) and self-esteem (Richard et al., 2017). By doing so, not only the longevity 547 and sustainability of a healthy athletic career is more likely, but also a successful transition 548 out of elite sport.

549 Limitations

No pre-pandemic data for the indicator and outcome variables were available. Thus, it is to not possible to make a statement about whether Swiss elite athletes perceived an elevated amount of stress after the onset and a year into the COVID-19 pandemic compared to times of normal sporting reality. However, other studies reported a drop in athletic identity (Graupensperger et al., 2020) as well as increased stress as a consequence of the pandemic and the associated the sporting break (Jia et al., 2023). These findings suggest that in a nonpandemic context the athletic identity might be even stronger for the current sample.

557 Moreover, applying these longitudinal findings to the data of this study, potentially elevated 558 stress levels triggered by the pandemic might still be present after one year and the alleged 559 return to normality.

560 Due to the current study being conducted solely in the Swiss elite sport system (Kempf et al., 2021; Kuettel et al., 2018; Örencik et al., 2023), generalizations of the findings 561 562 should be done cautiously and be based on comparable sport-environmental and cultural 563 conditions as well as COVID-19 restrictions. Additionally, the overrepresentation of athletes with an elevated performance level might bias psychosocial resources, particularly the 564 565 domain-specific measure of athletic identity, and stress perception. However, it remains 566 unclear in which way the specific characteristics of this sample affect the results. 567 Nevertheless, the comparatively large sample size of this longitudinal research design 568 population attests robust results.

569 Future research

570 Future studies should address the limitation inherent in the relatively short 571 investigation period of the current study and place a strong emphasis on longitudinal tracking 572 both the stability of psychosocial resources and perceived stress. While the structural and 573 individual stability of profiles over a nine-month period was demonstrated, classifying the 574 profiles as trait profiles (Schmitt & Blum, 2020), there exists a need to explore potential 575 transitions between these profiles during various stages of an athlete's career. This could 576 include investigating the emergence of increased resilience in response to adversity or 577 changes in perceived social support due to shifts in relationship or marital status.

578 Furthermore, it would be particularly insightful to longitudinally monitor the stress 579 development of athletes beyond the pandemic. Existing research has established a negative 580 association between stress and athletic performance (Rano et al., 2019). Therefore, it is

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581 crucial to examine whether athletes can return to their pre-pandemic stress levels and, how582 the pandemic has left its mark on their athletic development and performance levels.

In the pursuit of advancing the insight in this domain, it would be worthwhile for researchers to delve into the examination of psychosocial resource profiles across cultures and nations. While the identified profiles in this study capture the characteristics prevalent in the liberal Swiss national context, inclusive of its high-performance sport system and policies, it is plausible that variations in the sizes and configurations of these profiles could emerge within the diverse cultural contexts that encompass the global sporting community (Aquilina & Henry, 2010).

590 The current study was limited to investigate the relationship between psychosocial 591 resource profiles and perceived stress among elite athletes in the context of the COVID-19 592 pandemic, a single unprecedented stressor for elite athletes. However, within the trajectory of 593 an athlete's career, several predictable transition phases (e.g., initiation of sport, junior-to-594 senior transition, career discontinuation; Wylleman et al., 2013) and incidents (such as injury, 595 deselection, or performance decline) exist that might prove stressful. Consequently, it would 596 be valuable to explore whether psychosocial resource profiles may offer similar protective 597 benefits against a diverse range of stressors encountered both during and after a high-598 performance sport career.

599 Conclusion

600 The current study identified four stable psychosocial resource profiles: (1) *Athletic*

601 Identifiers With Above-Average Resources, (2) Below-Average Athletic Identifiers With

602 Below-Average Resources, (3) Variable Athletic Identifiers With Below-Average Internal and

603 Clearly Below-Average External Resources, and (4) Athletic Identifiers With Below-Average

604 Internal and Above-Average External Resources. It also found no changes in perceived stress

from the early phase of the COVID-19 pandemic (June 2020) to the return to normality

4.

(March 2021). Taking a differential perspective, however, *Athletic Identifiers With Above- Average Resources* exhibit a pattern of psychosocial resources that indicated significantly
reduced perceived stress at both measurement points. These findings have implications for
advancing future research on investigating the relationship between psychosocial resources
and other potential stressors in high-performance sport. Moreover, they can aid practitioners
in delivering personalized support to elite athletes.

