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Highlights

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- 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 2021).

29

30

- Significant differences in stress between psychosocial resource profiles.

31

Keywords

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athletic identity, mental health, person-oriented approach, resilience, self-esteem,

33

social support

34 **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* (n_{T1}
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
58 build all these resources.

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
63 high-performance sport and its prevailing demands have frequently been linked to
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
66 not only an important task for the individual athlete but also for the surrounding support
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.

76 **COVID-19: An unprecedented stressor**

77 In late 2019, the Coronavirus disease 2019 (COVID-19) rapidly spread and shortly
78 after, the World Health Organization declared it a global pandemic and public health
79 emergency of international concern (World Health Organization, 2020). To control infection
80 rates, national and local governing bodies enforced health policies and sanitary measures.
81 General restrictions (e.g., social distancing, lockdown, and travel bans) as well as sport-
82 specific consequences (e.g., limited access to training facilities and cancellation or
83 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
88 of the pandemic can be a stressor. In particular, potential implications of restrictions like
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
113 resources against perceived stress is integrated in one of the most prominent stress theories:
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
116 generated, and appraisal processes and coping mechanisms are initiated. While the primary
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
120 resources available to an individual decide what coping strategies to employ to effectively
121 address the challenge.

122 In light of these theoretical considerations, it becomes evident that even though elite
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

134 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
138 the one hand, higher levels of athletic identity can protect against burnout (Edison et al.,
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
160 perspective. It proposes that human development and functioning is a continuous process
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
163 homogenous subgroups from a heterogenous population, integrates these postulates.
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
176 self-esteem) of elite athletes and to test on an exploratory basis individual and structural
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
185 the COVID-19 pandemic (within-group), as well as the relationship of that development with
186 resource profiles (interaction effect). After determining the psychosocial resource profiles, it
187 becomes possible to formulate theory-driven hypotheses pertaining to the between-group
188 differences of stress perception exhibited by these profiles. However, it could be expected a
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
196 Olympic sports, floorball, or orienteering. The latter two sports were included because the
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
206 was statistically significant, $\chi^2(7) = 187.50$, $p < .001$, Nagelkerke $R^2 = .18$, $n = 1387$,
207 indicating a systematic difference between respondents and nonrespondents. Inspection of
208 individual predictors revealed that gender was not significantly associated with participation.

209 However, young athletes, Olympic winter sports as well as respondents with high
210 performance levels were slightly overrepresented. The increased participation rate of winter
211 sport athletes might be due to both surveys being conducted in their off-season. Additionally,
212 the overrepresentation of athletes with an elevated performance level might be attributed to
213 the fact that this study was supported by the Swiss Olympic Association and the Swiss Sport
214 Aid Foundation. As a result, successful athletes who benefit most from these institutions
215 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
226 with the athletic role.

227 (b) *Resilience* was measured via the Brief Resilience Scale (BRS; Smith et al., 2008),
228 a questionnaire - designed to evaluate an individual’s capacity to recover from adversity.
229 Participants rated their agreement with six statements such as “*I tend to bounce back quickly*
230 *after hard times*” on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly*
231 *agree*). The BRS demonstrated satisfactory internal consistency (T1 $\alpha = .78$, T2 $\alpha = .80$) and
232 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.

239 (d) *Self-esteem* was assessed via the Rosenberg Self-Esteem Scale (RSES; Rosenberg,
240 1965), which measures an individual's overall sense of self-worth based on perceptions about
241 oneself (e.g., "*I feel that I have a number of good qualities*"). The RSES consists of 10 items,
242 with participants responding on a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6
243 (*strongly agree*). The internal consistency of the RSES was satisfactory with Cronbach's
244 alpha coefficients of $.76$ at T1 and $.81$ at T2. To obtain a total score, the mean score across all
245 items was computed. High values were indicative of high self-esteem.

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

252 Procedure

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

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
262 determined by Levene's test. This study accords with the recommendations of the ethical
263 principles of psychologists and the code of conduct and thus was approved by the ethics
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
267 (1.8%) and three athletes at T2 (0.8%). Using the expectation maximization algorithm of
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
270 multivariate outlier analysis comparing Mahalanobis distance with the χ^2 distribution at $\alpha =$
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 ($M_{\text{age}} = 25.55$ years, $SD = 4.71$; 44.8% female, 55.2% male; Olympic summer sports =
274 59.5%, Olympic winter sports = 35.1%, non-Olympic sports = 5.4%).

275 **Data analysis**

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

283 indices as well as theoretical considerations (i.e., parsimony, replication, interpretability)
284 were considered to determine the final profile solution. Statistical indicators consisted of the
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,
287 aBIC, and AIC and higher entropy indicated better model fit. As for the BLRT, a p -value of
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
296 with equal indicator means using a χ^2 difference test with restricted maximum likelihood
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 (SS_i) 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
305 matrix caused by an inadequate sample size for the longitudinal analysis (Tanaka, 1987). The
306 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]*

328 Descriptive statistics (mean raw and z -standardized scores) for the four-profile
329 solutions are given in Table 2 and displayed in Figure 1. In addition, demographic and sport-
330 related information for further characterization of the profiles is summarized in Table 3.
331 Regarding the labeling of profiles, the approach proposed by Rowe (1996), which involves
332 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
337 identity, compared to athletes with lower performance levels or the general population norms
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*
342 *Above-Average Resources* (T1: $n = 235$, 63%; T2: $n = 240$, 64%). This profile is
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)
346 while earning the highest annual income. Moreover, the hours invested in sport almost
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
382 between the profiles across measurement points revealed that the structural stability of Profile

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*
387 *Identifiers With Above-Average Resources*) and Profile 4 (*Athletic Identifiers With Below-*
388 *Average Internal and Above-Average External Resources*) remained in their respective
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
398 resource profiles, $F(3, 369) = 21.79, p < .001, \eta_p^2 = .150$, no significant main effect for
399 measurement point, $F(1, 369) = 2.71, p = .10, \eta_p^2 = .007$, and no interaction between resource
400 profiles and measurement point, $F(3, 369) = 2.55, p = .06, \eta_p^2 = .020$. In order to better
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 ($ps \leq .001$) 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 *[Please insert Figure 2 near here]*

413 Discussion

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

420 Identification of four stable psychosocial resource profiles

421 Both at the initial stage of the pandemic as well as a year after its initial outbreak, four
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*

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

437 Even though the size of this profile is small (T1: $n = 14$; T2: $n = 7$), this constellation
438 of psychosocial resources is still statistically, theoretically, and practically meaningful in
439 high-performance sport. First, these athletes were not identified as unrealistic statistical
440 outliers. Second, prior studies with similar analytical methods (LPA) but different
441 populations have also reported small groups of elite athletes with vulnerable profiles,
442 highlighting the importance of not neglecting and practical occurrence of such observations
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
446 statistical indicators. These findings further emphasize the statistical and meaningful
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.

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

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.

462 When interpreting the results, however, the distribution of values must be considered.
463 Indicators, especially athletic identity and perceived social support, slightly deviate from a
464 normal distribution and a ceiling effect was observed. The alleged insufficient perceived
465 social support of the *Below-Average Athletic Identifiers With Below-Average Resources* and
466 the *Variable Athletic Identifiers With Below-Average Internal and Clearly Below-Average*
467 *External Resources* must be interpreted in relation to the total sample. These athletes do not
468 perceive no social support in absolute terms as they indeed affirm several items of the
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
471 assume a generally strong athletic identity as well as having sources of potential social
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
481 sport. The relatively high occurrence of transitions from individuals belonging to Profile 3 to
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**

487 Contrary to previous longitudinal research during the pandemic (Jia et al., 2023), the
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-Gavaldà 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

508 of stress during the pandemic as athletes with varying negative amplitudes on all resource
509 indicators (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,
521 specific interactions and potential compensation for the lack of resources play a crucial role
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

532 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
536 inter-individual differences, enables tailoring targeted interventions for specific subgroups of
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.,
545 2022). Specific interventions should be directed towards enhancing resilience (Galli &
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**

550 No pre-pandemic data for the indicator and outcome variables were available. Thus, it
551 is not possible to make a statement about whether Swiss elite athletes perceived an
552 elevated amount of stress after the onset and a year into the COVID-19 pandemic compared
553 to times of normal sporting reality. However, other studies reported a drop in athletic identity
554 (Graupensperger et al., 2020) as well as increased stress as a consequence of the pandemic
555 and the associated the sporting break (Jia et al., 2023). These findings suggest that in a non-
556 pandemic 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
561 (Kempf et al., 2021; Kuettel et al., 2018; Örencik et al., 2023), generalizations of the findings
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
564 with an elevated performance level might bias psychosocial resources, particularly the
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

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

583 In the pursuit of advancing the insight in this domain, it would be worthwhile for
584 researchers to delve into the examination of psychosocial resource profiles across cultures
585 and nations. While the identified profiles in this study capture the characteristics prevalent in
586 the liberal Swiss national context, inclusive of its high-performance sport system and
587 policies, it is plausible that variations in the sizes and configurations of these profiles could
588 emerge within the diverse cultural contexts that encompass the global sporting community
589 (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
605 from the early phase of the COVID-19 pandemic (June 2020) to the return to normality

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

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616

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866 **Table 1**867 *Descriptive Statistics (n = 373)*

Scale	<i>M</i>	<i>SD</i>	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

868 *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*
870 *disagree* to 7 = *strongly agree*; self-esteem 1 = *strongly disagree* to 6 = *strongly agree*;
871 perceived stress 0 = *never* to 4 = *very often*.

872 **Table 2**873 *Descriptive Statistics of Indicators and Perceived Stress at T1 and T2 for Latent Profiles*

Profile		<i>n</i> (%)	Athletic identity <i>M</i> (<i>SD</i>)	Resilience <i>M</i> (<i>SD</i>)	Perceived social support <i>M</i> (<i>SD</i>)	Self-esteem <i>M</i> (<i>SD</i>)	Perceived Stress <i>M</i> (<i>SD</i>)
Profile 1 <i>Athletic Identifiers With Above-Average Resources</i>	T1	235 (63%)	5.73 (0.74)	3.91 (0.54)	6.74 (0.34)	5.26 (0.49)	1.31 (0.49)
	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 <i>Below-Average Athletic Identifiers With Below- Average Resources</i>	T1	84 (22%)	5.60 (0.74)	3.65 (0.54)	5.54 (0.34)	4.83 (0.49)	1.69 (0.60)
	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 <i>Variable Athletic Identifiers With Below- Average Internal and Clearly Below-Average External Resources</i>	T1	14 (4%)	5.50 (0.74)	3.30 (0.54)	4.16 (0.34)	4.39 (0.49)	1.86 (0.60)
	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 <i>Athletic Identifiers With Below-Average Internal and Above-Average External Resources</i>	T1	40 (11%)	5.95 (0.74)	3.17 (0.54)	6.47 (0.34)	4.11 (0.49)	1.87 (0.46)
	T2	36 (9%)	6.07 (0.77)	3.01 (0.54)	6.46 (0.40)	4.11 (0.49)	2.07 (0.53)

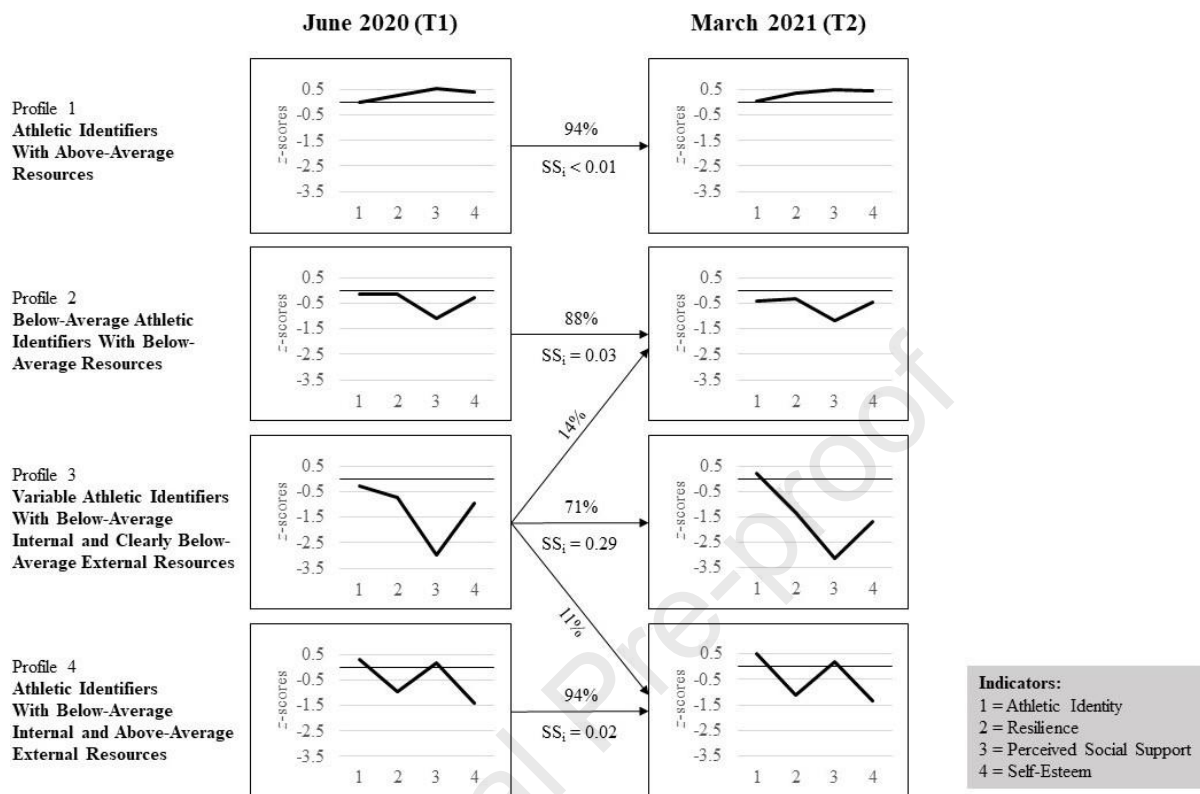
874 *Note.* Due to convergence problems, variances were constrained to be equal across profiles for indicators. Ranges of
875 scales: athletic identity 1 = *strongly disagree* to 7 = *strongly agree*; resilience 1 = *strongly disagree* to 5 = *strongly*
876 *agree*; perceived social support 1 = *strongly disagree* to 7 *strongly agree*; self-esteem 1 = *strongly disagree* to 6 =
877 *strongly agree*; perceived stress 0 = *never* to 4 = *very often*.

878 **Table 3**879 *Demographic Information of Psychosocial Resource Profiles*

		Gender		Age (years)	Sports category			Weekly hours			Annual income (CHF)
		Male (%)	Female (%)		Olympic summer (%)	Olympic winter (%)	Non- Olympic (%)	Sport (hrs)	Education (hrs)	Vocation (hrs)	
Profile 1 <i>Athletic Identifiers With Above-Average Resources</i>	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 <i>Below-Average Athletic Identifiers With Below- Average Resources</i>	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 <i>Variable Athletic Identifiers With Below- Average Internal and Clearly Below-Average External Resources</i>	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 <i>Athletic Identifiers With Below-Average Internal and Above-Average External Resources</i>	T1	33.1	66.9	23.63	76.3	20.5	3.2	14.49	9.29	3.93	27,279
	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 $1 \leq 14,000$ CHF over $4 = 50,001-70,000$ CHF to $8 \geq 200,000$ 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*

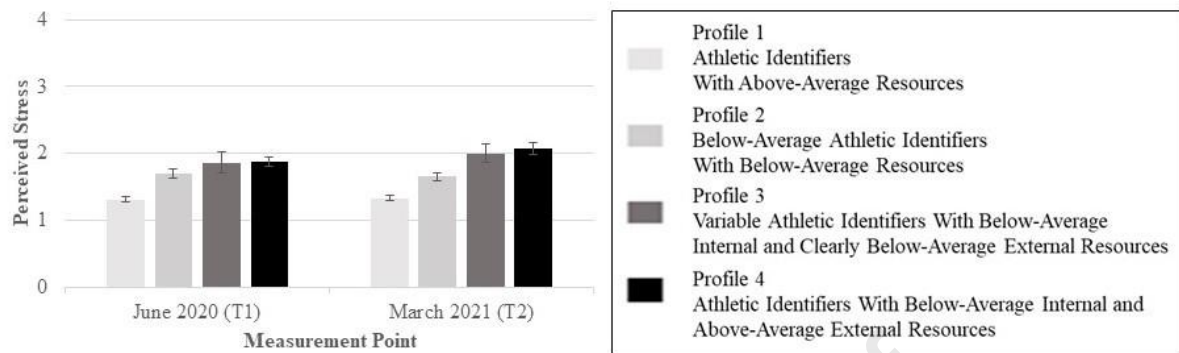
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884 *Note.* Transitional probabilities (arrows, only for probabilities $\geq 10\%$) and indicators of
885 structural stability (SS_i) are displayed.

886

887 **Figure 2**

888 *Perceived Stress of Psychosocial Resource Profiles for Both Measurement Points*



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890 *Note.* Error bars represent standard errors of the mean.

891 **Table S1**892 *Psychosocial Resource Latent Profiles: Models for 2- to 6-Profile-Solutions*

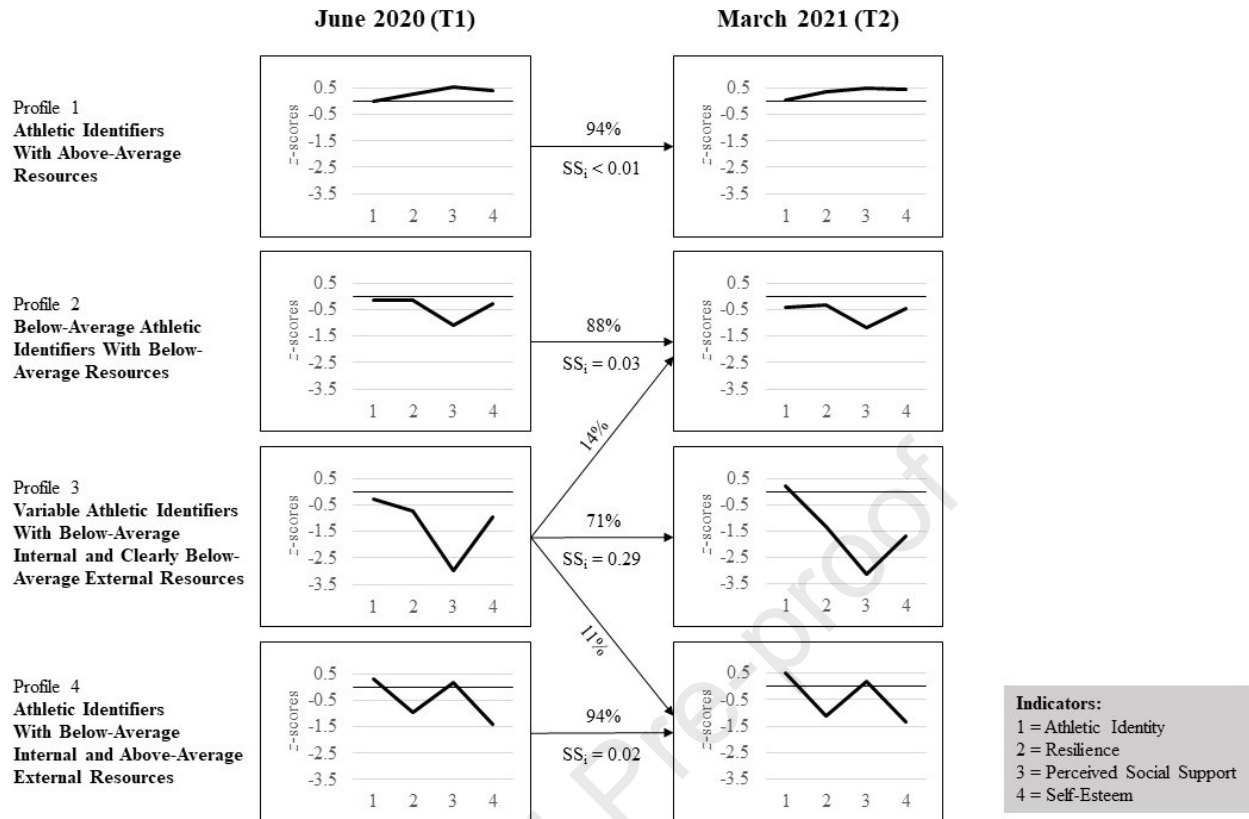
Measurement point	Model	BIC	aBIC	AIC	Entropy	BLRT	nP < 10/5%
T1: June 2020	1 profile	4277.48	4252.10	4246.11	–	–	0/0
	2 profiles	4167.33	4126.09	4116.35	0.75	$p < 0.001$	0/0
	3 profiles	4127.85	4070.74	4057.26	0.90	$p < 0.001$	1/1
	4 profiles	4101.99	4029.02	4011.80	0.85	$p < 0.001$	1/1
	5 profiles	4093.11	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	$p < 0.005$	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

