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Running Head: COACHING CLIMATES AND BURNOUT IN SCHOOL AND SPORTS

Relationship between Coaching Climates and Student-Athletes' Symptoms of Burnout
in School and Sports

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Running Head: COACHING CLIMATES AND BURNOUT IN SCHOOL AND SPORTS

Relationship between Coaching Climates and Student-Athletes'

Symptoms of Burnout in School and Sports

Abstract

The purpose of the present study was to investigate (1) what kind of coaching climates experienced by student-athletes can be found in sports high schools in Finland and (2) how these coaching climates are related to student-athletes' symptoms of burnout in sports and in school. A total of 414 student-athletes, aged 17–18, from seven sports high schools participated in this study. In addition to background information, the participants completed questionnaires concerning the perceived coaching climate and symptoms of burnout in both school and sports environments. By using latent profile analysis, four groups of experienced coaching climates were identified: extremely disempowering, disempowering, empowering, and intermediate. Student-athletes in the extremely disempowering and disempowering coaching climate groups reported higher levels of sport burnout than student-athletes in the other two groups. Moreover, they reported higher levels of school burnout than student-athletes in the empowering group. Overall, these findings offer timely insights into the ways high school coaches may play a role in student-athletes' burnout not only within but also across the domains of sports and school.

Keywords: coaching, sport and school burnout, dual career, youth sports, latent profile analysis

1 **Relationship between Coaching Climates and Student-Athletes'**

2 **Symptoms of Burnout in School and Sports**

3 Recently, the dual career pathway, where elite sports and education are combined, has received
4 increasing attention (EU Guidelines, 2012; Stambulova & Wylleman, in press). Previous research
5 indicates that combining athletic and educational pursuits brings extra challenges to student-
6 athletes due to time constraints and high expectations to succeed in both domains (e.g., Cosh &
7 Tully, 2015; xxx, 2017; Sisjord & Sorensen, 2018; Stambulova, Engström, Franck, Linnér, &
8 Lindahl, 2015). The desire for success in school as well as sports leaves less time for both physical
9 and mental recovery and, consequently, may compromise student-athletes' well-being exposing
10 them to burnout. One important factor that plays a role in student-athletes' well-being (or lack of
11 it) during the dual-career pathway is coaching (Appleton & Duda, 2016; Cosh & Tully, 2015). For
12 example, autonomy-supportive coaching (i.e., coaching that takes the athlete's perspective into
13 account) has been found to be related to higher psychological well-being in sports, whereas
14 controlling coaching (i.e., coaching that pressures athletes into matching their way of thinking and
15 behaving with the coach's ideals) has been related to more negative outcomes (Balaguer et al.,
16 2012; Isoard-Gauthier, Guillet-Descas, & Lemyre, 2012).

17 Thus far, research on the role of coaches has focused on the sports context and although
18 there is some evidence that the demands and resources associated with the two domains of dual
19 career, sports and school, may interact (Cosh & Tully, 2015; xxx, 2018a; Stuntz, 2016), little is
20 known about the coaches' role in student-athletes' well-being in school. Since school-aged
21 athletes spend a great deal of time interacting with their coaches, it is important to understand the
22 role of coaches in student-athletes' well-being in both of the dual career contexts (i.e., in
23 successful dual-career pathway; xxx, 2016). One indicator of lack of well-being among student-
24 athletes is the presence of symptoms of burnout (González, García-Merita, Castillo, & Balaguer,

25 2016; xxx, 2018a). The aim of the present study was to investigate how different coaching
26 climates relate to student-athletes' symptoms of burnout in sports and in school.

27 **Sport and School Burnout**

28 Burnout occurring in the sports context (i.e., athletic burnout; Raedeke, 1997) has been defined as
29 a multidimensional construct consisting of three sub-dimensions: 1) exhaustion in sports, 2) sport
30 devaluation or cynicism towards sports, and 3) feelings of inadequacy as an athlete (Raedeke,
31 1997; Raedeke & Smith, 2001; xxx, 2017). Exhaustion in sports can be physical or emotional,
32 stemming from, for example, intense training and competition; cynicism is related to a negative
33 attitude toward training and competition; and feelings of inadequacy occur as a reduced sense of
34 accomplishment and a lack of competence in one's sports performance (Eklund & Defreese, 2017;
35 xxx, 2017).

36 According to the broadly known psychological stress and coping model of athlete
37 burnout, that is, the cognitive affective model (Smith, 1986), sport burnout develops when the
38 demands experienced by the athlete continuously exceed the available resources. At the beginning
39 of the process, the athlete experiences situational demands, such as high expectations or an
40 excessive training load, after which cognitive appraisal, where the situation is perceived as either
41 challenging or threatening, takes place. This is followed by a matching physiological response
42 (e.g., anxiety). If the stressful process continues, the athlete is likely to withdraw from sports. In
43 previous research, sport burnout has not only been shown to be an indicator of athletes' ill-being
44 but it has also been related to various negative outcomes, such as reduced performance, an
45 increased level of injuries, decreased motivation, and eventually sport dropout (for a review, see
46 Gustafsson, Defreese, & Madigan, 2017).

47 In the dual career context, athletes try to manage with the demands of two different life
48 domains—sports and school/education—and, consequently, symptoms of burnout may take place
49 not only in sports but also in school (xxx, 2017; see also, Cosh & Tully, 2015). School burnout has
50 been defined with three dimensions similar to those conceptualized in sports context: 1)

51 exhaustion (i.e., tiredness or chronic fatigue) at school, 2) cynicism (i.e., distant attitude or lack of
52 interest) toward school, and 3) feelings of inadequacy (i.e., lower level of perceived competence
53 or lower achievement goals) as a student (Salmela-Aro, Kiuru, Leskinen, & Nurmi, 2009).
54 Analogously with the Smith's (1986) cognitive affective model applied in the sports context, the
55 psychological stress and coping model applied in the school context, that is, the demands-
56 resources model (Salmela-Aro & Upadyaya, 2014; see also, Demerouti et al., 2001) suggests that
57 school burnout develops as a consequence of school-related demands (e.g., overload of
58 schoolwork) continuously exceeding the available resources (e.g., social support). According to
59 the model, the first step in the development of school burnout is the energy-depleting process of
60 gradually wearing out. This is followed by a motivational process, in which the absence of
61 sufficient resources prevents effective coping with study demands, leading finally to
62 disengagement and withdrawal. School burnout has been shown to have severe consequences for
63 adolescents, for example, leading to depression (Salmela-Aro, Savolainen, & Holopainen, 2009)
64 and dropout from school (Bask & Salmela-Aro, 2013).

65 The demands and resources framework may be particularly useful for examining burnout
66 among student-athletes because striving for success on two domains instead of one may expose
67 student-athletes to be under more demands than would be evident when striving for success only
68 in one domain (i.e., only athletics or academics). Although the research on sport and school
69 burnout has traditionally followed somewhat separate lines of research, recently there has been an
70 increasing interest focusing on student-athletes' well-being not only within but also across the two
71 contexts of dual career (Cosh & Tully, 2015; Stambulova & Wylleman, in press; Stuntz, 2016;
72 xxx, 2016). Recent research on the topic has demonstrated that although sport and school burnout
73 are somewhat related constructs (i.e., they correlate positively with each other), they nevertheless
74 are empirically separate constructs demonstrating factorial validity (xxx, 2018b, 2019). The
75 domain-specificity of the symptoms of burnout is well understandable from a theoretical point of

76 view as well since in sport burnout the source of stress is sports, and in school burnout, in turn,
77 school. Nevertheless, some evidence exists that, over time, exhaustion experienced in school spills
78 over to the sports context (xxx, 2018a), making the investigation of school burnout among
79 student-athletes essential also from the perspective of sports context.

80 **Coaching Climate and Burnout**

81 Besides one's team members and family, coaches play an important role in athletes' lives and,
82 therefore, can be important social supports in promoting athletes' well-being (Cosh & Tully,
83 2015). However, if not supportive, coaching can also be a source of psychological ill-being.
84 Particularly, coaching climate, that is, the psychosocial environment that the coach creates for the
85 athletes (Appleton, Ntoumanis, Quested, Viladrich, & Duda, 2016) has been suggested to have
86 important influences on athletes' psychological well-being (Cronin & Allen, 2015).

87 The Achievement Goal Theory (AGT) framework on coaching (Nicholls, 1989) divides
88 the coach-created motivational environments into two different situation-focused climates: a task-
89 involving climate and an ego-involving climate. A task-involving climate is characterized as a
90 situation where athletes perceive that the coach values cooperative learning and effort, and that
91 each athlete on the team has an important role (Newton, Duda, & Yin, 2000). In an ego-involving
92 environment, in turn, athletes compare themselves to other athletes (e.g., to teammates), the coach
93 tends to favor the better players, and competition is present within the team (Newton et al., 2000).
94 In the previous literature, an ego-involving climate has been linked to higher sport burnout scores
95 and a task-involving climate to lower sport burnout scores among student-athletes (Harris &
96 Smith, 2009; Vitali et al., 2015).

97 Studies applying the Self Determination Theory (SDT) framework (Deci & Ryan, 2000)
98 on coaching, in turn, suggest that coaching styles can be either autonomy-supportive, controlling,
99 or characterized by elements of both (Isoard-Gauthier et al., 2012). In autonomy-supportive
100 coaching, the coach considers athletes' preferences and listens to their feelings and thoughts

101 (Appleton et al., 2016). In contrast, a controlling-coaching style refers to an environment where
102 the coach is perceived as coercive and authoritarian, and the coach does not consider athletes'
103 opinions in terms of sports-related decision-making (Isoard-Gauthier et al., 2012). Following the
104 SDT, the autonomy-supportive coaching style can be assumed to support athletes' basic
105 psychological needs (i.e., need for autonomy, competence, and relatedness), whereas controlling
106 coaching style can be seen to thwart these needs and, consequently, expose athletes to symptoms
107 of burnout (Isoard-Gauthier et al., 2012; see also, González et al., 2016). In the study by Balaguer
108 et al. (2012), autonomy-supportive coaching was related to lower burnout scores and controlling
109 coaching, in turn, to increased burnout scores.

110 Recently, Duda (2013) encapsulated the major social environmental elements of both the
111 AGT and the SDT and created a new multidimensional and hierarchical conceptualization of the
112 coach-created motivational climate. According to Duda (2013), motivational climate can be more
113 or less empowering and/or disempowering. An empowering motivational climate is marked by a
114 task-involving, autonomy-supportive, and social supportive environment, whereas a
115 disempowering climate is characterized by an ego-involving and more controlling environment
116 (Appleton et al., 2016; Duda, 2013). The basic idea behind of Duda's (2013) conceptualization is
117 that empowering climates will satisfy athletes' basic psychological needs for autonomy,
118 competence, and relatedness and, because of this, promote not only athletes' context-specific but
119 also their overall health (see also, Lentz, Kerins, & Smith, 2018). The relation between these
120 coaching climates and athletes' well-being has thus far only been investigated in a few studies. In
121 one of these studies, Appleton and Duda (2016) found the empowering coaching climate to be
122 related to lower levels of sport burnout symptoms and the disempowering coaching climate to
123 higher levels.

124 Overall, previous literature suggests that coaches play a role in athletes' psychological
125 well-being and can contribute to athletes' symptoms of burnout (or lack of them) in sports context.

126 So far, studies relating to the effects of coaching on athletes' well-being (or ill-being) have
127 nevertheless focused on athletes' well-being in sports context only, although there is some
128 evidence that the demands and resources in the two domains of dual career (i.e., sports and school)
129 may interact (Cosh & Tully, 2015; Stuntz, 2016; xxx, 2018a). For example, Stunzt (2016)
130 demonstrated that coaches knowing and caring about aspects of athletes' lives beyond the sports
131 context (i.e., cross-domain relationships; Stuntz, 2016, p. 17) was associated with greater
132 perceived competence, enjoyment, and sport commitment among a sample of collegiate athletes.
133 In the recent mixed-methods study by xxx (2018a), high school student-athletes who reported
134 experiences of disempowering coaching also reported school-related stress (see also, Cosh &
135 Tully, 2015), suggesting that coaches' roles may extend over from the sports context to school as
136 well.

137 One theoretical model that can be used when aiming to understand the cross-domain
138 relationship between sports and school contexts is the trans-contextual model of motivation
139 (Hagger, Chatzisarantis, Culverhouse, & Biddle, 2003; Hagger & Chatzisarantis, 2012).
140 According to this model, students' perceived autonomy support in one context may foster self-
141 determined (i.e., autonomous) motivation not only in that particular context, but also in another
142 related context (Hagger et al., 2003). More specifically, the model suggests that—as a results of the
143 positive transfer-effect of the internal perceived locus of causality across contexts—motivation in a
144 particular context is determined partly by motivation in related contexts (or global level
145 motivation; Vallerand, 2007). Among student-athletes who have selected to integrate elite sports
146 with education by studying in a sports high school, sports and education are closely related
147 developmental contexts. Following this line of thought, perceived autonomy support from coaches
148 (or teachers) can be assumed to foster student-athletes' autonomous motivation and related well-
149 being in sports (or school), which then extends to another relevant context for student-athletes;

150 school (or sports). Nevertheless, the role of the coaching climate on school burnout has not been
151 investigated before.

152 **The Aims of the Study**

153 The current study examined the associations of different coaching styles with student-athletes'
154 burnout symptoms in the two domains of dual career, that is, sports and school. First, we
155 examined whether the coaching climates, that is, empowering and disempowering climates,
156 suggested by Duda's (2013) theory could be identified among the sample of Finnish high school
157 student-athletes and how these are distributed throughout the data. In the present study, we applied
158 a person-oriented approach on coaching climates. Since this approach focuses on individuals
159 rather than the associations between variables at the population level (Bergman, Magnusson, & El-
160 Khouri, 2003), it made it possible to consider unobserved heterogeneity that represents
161 qualitatively different relationships between the assessed coaching variables. The major
162 advantages of this person-oriented approach in comparison with the variable-oriented approach, is
163 that it provides not only the option to identify different groups of individuals according to the
164 pattern they show with respect to criteria variables, but also to examine the proportion of sample
165 that show a particular pattern (Aunola et al., 2015). We hypothesized that we could identify two
166 coaching climate groups: disempowering and empowering coaching climates (hypothesis 1; Duda,
167 2013). A hypothesis concerning the proportion of sample showing a particular climate was not set
168 due to lack of previous studies on the topic.

169 Second, because various previous studies have demonstrated differences in coaching
170 climates depending on the type of sports (empowering climate being more typical among athletes
171 in individual-sports than those in team-sports; Rhind, Jowett, & Yang, 2012) and athletes' gender
172 (males reporting higher levels of disempowering climate and females higher levels of empowering
173 climate; Smith, Cumming, & Smoll, 2008; see also, Vazou, Ntoumanis, & Duda, 2006), whether
174 coaching climates would also differ in the present sample based on these variables was

175 investigated. We hypothesized that males would be over-represented in the disempowering group
176 (hypothesis 2) and that females would be over-represented in the empowering group (hypothesis
177 3; Smith et al., 2008). Furthermore, we hypothesized that individual-sports student-athletes would
178 be over-represented in the empowering group (hypothesis 4; Rhind et al., 2012).

179 Finally, we examined the extent to which the perceived coach-created climate is related to
180 athletes' symptoms of burnout (exhaustion, cynicism, and inadequacy) in sports and in school.
181 Based on the previous studies within the AGT and SDT frameworks, we hypothesized that
182 student-athletes in disempowering coaching climates would experience more symptoms of
183 burnout in sports compared to student-athletes in empowering coaching climates (hypothesis 5;
184 Balaguer et al., 2012; Harris & Smith, 2009; Vitali et al., 2015). We also expected that perceived
185 coaching climate would be similarly related to symptoms of burnout in school (hypothesis 6; xxx,
186 2018a).

187 **Method**

188 **Participants and Procedure**

189 This study is part of the Finnish Longitudinal Dual Career Study (xxx, 2016) in which adolescent
190 athletes' dual-career development has been followed throughout high school. The procedure of the
191 overall study was approved by the Ethical Committee of the relevant university in June 2015. The
192 current study took place when the adolescents were ending their second year in high school. The
193 sample consisted of 490 student-athletes (49% female, 51% male), born mostly in 1999, from
194 seven different sports high schools in Finland. In Finland, talented youth athletes can apply to a
195 sports upper secondary school ('urheilulukio' in Finnish) that structurally supports the
196 construction of a dual career pathway by, for example, collaborating with athletic clubs and sports
197 federations to hold morning practices for athletes, and giving some course credit for sports.

198 In the sample, 47.3% of the adolescents participated in individual and 52.4% in team
199 sports. Almost half of the students (49.2%) reported that their goal is to become a professional

200 athlete, while 35.7% did not aim for a career as a professional athlete, and the rest did not answer
201 the question. The reported grade point average of the student-athletes was, on average, 8.01 ($SD =$
202 0.922) on a scale of 4 to 10. A total of 76 participants were excluded from the final analysis due to
203 missing information on the variables used in this study. The excluded participants were randomly
204 distributed in terms of the background variables ($\chi^2(14) = 7.207, p = .926$). Participants filled in
205 surveys online via Mr Interview software during their school hours or in their free time.

206 **Measures**

207 **School burnout.** School burnout was measured via the School Burnout Inventory (SBI;
208 Salmela-Aro et al., 2009). The SBI consists of ten items measuring three different dimensions of
209 school burnout: 1) exhaustion at school (four items, e.g., “I brood over matters related to my
210 school work a lot during my free time”), 2) cynicism towards school (three items, e.g., “I feel like
211 I am losing interest in my school work”), and 3) feelings of inadequacy at school (three items, e.g.,
212 “I often have feelings of inadequacy in my school work”). The items were each rated on five-point
213 Likert-scale (1 means “strongly disagree,” and 5 means “strongly agree”). To create indices for the
214 three subscales of school burnout, the mean of the standardized items was calculated separately for
215 each subscale. The Cronbach’s α reliabilities for the three subscales were .855, .854, and .803,
216 respectively. For the overall school burnout scale, Cronbach’s α reliability was .881.

217 **Sport burnout.** Sport burnout was measured with the Sport Burnout Inventory—Dual
218 Career (SpBI-DC) form (xxx, 2017) developed on the basis of SBI. The SpBI-DC has been
219 developed to have identical methods of measurement for burnout symptoms in the school and
220 sports domains. Having identical, domain-matching items on school and sports domains allows for
221 parallel investigation of sport and school burnout in a dual career context. The scale consisted of
222 10 items measuring three dimensions of sport burnout: 1) exhaustion with one’s sports includes
223 four items (e.g., “I feel overwhelmed by my sports”), 2) cynicism toward the meaning of one’s
224 sports includes three items (e.g., “Sports don’t interest me anymore”), and 3) feelings of

225 inadequacy as an athlete includes three items (e.g., “I often have feelings that I’m not doing well
226 in my sports”). The items were each rated on five-point Likert-scale (1 means “strongly disagree,”
227 and 5 means “strongly agree”). To create indices for the three subscales of sport burnout, the mean
228 of the standardized items was calculated separately for each subscale. The Cronbach’s α
229 reliabilities for the three subscales were .752, .834, and .794, respectively. For the overall sport
230 burnout scale, Cronbach’s α reliability was .874. The scale has previously been shown to be a
231 reliable and valid instrument for measuring sport burnout in a dual career context (xxx, 2017).

232 **Coaching climate.** The Empowering and Disempowering Motivational Climate
233 Questionnaire (EDMCQ-C) was used to measure athletes’ experiences in regard to coaching
234 climate (Appleton et al., 2016). The questionnaire consisted of 32 items that were rated on five-
235 point Likert-scale ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire
236 consisted of five subscales measuring different aspects of coaching climates. Task-involving
237 coaching consisted of nine items (e.g., “My coach encourages players to try new skills”),
238 autonomy-supportive coaching consisted of five items (e.g., “My coach gives players choices and
239 options”), socially supportive coaching consisted of three items (e.g., “My coach really
240 appreciates players as people, not just as athletes”), ego-involving coaching of seven items (e.g.,
241 “My coach substitutes players when they make a mistake”), and controlling coaching of eight
242 items (e.g., “My coach pays less attention to players when they displease him/her”). To create
243 indices for the five subscales measuring the coaching climates, the mean of the standardized items
244 was calculated separately for each subscale. Cronbach’s α reliabilities for the five subscales were
245 .875, .784, .789, .855, and .732, respectively.

246 **Analysis Strategy**

247 The analyses were carried out according to the following steps. First, Latent Profile Analyses
248 (LPA) was conducted to identify different coaching climates using task-involving, ego-involving,
249 autonomy-supportive, socially supportive, and controlling coaching as criteria variables. The

250 models were estimated using Mplus statistical software (Version 8.0; Muthén & Muthén, 1998–
251 2017) and the maximum likelihood with robust standard errors estimation method (MLR). To
252 decide the optimal number of different coaching climates existing in the sample, the following
253 statistical criteria were used: (1) log likelihood –value (Log L), (2) Akaike’s information criterion
254 (AIC), (3) Bayesian information criterion (BIC), (4) the sample size–adjusted Bayesian
255 information criterion (aBIC), (5) the Vuong-Lo-Mendel-Rubin test (VLMR), (6) the Lo-Mendel-
256 Rubin test (LMR), (7) the parametric bootstrapped likelihood ratio test (BLRT; Muthén &
257 Muthén, 1998–2017), and (8) the reliability of classification by entropy. The lower values of the
258 Log L, AIC, BIC and aBIC indicate the better model. In the likelihood ratio tests (VLMR, LMR,
259 and BLRT), in turn, a low p value ($p < .05$) indicates that a solution with k number of latent
260 profiles fit the data better than the solution with $k-1$ latent profiles. The entropy ranges from 0 to
261 1, values closer to 1 indicating a more reliable classification of individuals.

262 Second, cross-tabulations were conducted to investigate gender and type of sport
263 distributions within the different coaching climate groups. Finally, multivariate analysis of
264 variance (MANOVA) was used to examine the extent to which the found coaching climates are
265 related to symptoms of burnout in the sports and school domains respectively. In these analyses,
266 exhaustion, cynicism, and feelings of inadequacy in a particular domain were treated as dependent
267 variables and the coaching climate (i.e., group membership) as an independent variable. The
268 impacts of gender and type of sport were controlled for by including them as independent
269 variables in the analyses as well. The cross-tabulations and MANOVAs were conducted using
270 IBM’s SPSS statistics program (version 24). The descriptive information and bivariate
271 correlations between the study variables are shown in Table 1.

272

Results

273 Coaching Climates

274 The first research question asked what kind of coaching climates can be identified among the
275 sample and how these climates are distributed throughout the data. The model fit indices and class
276 sizes of two- to six-class solutions of LPA are shown in Table 2. The log L, AIC, BIC and aBIC
277 values decreased when the number of classes increased (see Table 2) suggesting that even more
278 than six classes could be found. Similarly, the BLRT suggested that even more than six profiles
279 could be identified. However, according to the VLMR and the LMR results, the four-class
280 solution was better than the three-class solution and increasing the number of classes did not
281 improve the fit of the model. Due to the entropy value being higher in the four-class solution than
282 in the five or six-class solutions as well, this solution was selected for further analysis.

283 Based on the VLMR and LMR, also the two-class solution could have been considered
284 suitable. According to these two tests, the two-class solution was better than the one-class solution
285 but the three-class solution was only statistically marginally ($p < .10$) superior compared to the
286 two-class solution. However, previous simulation studies (Nylund, Asparouhov, & Muthén, 2007;
287 Tolvanen, 2007) suggest that when the different fit indices end up to support different number of
288 latent profiles, BIC-value from information criteria values and BLRT from statistical tests are the
289 most reliable indices compared to other indices. It is not unusual, however, that these indices
290 continue to decrease when increasing number of profiles. In that case, reduction in the change of
291 information criteria values (rather than values themselves) can be used to decide the optimal
292 number of latent profiles (Wang, Morin, Ryan, & Liu, 2016). In the present study, the reductions
293 in the AIC, BIC, and aBIC values were relatively high when comparing two-class solution to
294 three-class solution, or three-class-solution to four-class solution. However, from the four-class
295 solution forward, the reduction in the values was notably smaller indicating that the improvement
296 of the fit was decreasing. Inspection of these decreases in information criteria values provided,
297 thus, further support for the selected four-class solution.

298 The groups' means (*M*) and standard deviations (*SD*) for the coaching climate variables
299 and the result of the analysis of variance (ANOVA) comparing the found four groups according to
300 the criteria variables are presented in Table 3. The coaching climate profiles of the found groups
301 are shown in Figure 1. The first group consisted of participants whose coaches used less ego-
302 involving and controlling coaching but more autonomy-supportive, socially supportive, and task-
303 involving coaching compared to the other three groups, thus we labeled it as the empowering
304 coaching climate (see Table 3). This climate was typical for a total of 24% of student-athletes. The
305 second and the largest group (typical for a total of 42% of student-athletes) was characterized by
306 average levels of all coaching variables, thus indicating average levels of both empowering and
307 disempowering features of coaching. Consequently, this group was labeled as the *intermediate*
308 coaching climate. The third group, consisting of 27% of student-athletes, labeled as the
309 *disempowering* coaching climate, consisted of participants experiencing significantly less
310 autonomy-supportive, socially supportive, and task-involving coaching and significantly more
311 ego-involving and controlling coaching compared to the previous two groups. The final, and the
312 smallest group with 7% of the participants, was labeled as the *extremely disempowering* coaching
313 climate, consisted of participants who experienced lower levels of socially supportive, task-
314 involving, and autonomy-supportive coaching compared to the other three groups. Student-
315 athletes in this group also reported higher levels of ego-involving and controlling coaching than
316 those in the empowering and intermediate groups.

317 **Gender and Type of Sport Differences in the Perceived Coaching Climates**

318 The second aim was to examine whether there are differences between gender or type of sport in
319 the perceived coaching climate groups. A chi-squared analysis showed a statistically significant
320 association between group membership and gender ($\chi^2(3, N = 411) = 7.78, p = .05$): females were
321 over-represented among those who reported an empowering climate (29% of females being in this
322 group; adj.res = 2.0, $p < .05$) and under-represented among those reporting disempowering climate

323 (22% of females being in this group; adj.res = -2.1, $p < .05$), whereas males were under-
324 represented among empowering group (20% of males being in this group; adj.res = -2.0, $p < .05$)
325 and over-represented among disempowering group (32% of males being in this group; ad.res =
326 2.1, $p < .05$). The association between group membership and type of sport was only marginally
327 significant ($\chi^2(3, N = 413) = 7.43, p = .06$): team-sports athletes were over-represented among
328 disempowering group (32% of team sports athletes being in this group; adj.res = 2.6, $p < .05$),
329 whereas individual-sports athletes were under-represented among this group (20% of individual
330 sports athletes being in this group; adj.res = -2.6, $p < .05$).

331 **Coaching Climate and Burnout in Sports**

332 The third aim was to find out the extent to which the experienced coaching climate is related to
333 athletes' burnout (exhaustion, cynicism, and inadequacy) in sports. The results of MANOVA
334 showed that the interaction effects of Gender \times Coaching climate ($F(9, 963) = 1.037, p = .408$)
335 and that of Type of sport \times Coaching climate ($F(9, 963) = 0.478, p = .890$) were not statistically
336 significant, suggesting that gender and type of sport did not moderate the association of coaching
337 climate with sport burnout. The main effect of coaching climate, in turn, was statistically
338 significant (Wilks' $\lambda = 0.860, F(9, 963) = 6.823, p < .001, \eta_p^2 = .047$). The test of between-
339 subjects effects revealed that there were significant differences between the coaching climate
340 groups in all three sport burnout subscales ($p < .001$). The z-scores and standard deviations for the
341 burnout subscales in coaching climate groups are presented in Table 4. The results of pairwise
342 comparisons (see Table 4) revealed that athletes in the empowering group had significantly lower
343 levels of exhaustion, feelings of inadequacy, and cynicism compared to athletes in the
344 disempowering and extremely disempowering group, as well as a lower level of exhaustion than
345 athletes in the intermediate group. Athletes in the intermediate group reported a lower level of
346 exhaustion and feelings of inadequacy than athletes in the two disempowering groups and a lower
347 level of cynicism than those in the extremely disempowering group. Athletes in the

348 disempowering and extremely disempowering groups did not differ from each other in terms of
349 sport burnout symptoms.

350 **Coaching Climate and Burnout in School**

351 Next, a similar MANOVA was conducted to find out the extent to which the experienced coaching
352 climate was related to athletes' burnout in school. The results showed, first, that the interaction
353 effects of Gender \times Coaching climate ($F(9, 949) = 0.820, p = .598$) and Type of sport \times Coaching
354 climate ($F(9, 949) = 1.146, p = .327$) were not statistically significant. The main effect of
355 coaching climate, however, was statistically significant (Wilk's $\lambda = 0.923, F(9, 949) = 3.508, p <$
356 $.001, \eta_p^2 = .026$). The test of between-subjects effects revealed that there were significant
357 differences between the clusters in all three school burnout subscales ($p < .001$ for exhaustion and
358 inadequacy and $p < .05$ for cynicism). The z-scores and standard deviations for the school burnout
359 subscales in coaching climate groups are presented in Table 4. The results of pairwise
360 comparisons (see Table 4) revealed that athletes in the empowering group reported experiencing
361 feelings of inadequacy in academics less than athletes in the other three groups. Moreover, they
362 reported less exhaustion at school than those in the disempowering and extremely disempowering
363 groups and less cynicism towards school work than those in the disempowering group. Athletes in
364 the intermediate, disempowering and extremely disempowering groups did not differ from each
365 other in terms of school burnout symptoms.

366 **Discussion**

367 The first aim of this study was to examine how Duda's (2013) motivational climate theory fit to
368 the data of Finnish high school student-athletes. The results of the present study revealed that 34%
369 of the student-athletes reported either a disempowering (27%) or an extremely disempowering
370 (7%) coaching climate, whereas the empowering coaching climate was typical for 24% of the
371 student-athletes. Overall, these three climates were in accordance with our first hypothesis and
372 with Duda's (2013) theory (i.e., they were clearly either disempowering or empowering). Due to

373 the fact that none of the previous studies have tested Duda's (2013) theory using a person-oriented
374 approach, the findings of the present study provide important support for the theory by showing
375 that empowering and disempowering coaching climates can be identified not only theoretically but
376 also empirically based on student-athletes' perceptions of coaching climates.

377 However, one unexpected type of climate was also found, namely the intermediate
378 climate (reported by 42% of student-athletes), in which the student-athletes scored between the
379 empowering and disempowering coaching climates in all the coaching climate subscales. This
380 result suggests that the coaching climate is not necessarily either disempowering or empowering
381 but can also be something between these two (see also, Smith et al., 2016). It is noteworthy that
382 the intermediate group comprised the largest group in our study. One possible explanation for this
383 result is that coaches use both empowering and disempowering behaviors when interacting with
384 athletes (e.g., Smith et al., 2016; Smith, Quested, Appleton, & Duda, 2017). This shifting between
385 empowering and disempowering coaching might stem, for example, from daily variations (Aunola
386 et al., 2015) in the coaches' own stress levels or ill-being. Another possibility is that coaches
387 behave differently in different situations, for example, in training and competition environments
388 (e.g., Smith et al., 2017), and, due to this, athletes are not able to rate their coaches to be either
389 disempowering or empowering. To understand why those in the intermediate group experience
390 their coaching climates the way they do, further studies applying qualitative methods might be
391 effective in developing an answer.

392 The second aim of this study was to examine the distribution of the coaching climates
393 with respect to gender and type of sport. The results concerning the role of gender were in line
394 with our hypothesis two and three, as well as with previous findings (Smith et al., 2008; Vazou et
395 al., 2006), as males were over-represented in the disempowering coaching climate group and
396 females, in turn, in the empowering coaching climate group. This result may indicate that females'
397 coaches use more autonomy-supportive, socially supportive, and task-involving coaching than

398 those of males, which would be in line with the theorization that social agents, including coaches,
399 emphasize differential elements of the achievement context to males and females (White & Duda,
400 1994). Alternatively, it is also possible that the result is due to the differences between females and
401 males in motivational patterns and, thus, their way of perceiving the motivational climate created
402 by coaches and related cues (White & Duda, 1994). As coaches educate themselves more, they are
403 possibly becoming more aware of gender differences in motivation and modify their behavior to fit
404 the athletes' needs.

405 In the present study, the type of sport was found to be only marginally related to coaching
406 climate: student-athletes in team sports were over-represented among the disempowering group,
407 whereas student-athletes in individual sports were under-represented among this group (hypothesis
408 4). The result suggests that team sports' coaches may use more controlling and ego-involving, and
409 less autonomy-supportive, socially supportive, and task-involving coaching compared to coaches
410 of student-athletes in individual sports. One explanation is that in individual sports, athletes
411 develop closer interpersonal relationships with their coaches than in team sports (Rhind et al.,
412 2012) and, therefore, may experience the coaching climate as less disempowering. Although the
413 results concerning type of sport were only marginally significant in the present study, they are in
414 line with the previous findings reported by Rhind and colleagues (2012), suggesting that the
415 disempowering climate, the climate that is related to burnout, may be more typical among athletes
416 involved in team-sports than in individual-sports.

417 The third aim of the present study was to find the extent to which the experienced
418 coaching climates are related to the student-athletes' symptoms of burnout in sports and school.
419 The results concerning sport burnout supported hypothesis 5 as the student-athletes in the
420 disempowering groups (i.e., disempowering and extremely disempowering groups) experienced
421 higher sport burnout scores compared to the student-athletes in the empowering and intermediate
422 groups. Our results are consistent with the previous research using Duda's (2013) theory of

423 empowering and disempowering coaching climates as the findings of Appleton and Duda (2016)
424 revealed that an empowering coaching climate was negatively related, and a disempowering
425 coaching was positively related to sport burnout (see also, Quested et al., 2013). The results of the
426 present study are also in agreement with the previous studies that have approached coaching
427 climates from the SDT or AGT perspectives (e.g., Balaguer et al., 2012; Vitali et al., 2015).
428 Overall, the results indicate that athletes whose coaches emphasize that everyone has an important
429 role on the team, value each athlete as a person and listen to athletes' thoughts and feelings,
430 experience lower symptoms of burnout. On the contrary, more controlling coaching, intra-team
431 competition, and punishing athletes for making mistakes is associated with higher levels of
432 burnout. The results of the present study add to the previous literature by demonstrating with a
433 person-oriented approach that although student-athletes in different subgroups perceived their
434 coaching climates differently, not all subgroups differed from each other regarding sport burnout.
435 Particularly, the fact that subgroups of student-athletes reporting intermediate and empowering
436 coaching climates did not differ from each other in terms of sport burnout suggests that also
437 coaching environments that are not clearly either disempowering or empowering can be 'good
438 enough' environments what it comes to the prevention of sport burnout.

439 To the best of our knowledge, this study is the first to investigate the relationship between
440 coaching climates and burnout in school. The results supported hypothesis 6 by revealing that the
441 student-athletes in the two disempowering coaching climate groups experienced higher levels of
442 school burnout than the student-athletes in the empowering coaching climate group. Interestingly
443 and contrary to the results regarding sport burnout, the two disempowering groups and
444 intermediate group did not differ from each other in regard to school burnout. Thus, these results
445 suggest that the coaching climate must be empowering rather than intermediate or disempowering
446 to protect student-athletes from burning out in school. One possible explanation for the result is
447 that coaches creating empowering climates are concerned more of their athletes' holistic well-

448 being and development (e.g. are caring about aspects of athletes' lives beyond the sports context;
449 Stunzt, 2016) than those with less empowering coaching style. Following the reasoning of trans-
450 contextual model of motivation (Hagger et al., 2003) and cross-domain (Stunzt, 2016) models, it is
451 also possible that the empowering climate created by coaches fosters student-athletes' autonomous
452 motivation and related psychological well-being first in the sports context, which then is extended
453 to school. According to the SDT (Deci & Ryan, 2000), people have innate needs for feelings of
454 competence, relatedness, and autonomy. It is possible that the intermediate coaching climate does
455 not fulfil these three needs well enough to protect the student-athletes from burning out in school
456 (see also, Lentz et al., 2018).

457 This study had some limitations that should be considered before generalizing the results.
458 First, the study was cross-sectional, and therefore we cannot assume causality between the
459 variables: it is possible that the symptoms of burnout are reflected on how participants perceive
460 the coaching climate or that there is a reciprocal relationship between these variables. The found
461 relationship can also be explained by a third variable or, for example, time of year. It is possible,
462 for example, that for some of the participants the symptoms of burnout were maximized at the end
463 of the school year and, due to this, influenced the manner in which they perceived the coaching
464 climate. Due to the cross-sectional data, it was not possible to examine the stability and changes in
465 coaching climates either. In future studies, longitudinal research about student-athletes' possible
466 shifting between different coaching climates and changes in burnout levels in school and sports
467 would be important to obtain more information about the connection between coaching climates
468 and burnout. Also, the possible consequences for this connection, such as dropout or performance
469 outcomes, would be important to study to identify the different risk and resilience factors leading
470 to (dis)continuity of the dual-career pathway.

471 Second, coaching climates were measured only from student-athletes' points of view. In
472 future research, coaches' perceptions should also be considered. In addition, comparisons between

473 coaches' and student-athletes' perceptions on coaching climates would provide a bigger picture of
474 the phenomenon, especially if coaches' and athletes' views differ from each other (see Smith et
475 al., 2016). Furthermore, research into the ways different athletes rate the same coach would
476 provide information on whether it is the individual's experience or the more general coaching
477 style that plays a role in burnout

478 Third, in the present study, a relatively novel measure was used to assess sport burnout,
479 that is, the SpBI-DC (xxx, 2017). Because the majority of the previous studies have used the
480 Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001) to measure athletic burnout,
481 whereas the present study does not, caution is advised when comparing the results of the present
482 study to the previous research. In the present study, the focus was not only on sport burnout, but
483 also on school burnout and, therefore, a comparable measure for these two different life domains
484 was needed. Since the SpBI-DC is a relatively short measure with comparable items to the School
485 Burnout Inventory (SBI; Salmela-Aro et al., 2009), and it was found to show good reliability, it
486 can be considered to be a good candidate to measure sport burnout also in further studies,
487 particularly in those focusing on student-athletes and their dual career development.

488 Fourth, the role of teaching environments was not investigated. Similarly as sports coaches
489 were found to play a role in school burnout, teacher-created school environments may play a role
490 in student-athletes' sport burnout. Future research on possible trans-contextual effects from school
491 environment to sport context is therefore needed to get a bigger picture of the phenomenon.
492 Finally, this study consisted of Finnish sports high school student-athletes. Seeing as the pattern of
493 results may vary in different cultural and educational settings, future cross-cultural studies are
494 needed to discover the similarities and differences in the reported findings between countries.
495 Furthermore, it is possible that the experiences of students in sports schools are different from the
496 experiences of those who are not in a sports school. Thus, before generalizing the results, future

497 studies in other kinds of dual-career environments and types of schools (e.g., vocational track) are
498 needed.

499 **Conclusion**

500 The findings of the present study provide important support for Duda's (2013) theory by showing
501 that both empowering and disempowering coaching climates can be identified based on student-
502 athletes' perceptions of coaching climates. In addition to the empowering and disempowering
503 coaching climates (Duda, 2013), however, the present study identified a climate that was between
504 these two; the intermediate climate. This turned out to be the largest coaching climate group,
505 which indicates that most of the coaches are rated as having a coaching style somewhere between
506 disempowering and empowering. In terms of sport burnout, student-athletes belonging to the
507 intermediate climate demonstrated levels of burnout as low as those belonging to the empowering
508 climate. However, in terms of school burnout, those belonging to the intermediate climate showed
509 equal levels of burnout symptoms as those belonging to the disempowering climates, suggesting
510 that in order to prevent school burnout, instructions to avoid disempowering coaching climate may
511 not be an optimal solution; rather, efforts to encourage an empowering climate might be needed.

512 The results suggest that in the dual-career pathway, coaches may have an important role
513 not only in regard to student-athletes' psychological well-being in sports but also in school. As the
514 empowering coaching climate was found to be the most favorable coaching climate to protect
515 athletes from burnout both in sports and in school, this finding should be considered in the future
516 education of coaches in order to inform and instruct them on how they can create an empowering
517 coaching climate for their athletes. From a theoretical point of view, the findings of the present
518 study add to the previous literature by demonstrating cross-contextual influence (Hagger et al.,
519 2003; Stuntz, 2016) from sports context to school (see also, Cosh & Tully, 2015; xxx, 2018a):
520 coaching climate is associated not only with student-athletes' symptoms of burnout in sports but
521 also with their symptoms in school. Increasing the knowledge of these kinds of cross-contextual

522 influences may provide important insights into the role of coaches in student-athletes'
523 development during adolescence for both the coaches and the athletes. When training coaches, it
524 would be important to instruct them to support student-athletes' holistic development (Cosh &
525 Tully, 2015; Stambulova & Wylleman, in press; Stuntz, 2016) by generating empowering
526 coaching climates. Enhancing coaches' concern for athletes' holistic development and well-being
527 could also facilitate youth athletes' efforts to successfully combine sports and education. Overall,
528 this paper adds to the knowledge on how the created coaching climate can be related on athletes'
529 well-being not only within but also across the domains of sports and school.

530 **References**

- 531 Appleton, P. R., & Duda, J. L. (2016). Examining the interactive effects of coach-created
532 empowering and disempowering climate dimensions on athletes' health and functioning.
533 *Psychology of Sport and Exercise*, 26, 61–70. doi:
534 <https://doi.org/10.1016/j.psychsport.2016.06.007>
- 535 Appleton, P. R., Ntoumanis, N., Quested, -E., Viladrich, C., & Duda, J. L. (2016). Initial
536 validation of the coach-created Empowering and Disempowering Motivational Climate
537 Questionnaire (EDMCQ-C). *Psychology of Sport and Exercise*, 22, 53–65.
538 doi:10.1016/j.psychsport.2015.05.008
- 539 Aunola, K., Tolvanen, A., Kiuru, N., Kaila, S., Mullola, S., & Nurmi, J.-E. (2015). A Person-
540 oriented approach to diary data: Children's temperamental negative emotionality increases
541 susceptibility to emotion transmission in father-child dyads. *Journal for Person-Oriented*
542 *Research*, 1(1-2), 72-86. doi:10.17505/jpor.2015.08
- 543 Balaguer, I., González, L., Fabra, P., Castillo, I., Mercé, J., & Duda, J. L. (2012). Coaches'
544 interpersonal style, basic psychological needs and the well-and ill-being of young soccer
545 players: A longitudinal analysis. *Journal of Sports Sciences*, 30(15), 1619–1629.
546 doi:10.1080/02640414.2012.731517

- 547 Bask, M., & Salmela-Aro, K. (2013). Burned out to drop out: Exploring the relationship between
548 school burnout and school dropout. *European Journal of Psychology of Education*, 28(2),
549 511–528. doi:10.1007/s10212-012-0126-5
- 550 Bergman, L. R., Magnusson, D., & El-Khoury, B. M. (2003). *Studying individual development in*
551 *an interindividual context: A person-oriented approach. Paths through life*, Vol. 4. Mahwah,
552 NJ, USA: Lawrence Erlbaum Associates.
- 553 Cosh, S., & Tully, P. J. (2015). Stressors, coping, and support mechanisms for student athletes
554 combining elite sport and tertiary education: Implications for practice. *The Sport*
555 *Psychologist*, 29(2), 120–133. doi:10.1123/tsp.2014-0102
- 556 Cronin, L. D., & Allen, J. B. (2015). Developmental experiences and well-being in sport: The
557 importance of the coaching climate. *The Sport Psychologist*, 29(1), 62–71.
558 doi:10.1123/tsp.2014-0045
- 559 Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the
560 self-determination of behavior. *Psychological Inquiry*, 11(4), 227–268.
561 doi:10.1207/S15327965PLI1104_01
- 562 Duda, J. L. (2013). The conceptual and empirical foundations of Empowering Coaching™ Setting
563 the stage for the PAPA project. *International Journal of Sport and Exercise Psychology*,
564 11(4), 311–318. doi:10.1080/1612197X.2013.839414
- 565 Eklund, R. C., & Defreese, J. D. (2017). Burnout in sport and performance. *Oxford Research*
566 *Encyclopedia of Psychology*. doi: 10.1093/acrefore/9780190236557.013.165
- 567 *EU guidelines on dual careers of athletes: Recommended policy actions in support of dual*
568 *careers in high performance sport*. (2012). Retrieved from
569 http://ec.europa.eu/sport/library/documents/dual-career-guidelines-nal_en.pdf

- 570 González, L., García-Merita, M., Castillo, I., & Balaguer, I. (2016). Young athletes' perceptions of
571 coach behaviors and their implications on their well-and ill-being over time. *The Journal of*
572 *Strength & Conditioning Research*, 30(4), 1147-1154. doi: 10.1519/JSC.0000000000001170
- 573 Gustafsson, H., Defreese, J. D., & Madigan, D. J. (2017). Athlete burnout: Review and
574 recommendations. *Current Opinion in Psychology*, 16, 109-113. doi:
575 10.1016/j.copsyc.2017.05.002
- 576 Hagger, M. S., & Chatzisarantis, N. L. (2012). Transferring motivation from educational to
577 extramural contexts: A review of the trans-contextual model. *European Journal of*
578 *Psychology of Education*, 27(2), 195-212. doi: 10.1007/s10212-011-0082-5
- 579 Hagger, M. S., Chatzisarantis, N. L., Culverhouse, T., & Biddle, S. J. (2003). The processes by
580 which perceived autonomy support in physical education promotes leisure-time physical
581 activity intentions and behavior: A trans-contextual model. *Journal of Educational*
582 *Psychology*, 95(4), 784. doi: 10.1037/0022-0663.95.4.784
- 583 Harris, B. S., & Smith, M. L. (2009). The influence of motivational climate and goal orientation
584 on burnout: an exploratory analysis among Division I collegiate student-athletes. *Athletic*
585 *Insight: The Online Journal of Sport Psychology*, 11(2).
- 586 Isoard-Gautheur, S., Guillet-Descas, E., & Lemyre, P. N. (2012). A prospective study of the
587 influence of perceived coaching style on burnout propensity in high level young athletes:
588 Using a self-determination theory perspective. *The Sport Psychologist*, 26(2), 282–298.
589 doi:10.1123/tsp.26.2.282
- 590 Lentz, B., Kerins, M. L., & Smith, J. (2018). Stress, mental health, and the coach-athlete
591 relationship: A literature review. *Applied Research in Coaching & Athletics*, 33, 214-238.
- 592 Nylund, K. L., Asparouhov, T., & Muthén, B. O. (2007). Deciding on the number of classes in latent
593 class analysis and growth mixture modeling: A Monte Carlo simulation study. *Structural*
594 *Equation Modeling*, 14, 535–569. doi: 10.1080/10705510701575396

- 595 Newton, M., Duda, J. L., & Yin, Z. (2000). Examination of the psychometric properties of the
596 Perceived Motivational Climate in Sport Questionnaire-2 in a sample of female athletes.
597 *Journal of Sports Sciences, 18*(4), 275–290. doi:10.1080/026404100365018
- 598 Nicholls, J. G. (1989). *The competitive ethos and democratic education*. Harvard University Press.
- 599 Quested, E., Ntoumanis, N., Viladrich, C., Haug, E., Ommundsen, Y., Van Hove, A., ... & Duda, J.
600 L. (2013). Intentions to drop-out of youth soccer: A test of the basic needs theory among
601 European youth from five countries. *International Journal of Sport and Exercise Psychology,*
602 *11*(4), 395–407. doi:10.1080/1612197X.2013.830431
- 603 Raedeke, T. D. (1997). Is athlete burnout more than just stress? A sport commitment perspective.
604 *Journal of Sport & Exercise Psychology, 19*, 396-417. doi: 10.1123/jsep.19.4.396
- 605 Raedeke, T. D., & Smith, A. L. (2001). Development and preliminary validation of an athlete
606 burnout measure. *Journal of Sport & Exercise Psychology, 23*, 281-306. doi:
607 10.1123/jsep.23.4.281
- 608 Rhind, D. A., Jowett, S., & Yang, S. X. (2012). A comparison of athletes' perceptions of the coach-
609 athlete relationship in team and individual sports. *Journal of Sport Behavior, 35*(4), 433–452.
- 610 Salmela-Aro, K., Kiuru, N., Leskinen, E., Nurmi, J-E. (2009). School Burnout Inventory (SBI):
611 Reliability and validity. *European Journal of Psychological Assessment, 25*, 48–57.
612 doi:10.1027/1015-5759.25.1.48
- 613 Salmela-Aro, K., Savolainen, H., & Holopainen, L. (2009). Depressive symptoms and school
614 burnout during adolescence: Evidence from two cross-lagged longitudinal studies. *Journal of*
615 *Youth and Adolescence, 38*(10), 1316-1327.
- 616 Salmela-Aro, K., & Upadyaya, K. (2014). School burnout and engagement in the context of
617 demands-resources model. *British Journal of Educational Psychology, 84*, 137-151. doi:
618 10.1111/bjep.12018.

- 619 Sisjord, M. K., & Sorensen, M. (2018). "I would not be satisfied if I had not given it a try": The
620 expectations and experiences of students in a high school skiing program. *European Journal for*
621 *Sport and Society*, 15(2), 118-133. doi:10.1080/16138171.2018.1457283
- 622 Smith, R. E. (1986). Toward a cognitive-affective model of athletic burnout. *Journal of Sport*
623 *Psychology*, 8, 36–50.
- 624 Smith, R. E., Cumming, S. P., & Smoll, F. L. (2008). Development and validation of the
625 motivational climate scale for youth sport. *Journal of Applied Sport Psychology*, 20(1), 116–136.
626 doi:10.1080/10413200701790558
- 627 Smith, N., Quested, E., Appleton, P. R., & Duda, J. L. (2017). Observing the coach-created
628 motivational environment across training and competition in youth sport. *Journal of Sport*
629 *Sciences*, 35(2), 149–158. doi:10.1080/02640414.2016.1159714
- 630 Smith, N., Tessier, D., Tzioumakis, Y., Fabra, P., Quested, E., Appleton, P., ... & Duda, J. L.
631 (2016). The relationship between observed and perceived assessments of the coach-created
632 motivational environment and links to athlete motivation. *Psychology of Sport and Exercise*,
633 23, 51–63. doi:10.1016/j.psychsport.2015.11.001
- 634 Stambulova, N. B., Engström, C., Franck, A., Linnér, L., & Lindahl, K. (2015). Searching for an
635 optimal balance: Dual career experiences of Swedish adolescent athletes. *Psychology of Sport*
636 *and Exercise*, 21, 4–14. doi:10.1016/j.psychsport.2014.08.009
- 637 Stambulova, N. B., & Wylleman, P. (in press). Psychology of athletes' dual careers: A state-of-art
638 critical revkiew of the European discourse. *Psychology of Sport and Exercise. Advanced Online*
639 *Publication*. doi: 10.1016/j.psychsport.2018.11.013
- 640 Stuntz, C. P. (2016). Cross-domain relationships with assistant and head coaches: Comparing levels
641 and correlates. *International Sport Coaching Journal*, 3(1), 17-30. doi: 10.1123/iscj.2015-0011
- 642 Tolvanen, A. (2007). *Latent growth mixture modeling: A simulation study*. University of Jyväskylä,
643 Department of Mathematics and Statistics, Report 111. Jyväskylä: University Printing House.

- 644 Vallerand, R. J. (2007). A hierarchical model of intrinsic and extrinsic motivation for sport and
645 physical activity. In M. S. Hagger & N. L. D. Chatzisarantis (Eds.), *Intrinsic motivation and*
646 *self-determination in exercise and sport* (pp. 255–279). Champaign: Human Kinetics.
- 647 Vazou, S., Ntoumanis, N., & Duda, J. L. (2006). Predicting young athletes' motivational indices as a
648 function of their perceptions of the coach-and peer-created climate. *Psychology of Sport and*
649 *Exercise*, 7(2), 215–233. doi:10.1016/j.psychsport.2005.08.007
- 650 Vitali, F., Bortoli, L., Bertinato, L., Robazza, C., & Schena, F. (2015). Motivational climate,
651 resilience, and burnout in youth sport. *Sport Sciences for Health*, 11(1), 103–108.
652 doi:10.1007/s11332-014-0214-9
- 653 Wang, J. C. K., Morin, A. J. S., Ryan, R. M., & Liu, W. C. (2016). Students' motivational profiles in
654 the physical education context. *Journal of Sport & Exercise Psychology*, 38, 612–630. doi:
655 0.1123/jsep.2016-0153
- 656 White, S. A., & Duda, J. L. (1994). The relationship of gender, level of sport involvement, and
657 participation motivation to task and ego orientation. *International Journal of Sport Psychology*,
658 25(1), 4-18.

Table 1*Means (M), Standard Deviations (SD), and Inter-Correlations between Study Variables*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	<i>M</i>	<i>SD</i>
<i>Symptoms of Burnout</i>													
1. Exhaustion ¹	1.00											2.75	0.95
2. Inadequacy ¹	.62 ^a	1.00										2.83	0.97
3. Cynicism ¹	.30 ^a	.61 ^a	1.00									2.45	0.95
4. Exhaustion ²	.54 ^a	.47 ^a	.27 ^a	1.00								2.24	0.82
5. Inadequacy ²	.43 ^a	.41 ^a	.19 ^a	.62 ^a	1.00							2.27	0.96
6. Cynicism ²	.29 ^a	.28 ^a	.21 ^a	.49 ^a	.63 ^a	1.00						1.55	0.71
<i>Coaching</i>													
7. Controlling	.09	.18 ^a	.17 ^a	.25 ^a	.13 ^b	.22 ^a	1.00					2.50	0.65
8. Ego-involving	.13 ^b	.21 ^a	.13 ^b	.27 ^a	.21 ^a	.22 ^a	.76 ^a	1.00				2.63	0.85
9. Socially-supportive	-.19 ^b	-.23 ^a	-.15 ^b	-.28 ^a	-.25 ^a	-.22 ^a	-.49 ^a	-.55 ^a	1.00			3.77	0.82
10. Autonomy-supportive	-.17 ^a	-.17 ^b	-.14 ^b	-.27 ^a	-.22 ^a	-.26 ^a	-.41 ^a	-.49 ^a	.72 ^a	1.00		3.93	0.65
11. Task-involving	-.26 ^a	-.27 ^a	-.11 ^c	-.30 ^a	-.30 ^a	-.28 ^a	-.35 ^a	-.47 ^a	.75 ^a	.76 ^a	1.00	3.76	0.65

Note. ^c $p < .05$, ^b $p < .01$, ^a $p < .001$; ¹school, ²sports.

Table 2*Model Fit Indices for Solutions with Different Number of Latent Classes (N = 414)*

	Log L (df)	AIC	BIC	ABIC	Entropy	VLMR*	LMR*	BLRT*	AvePP	class size (n)
2-classes	-1870.993 (16)	3773.986	3838.400	3787.629	0.841	< .001	< .001	< .001	.95 – .96	243, 171
3-classes	-1769.430 (22)	3582.859	3671.428	3601.617	0.805	0.073	0.077	< .001	.90 – .93	129, 189, 96
4-classes	-1706.771 (28)	3469.541	3582.265	3493.415	0.840	0.016	0.017	< .001	.90 – .93	101, 174, 109, 30
5-classes	-1672.551 (34)	3413.101	3549.980	3442.090	0.814	0.371	0.381	< .001	.78 – .93	104, 142, 99, 41, 28
6-classes	-1651.859 (40)	3383.718	3544.752	3417.823	0.805	0.308	0.315	< .001	.77 – .91	76, 142, 89, 44, 35, 28

Note. Log L = Log-likelihood value; AIC = Akaike's information criterion; BIC = Bayesian information criterion; ABIC = Sample size adjusted Bayesian information criterion; LMR* = Lo-Mendell-Rubin adjusted likelihood test, *p*-value; VLMR* = Vuong-Lo-Mendell-Rubin likelihood ratio test, *p*-value; BLRT* = Bootstrapped Likelihood Ratio Test, *p*-value. AvePP = Average Latent Class Posterior Probabilities.

Table 3

Standardized Scores of Coaching Variables (Standard Deviations in Parentheses) for the Four Coaching Climate Groups

	Coaching climate				<i>F</i> (3, 410)
	Extremely				
	Disempowering (<i>n</i> = 30)	Disempowering (<i>n</i> = 109)	Intermediate (<i>n</i> = 174)	Empowering (<i>n</i> = 101)	
Controlling coaching ^b	0.594 (0.648)	0.365 (0.464)	-0.082 (0.503)	-0.423 (0.445)	61.846***
Ego-involving ^a	0.781 (0.663)	0.507 (0.528)	-0.090 (0.560)	-0.624 (0.537)	88.804***
Socially supportive ^b	-1.700 (0.521)	-0.692 (0.392)	0.206 (0.364)	0.898 (0.392)	496.159***
Autonomy-supportive ^b	-1.468 (0.735)	-0.466 (0.437)	0.085 (0.364)	0.792 (0.306)	304.887***
Task-involving ^b	-1.203 (0.672)	-0.551 (0.376)	0.087 (0.345)	0.801 (0.382)	306.968***

Note 1. *** $p < .001$.

Note 2. ^aPairwise comparisons calculated using Bonferroni because the assumption of equal variances between the groups was confirmed; ^bpairwise comparisons calculated using Dunnett's T3 because the assumption of equal variances between the groups was not confirmed.

Note 3. All groups showed statistically significant difference ($p < .01$) in all criteria variables with two exceptions: There was no difference in controlling coaching and ego-involving coaching between extremely disempowering and disempowering coaching climates.

Table 4

Group Means (M) and Standard Deviations (SD) of Sports and School Burnout Subscales (Standardized Variables) in Different Coaching Climate Groups and Pairwise Comparisons between the Groups

	Coaching climate	<i>M (SD)</i>	Pairwise comparisons, <i>p</i> -values		
			Empowering	Intermediate	Disempowering
<i>Sports</i>					
Exhaustion	Empowering	-.269 (0.638)	-		
	Intermediate	-.084 (0.717)	.227		
	Disempowering	.245 (0.772)	< .001	.001	-
	Extremely disempowering	.493 (0.845)	< .001	< .001	.596
Feelings of inadequacy	Empowering	-.262 (0.814)	-		
	Intermediate	-.104 (0.763)	.690	-	
	Disempowering	.237 (0.831)	< .001	<.001	-
	Extremely disempowering	.516 (0.922)	< .001	.001	.560
Cynical attitude toward	Empowering	-.278 (0.692)	-		
	Intermediate	-.042 (0.785)	.155	-	
	Disempowering	.173 (0.899)	.001	.223	-
	Extremely disempowering	.556 (1.277)	< .001	.003	.177
<i>School</i>					
Exhaustion	Empowering	-.204 (0.888)	-		
	Intermediate	-.019 (0.824)	.382	-	
	Disempowering	.190 (0.771)	.002	.201	-
	Extremely disempowering	.229 (0.813)	.059	.726	1.00
Feelings of inadequacy	Empowering	-.287 (0.867)	-		
	Intermediate	.015 (0.861)	.023	-	
	Disempowering	.191 (0.748)	< .001	.504	-
	Extremely disempowering	.320 (0.790)	.003	.397	1.00
Cynical attitude	Empowering	-.216 (0.871)	-		
	Intermediate	.005 (0.906)	.260	-	

Disempowering	.149 (0.794)	.015	1.00	-
Extremely disempowering	.213 (0.820)	.114	1.00	1.00

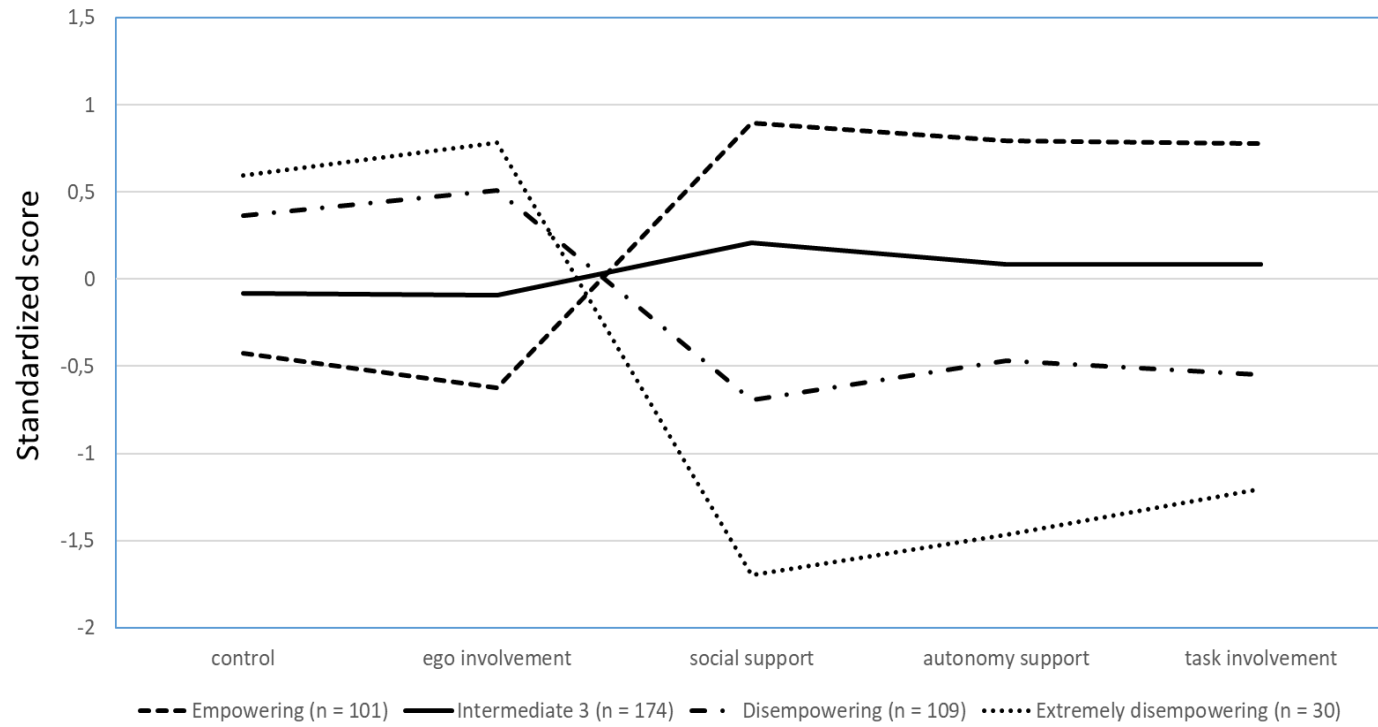


Figure 1. Coaching climate profiles.