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Table 1

Descriptive Statistics (n = 373)

Scale	М	SD	Skewness	Kurtosis
T1: June 2020				
Athletic identity	5.72	0.75	-0.60	0.44
Resilience	3.74	0.60	-0.33	0.35
Perceived social support	6.34	0.74	-1.38	1.69
Self-esteem	4.99	0.63	-0.60	-0.15
Perceived stress	1.47	0.56	0.28	0.19
T2: March 2021				
Athletic identity	5.66	0.80	-0.83	1.55
Resilience	3.71	0.63	-0.44	0.36
Perceived social support	6.32	0.73	-1.22	1.29
Self-esteem	4.99	0.65	-0.65	0.01
Perceived stress	1.49	0.56	0.17	-0.16

Note. Ranges of scales: athletic identity 1 = *strongly disagree* to 7 = *strongly agree*;

869 resilience $1 = strongly \, disagree$ to $5 = strongly \, agree$; perceived social support 1 = strongly

disagree to 7 = *strongly agree*; self-esteem 1 = *strongly disagree* to 6 = *strongly agree*;

871 perceived stress 0 = never to 4 = very often.

Table 2

873 Descriptive Statistics of Indicators and Perceived Stress at T1 and T2 for Latent Profiles

Profile		n (%)	Athletic identity M (SD)	Resilience M (SD)	Perceived social support M (SD)	Self-esteem M (SD)	Perceived Stress <u>M (SD)</u>
Profile 1	T1	235 (63%)	5.73 (0.74)	3.91 (0.54)	6.74 (0.34)	5.26 (0.49)	1.31 (0.49)
Above-Average Resources	T2	240 (64%)	5.70 (0.77)	3.92 (0.54)	6.69 (0.40)	5.29 (0.49)	1.33 (0.50)
Profile 2 Below-Average Athletic	T1	84 (22%)	5.60 (0.74)	3.65 (0.54)	5.54 (0.34)	4.83 (0.49)	1.69 (0.60)
Identifiers With Below- Average Resources	T2	90 (24%)	5.34 (0.77)	3.51 (0.54)	5.44 (0.40)	4.69 (0.49)	1.65 (0.52)
Profile 3 Variable Athletic Identifiers With Below-	T1	14 (4%)	5.50 (0.74)	3.30 (0.54)	4.16 (0.34)	4.39 (0.49)	<mark>1.86 (0.60)</mark>
Average Internal and Clearly Below-Average External Resources	T2	7 (2%)	5.84 (0.77)	2.87 (0.54)	4.02 (0.40)	3.91 (0.49)	2.00 (0.36)
Profile 4 Athletic Identifiers With Below-Average Internal	T1	40 (11%)	5.95 (0.74)	3.17 (0.54)	6.47 (0.34)	4.11 (0.49)	1.87 (0.46)
and Above-Average External Resources	T2	36 (9%)	6.07 (0.77)	3.01 (0.54)	6.46 (0.40)	4.11 (0.49)	2.07 (0.53)

Note. Due to convergence problems, variances were constrained to be equal across profiles for indicators. Ranges of

875 scales: athletic identity 1 = strongly disagree to 7 = strongly agree; resilience 1 = strongly disagree to 5 = strongly

agree; perceived social support 1 = strongly disagree to 7 strongly agree; self-esteem <math>1 = strongly disagree to 6 =

strongly agree; perceived stress 0 = never to 4 = very often.

878 **Table 3**

879 Demographic Information of Psychosocial Resource Profiles

		Gender		Sports category			Weekly hours				
		Male (%)	Female (%)	Age (years)	Olympic summer (%)	Olympic winter (%)	Non- Olympic (%)	Sport (hrs)	Education (hrs)	Vocation (hrs)	Annual income (CHF)
Profile 1 Athletic Identifiers With Above-Average Resources	T1	56.2	43.6	24.79	55.3	41.3	5.4	14.99	7.19	6.23	45,591
	T2	56.9	43.1	25.22	55.6	38.6	5.9	27.46	7,31	6.24	45,058
Profile 2 Below-Average Athletic Identifiers With Below- Average Resources	T1	62.1	37.9	25.06	62.7	29.8	7.5	13.60	7.47	6.59	39,205
	T2	65.8	34.2	26.39	61.7	33.6	4.7	27.04	8.15	7.86	35,795
Profile 3 Variable Athletic Identifiers With Below- Average Internal and Clearly Below-Average External Resources	T1	72.6	27.4	26.86	79.4	20.6	0.0	10.46	4.40	10.42	32,040
	T2	79.5	20.5	29.61	73.8	17.4	0.0	30.16	9.95	9.51	34,806
Profile 4 Athletic Identifiers With Below-Average Internal	T1	33.1	66.9	23.63	76.3	20.5	3.2	14.49	9.29	3.93	27,279
and Above-Average External Resources	T2	29.0	71.0	24.94	77.8	17.4	4.8	30.70	7.37	1.33	34,156