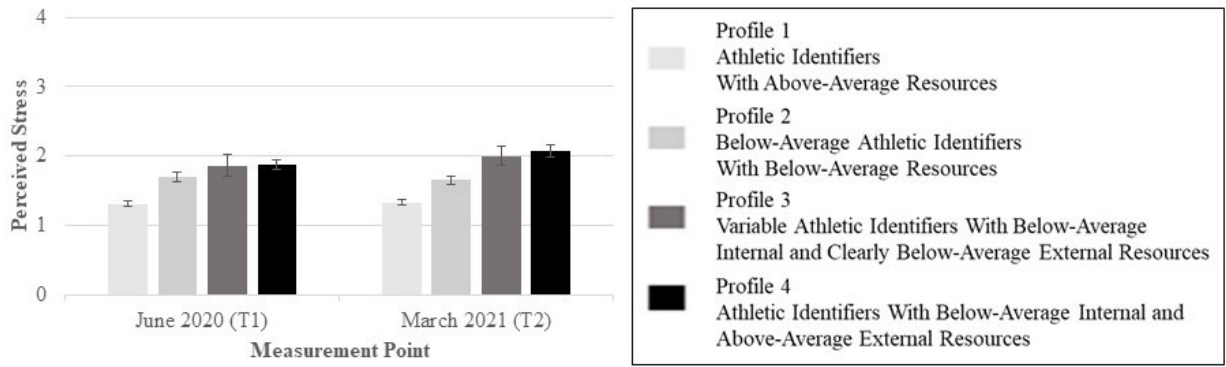
893 *Note.* BIC = Bayesian information criterion; aBIC = sample adjusted Bayesian information criterion; AIC = Akaike's
894 Information Criterion; BLRT = Bootstrapped likelihood-ratio test; nP < 10/5% = number of patterns with less than 10% and
895 5% of the cases respectively. The preferred profile-solutions are highlighted in bold.

896 **Table S2**897 *Posterior Probabilities for the 4-Profile Solution at T1 and T2*

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

898





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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

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

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

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