Note. Due to information sensitivity, annual income was measured on an 8-point Likert scale ranging from $1 \le 14,000$ CHF over 4 = 50,001-70,000 CHF to $8 \ge 200,000$ CHF; for reference 1 CHF = 1.08 USD in March 2021). For mean calculation, mid values of these ranges were used as an estimation of annual income (i.e., 1 = 7000 CHF over 4 = 60,000 CHF to 8 = 250,000 CHF). 880

881 Figure 1



882 Psychosocial Resource Profiles for Both Measurement Points

884 *Note.* Transitional probabilities (arrows, only for probabilities $\geq 10\%$) and indicators of

structural stability (SS_i) are displayed.

886

887 Figure 2



888 Perceived Stress of Psychosocial Resource Profiles for Both Measurement Points



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43

891 **Table S1**

892	Psychosocial	Resource .	Latent F	Profiles:	Models f	for 2- to	6-Profile-Solu	tions
	~							

Measurement point	Model	BIC	aBIC	AIC	Entropy	BLRT	nP < 10/5%
T1: June 2020	1 profile	4277.48	4252.10	4246.11	_	_	0/0
	2 profiles	4167.33	4126.09	4116.35	0.75	p < 0.001	0/0
	3 profiles	4127.85	4070.74	4057.26	0.90	p < 0.001	1/1
	4 profiles	4101.99	4029.02	4011.80	0.85	<i>p</i> < 0.001	1/1
	5 profiles	4093.11	4005.27	3984.31	0.83	p < 0.001	2/1
	6 profiles	4084.15	3979.45	3954.74	0.86	p < 0.001	4/1
T2: March 2021	1 profile	4277.48	4252.10	4246.11	_	_	0/0
	2 profiles	4154.70	4113.45	4103.72	0.73	p < 0.005	0/0
	3 profiles	4126.14	4069.03	4055.55	0.78	p < 0.005	0/0
	4 profiles	4101.37	4028.40	4011.18	0.84	<i>p</i> < 0.005	1/1
	5 profiles	4089.32	4000.49	3979.52	0.87	p < 0.005	2/1
	6 profiles	4061.17	3956.47	3931.76	0.86	p < 0.005	2/1

893 *Note*. BIC = Bayesian information criterion; aBIC = sample adjusted Bayesian information criterion; AIC = Akaike's

894 Information Criterion; BLRT = Bootstrapped likelihood-ratio test; nP < 10/5% = number of patterns with less than 10% and

895 5% of the cases respectively. The preferred profile-solutions are highlighted in bold.

896 **Table S2**

Profiles Profiles 1 2 3 4 **T**1 0.957 0.024 0.000 0.018 Profile 1 Athletic Identifiers With Above-Average Resources 0.028 0.000 0.020 T2 0.952 T1 0.060 0.897 0.006 0.037 Profile 2 Below-Average Athletic Identifiers With Below-Average Resources T2 0.893 0.004 0.027 0.076 Profile 3 T1 0.000 0.078 0.922 0.000 Variable Athletic Identifiers With Below-Average Internal and Clearly T2 0.000 0.130 0.869 0.000 Below-Average External Resources Profile 4 **T**1 0.189 0.000 0.084 0.728 Athletic Identifiers With Below-Average Internal and Above-Average External T2 0.713 0.159 0.128 0.000 Resources

897 *Posterior Probabilities for the 4-Profile Solution at T1 and T2*

898



Indicators:

1 = Athletic Identity

2 = Resilience 3 = Perceived Social Support

4 = Self-Esteem



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Highlights

- Latent profile analysis characterized psychosocial resources of elite athletes.
- Four distinct profiles demonstrated individual and structural stability.
- No changes in stress during the COVID-19 pandemic (period: June 2020–March 2021).
- Significant differences in stress between psychosocial resource profiles.

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Declaration of interests

 \boxtimes 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: