To Flourish or Languish, that is the Question
Exploring the Mental Health Profiles of Danish Elite Athletes
Küttel, Andreas; Kristian Pedersen, Andreas; Larsen, Carsten Hvid

Published in:
Psychology of Sport and Exercise

DOI:
10.1016/j.psychsport.2020.101837

Publication date:
2021

Document version:
Accepted manuscript

Document license:
CC BY-NC-ND

Citation for published version (APA):

Go to publication entry in University of Southern Denmark's Research Portal

Terms of use
This work is brought to you by the University of Southern Denmark.
Unless otherwise specified it has been shared according to the terms for self-archiving.
If no other license is stated, these terms apply:
• You may download this work for personal use only.
• You may not further distribute the material or use it for any profit-making activity or commercial gain
• You may freely distribute the URL identifying this open access version
If you believe that this document breaches copyright please contact us providing details and we will investigate your claim.
Please direct all enquiries to puresupport@bib.sdu.dk

Download date: 14. Sep. 2023
To Flourish or Languish, that is the Question: Exploring the Mental Health Profiles of Danish Elite Athletes

Andreas Kuettel*¹, Andreas K. Pedersen², Carsten H. Larsen¹

¹University of Southern Denmark, Odense, Denmark

²Institute for Regional Health Research, Aabenraa, Denmark

Andreas Kuettel (*corresponding author)  ORCID: 0000-0003-0235-3590
Assistant Professor, Ph.D.
Department of Sports Science and Clinical Biomechanics
University of Southern Denmark
Campusvej 55, DK-5230 Odense M, Denmark
Phone: +45-50-172897  https://www.linkedin.com/in/andreas-küttel-b7682356
E-mail: akuttel@health.sdu.dk or andreaskuettel@bluewin.ch

Andreas Kristian Pedersen
Cand. Scient., Statistician
Institute for Regional Health Research, Hospital of Southern Jutland
Region of Southern Denmark
Kresten Phillipsens Vej 15, DK-6200 Aabenraa, Denmark
E-mail: andreas.kristian.pedersen@rsyd.dk  https://www.linkedin.com/in/andreas-pedersen-61a722167/

Carsten Hvid Larsen
Associate Professor, Ph.D.  ORCID: 0000-0003-3309-9417
Department of Sports Science and Clinical Biomechanics
University of Southern Denmark
Campusvej 55, DK-5230 Odense M, Denmark
E-mail: chlarsen@health.sdu.dk  https://www.linkedin.com/in/carstenhvidlarsen/
Mental health in Danish elite athletes

Abstract

Objectives: The purpose of this study was (a) to investigate mental well-being and the prevalence of anxiety and depressive symptoms in Danish male and female elite athletes, (b) to identify latent profiles in athletes based on their mental health and ill health, and (c) to examine whether the different profiles vary in selected protective and risk factors concerning mental health.

Methods: A total of 612 Danish athletes ($M = 18.99, SD = 4.29$) from 18 different sports completed an online version of the Holistic Athlete Mental Health Survey that assessed well-being, depression, and anxiety together with potential risk and protective factors (e.g., injuries, stress, sleep, social support, sport environment).

Results: Overall, 13.9% of athletes reported moderate or severe anxiety symptoms while 21.1% reported moderate or severe depressive symptoms. Female athletes had a significantly higher prevalence of anxiety and depressive symptoms and lower mental well-being scores than male athletes. Through a latent profile analysis, three distinctive mental health profiles (flourishing, moderate mental health, languishing) were discovered. MANOVA following Kruskal-Wallis tests revealed substantial differences between these profiles regarding their perception of social support, sport environment, and stressors from different life domains.

Conclusions: Danish elite athletes display similar levels of anxiety and depressive symptoms as the Danish general population. Flourishing athletes report lower stress levels, receive higher support from the private and sport domain, and perceive their sport environment as more supportive than athletes who are languishing. A tailored approach is proposed to support athletes’ mental health.

Keywords: well-being, depression, anxiety, prevalence, high-performance sport, environment
To Flourish or Languish, that is the Question: Exploring the Mental Health Profiles of Danish Elite Athletes

Elite sport, and sport in general, offer many opportunities to promote mental health and well-being, and to develop social and emotional skills (Schinke, Stambulova, Si, & Moore, 2017). The sporting context can be an excellent social-emotional training ground, where athletes engage in teamwork and social interactions, and make use of psychological and emotional skills such as self-awareness, motivation, and perseverance (Gould & Carson, 2008). However, a range of studies have determined worrisome levels of common mental disorders (CMD: anxiety, mood, psychotic, and eating disorders) among athlete populations (e.g., Gulliver et al., 2015, 2018; Kilic et al., 2017; Schaal et al., 2011), indicating that the high demands and increased pressure in international elite sport may have a detrimental effect on athletes’ mental health (Gulliver, Griffiths, & Christensen, 2012). Furthermore, the peak competitive years tend to overlap with the peak age for the risk of onset of CMD (Åkesdotter, Kenttä, Eloranta, & Franck, 2020; Gulliver et al., 2015). Most studies on mental health in elite sport have investigated depression and anxiety (Kuettel & Larsen, 2019), and the variation in reported prevalence among athletes is a subject of ongoing debate (Coyle, Gorczynski, & Gibson, 2017).

Symptoms of CMD in relation to perfectionism have been investigated within professional team sports in Denmark (Jensen et al., 2018; Kilic et al., 2017). However, little is known about the Danish athletes’ mental health despite that there is traditionally a strong focus on the welfare of elite athletes in Denmark. By law, elite sports should be promoted in a socially responsible manner (Danish Elite Sport Act No. 643, 1984/2004), meaning that athletes should pursue education and be prepared to contribute to the society after career termination (Kuettel, Christensen, Zysko, & Hansen, 2018). Danes rank among the happiest people (World Happiness
Reports, n.d.), but there has lately been a serious increase in symptoms of anxiety and depression especially among Danish female adolescents (Sundhedsstyrelsen, 2018).

In recent years, research on mental health in elite sport has grown rapidly. The current position stands and the consensus statements from the International Society of Sport Psychology (ISSP; Henriksen et al., 2019, 2020; Schinke, et al., 2017), the European Federation of Sport Psychology (Moesch et al., 2018), and the International Olympic Committee (Reardon et al., 2019) represent the increasing attention directed towards a proactive discourse that aims to foster athletes’ mental health. Reardon et al.’s (2019) review highlighted the need for more specific screening methods and emphasized that there is a lack of understanding about which elements of the sporting subculture contribute to positive mental health outcomes.

The Complete State of Mental Health

Current views on mental health have shifted the focus from a negative conceptualization of mental health as the absence of mental illness to definitions that encompass positive mental health aspects and include the level of functioning and flourishing of individuals (Schinke et al., 2017; Tennant et al., 2007). The two-continuum model of Keyes (2002) suggests that mental health and mental illness are two distinct but related dimensions existing on two separate continua, hence characterizing mental health as a complete state in a holistic view. The first continuum relates to the absence and presence of mental health, whilst the second relates to the absence or presence of mental illness. Accordingly, athletes could simultaneously have both positive mental health and experience mental illness. Alternatively, athletes could be free from mental illness but might be languishing. Kuettel and Larsen (2019) emphasized that mental health is a dynamic state where athletes can realize their potential and act according to their values, are able to cope with different life stressors, and experience trusting relationships.
Factors Affecting Athletes’ Mental Health in the Elite Sports Context

The elite sports context consists of a wide range of stressors (Arnold & Fletcher, 2012). These include competitive (e.g., performance expectation, selection), organizational (e.g., disturbed sleep patterns due to travels), and personal (e.g., relationship conflicts, critical within-career transitions) stressors that potentially increase the risk of CMD in athletes (Rice et al., 2016). In their scoping review, Kuettel and Larsen (2019) classified the factors affecting elite athletes’ mental health into risk and protective factors for both the personal and the sport-environmental domain. Previous studies have predominantly focused on personal risk factors such as injury and overtraining (e.g., Gouttebarge, Frings-Dresen, & Sluiter, 2015), maladaptive personality traits (e.g., Jensen et al., 2018), or adverse life events (e.g., Gouttebarge et al., 2017). Several studies also showed that female athletes tend to express higher symptoms of CMD than males (e.g., Appaneal, Levine, Perna, & Roh, 2009; Schaal et al., 2011). Less focus has been placed on personal protective factors such as career satisfaction (e.g., Lundqvist & Raglin, 2015), recovery (e.g., Frank, Nixdorf, & Beckmann, 2017), or mental toughness (e.g., Gerber et al., 2018). Researchers have also been interested in sport-environmental risk factors such as expectations or deselection (e.g., Coyle et al., 2017), stigma towards help-seeking (Gulliver et al., 2012), or low support from teammates (e.g., Gouttebarge et al., 2017). Finally, sport-environmental protective factors such as mental health literacy (e.g., Breslin et al., 2018) or a trusting training environment (e.g., Lundqvist & Raglin, 2015) can contribute to athletes’ mental health. Research from a holistic-ecological approach embraces the idea that factors such a coherent organizational culture, supportive training groups, psycho-social skills, and proximal role models affect successful talent development environments (Henriksen, Stambulova, & Roessler, 2010). So far, only a few studies have examined how the sporting environment may
support athletes’ well-being and as such could be understood as a protective factor underpinning mental health (e.g., Ivarsson et al., 2015). However, specific protective and risk factors have not been investigated concerning athletes’ complete mental health state (Keyes, 2002) that incorporates both the mental health and mental illness continua.

The aims of this study were (a) to investigate mental well-being and the prevalence of anxiety and depressive symptoms in Danish male and female elite athletes, (b) to identify latent profiles in athletes based on their mental health and their symptoms of mental illness, and (c) to examine whether the different profiles vary in selected protective and risk factors concerning mental health. Based on Keyes’ (2002) mental health model, we assumed that different mental health profiles of athletes can be found and that a latent profile analysis is an appropriate method to detect them. Taking an explorative approach, we hypothesized that athletes with a more favorable mental health profile would in general score higher on protective factors – and accordingly lower on risk factors – than athletes with more problematic mental health profiles.

Methods

An observational study based on a cross-sectional research design was applied. Cross-sectional designs are generally used for population-based surveys to assess the prevalence of diseases and can be used to generate associations between study variables and to compare groups rather than to make causal inferences (Bryman, 2012).

Participants

To get a general overview of the mental health among Danish elite athlete, we aimed to include athletes from a broad range of sports and elite sports levels. The study sample consisted of 612 current Danish elite athletes (n = 258 female athletes, Mage = 19.90, SD = 4.69; and 354 male athletes, Mage = 18.33, SD = 3.85) from 18 different sports (see supplementary file),
distributed between individual (\(n = 209\); e.g., badminton, cycling, swimming, tennis) and team sports (\(n = 403\); e.g., basketball, football, handball, ice-hockey, volleyball). In terms of their athletic level, 45% were categorized as national youth elite, 19% as international youth elite, 18% as national senior elite, 12% as international senior elite, and 6% as world-class senior elite.

**Procedure**

After receiving approval from the regional ethics committee, 19 Danish sports federation were contacted to participate in the study of which 18 agreed. To be eligible for the study, athletes had to (a) be part of a national youth or elite sports program, and (b) participate in international competitions or the highest national level. Potential athletes were contacted via their federation and subsequently received a link to the online survey. This recruitment procedure was deemed relevant to meet the standards of the European general data protection regulations (GDPR) and safeguarding privacy rights of sensitive personal data. Conversely, this procedure did not allow calculation of the probability and response rates, being a not-list-based survey (Bryman, 2012). Participants were informed that participation was voluntary, that no individual could be identified, and that their information will only be used for research purposes.

**Instrument**

Since there was a lack of an existing instrument that could assess the complete mental health state (Keyes, 2002) along with sport-specific protective and risk factors, we developed the Holistic Athlete Mental Health Survey (HAMHS). The HAMHS consists of both existing scales (see below) and own items derived from the sport-specific mental health literature (Kuettel & Larsen, 2019, Rice et al., 2016) and takes circa 15-20 minutes to complete. A copy of the HAMHS can be obtained from the first author. In line with our third study objective and based on Kuettel and Larsen’s (2019) review, we included some of the most relevant protective and
risk factors from both the personal and the environmental domain. Besides some prominent risk
factors (such as injury and general life stressors), also some factors that have received less
attention in the previous research (e.g., characteristics of the training environment, social
support) were incorporated. The choice was further influenced by the authors’ applied work in
talent and elite sport environments that is grounded in a holistic-ecological approach.

Measures

Mental Health and Symptomatology of Anxiety and Depression

Mental Well-Being. To assess athletes’ mental well-being, we used the validated seven-
item Danish version (Koushede et al., 2019) of the Short-Warwick-Edinburg-Mental-Wellbeing-
Scale (SWEMWBS, Tennant et al., 2007) covering both the hedonic and the eudemonic
dimensions of well-being. Items such as “I’ve been feeling useful” and “I’ve been feeling
optimistic about the future” were answered on a 5 point-Likert scale ranging from 1 (none of the
time) to 5 (all of the time). The instrument has been shown to have good internal consistency and
has been tested in age groups similar to our sample (Koushede et al., 2019). Scores from 24-29
indicate average well-being, scores ≥ 30 above average, and scores ≤ 23 below average well-
being (Nicholls, Madigan, Fairs, & Bailey, 2020).

Anxiety. To assess athletes’ anxiety symptoms, we used the Generalized-Anxiety-
Disorders questionnaire (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006) which is a widely-
used, valid, and efficient tool for screening generalized anxiety disorders and assessing its
severity in clinical practice and research. Athletes answered on a scale from 0 (not at all sure) to
3 (nearly every day) how often they have been bothered by problems such as “Feeling nervous,
anxious, or on edge” or “Worrying too much about different things” within the past two weeks.
The proposed cut-off points are: 0-4 (minimal symptoms), 5-9 (mild symptoms), 10-14 (moderate
symptoms), and 15-21 (severe symptoms). Using the threshold score of 10, the GAD-7 has a sensitivity of 89% and a specificity of 82% (Spitzer et al., 2006).

**Depression.** To assess depressive symptoms, athletes completed the Center for Epistemological Study Depression Scale (CES-D; Radloff, 1977) which is a commonly-used reliable and valid 20-items instrument. Statements such as “I felt awful”, “People were unfriendly”, “I talked less than usual” were answered on a scale from 0 (rarely or none of the time) to 3 (most or all of the time) for how often athletes felt this way during the last week. The proposed cut-off points are 0-15 (no to mild symptomatology), 16-23 (moderate symptomatology), and 24-60 (severe symptomatology). At the threshold score of 16, the CES-D was found to have a sensitivity of 86% and a specificity of 90% (Radloff, 1977).

**Protective and Risk Factors for Athletes’ Mental Health**

**Social support.** The social support received from athletes’ private domain (e.g., parents, siblings, friends) was assessed by three subscales (i.e., perceived emotional support, perceived instrumental support, and support seeking) of the Berlin Social Support Scale (BSSS; Schulz & Schwarzer, 2003) from 1 (completely disagree) to 5 (completely agree). The BSSS has shown to be a valid and reliable instrument in different sub-groups. To assess the social support received from persons within the sports environment (e.g., coaches, teammates, physiotherapists), we adopted the 13 items from the BSSS to the sporting context (e.g., “When I am worried, there is someone within my sporting environment who helps me”).

**Recovery and career satisfaction.** Athletes reported their average hours of sleep, and if and how much they practice specific relaxation techniques such as autogenic training, progressive muscle relaxation, or mindfulness/meditation. Furthermore, athletes appraised their satisfaction with the results of their last important competition on a 5-point Likert scale.
**Sport environment.** Athletes answered 10 questions on a five-point Likert-scale anchored 1 (completely disagree) to 5 (completely agree) about their sport environment. The items were derived from Henriksen et al. (2010) characteristics of successful talent development environments. Examples of items are “Knowledge sharing is a key component in my sport environment”, “I am involved in most of the decision-making processes concerning my sporting development”, and “I feel I have established some meaningful relations with persons within my sport environment”. The scale had a satisfactory Cronbach α-coefficient of .86.

**Stressors from different life domains.** Applying a holistic whole-person perspective on athletes (Wylleman, Reints, & De Knop, 2013), we intended to assess athletes’ general perception of stress stemming from the sports domain (e.g., competition, selection, pressure), the education/work domain (e.g., exams, deadlines, income), and the private life domain (e.g., relationships, daily hassles) on a scale from 1 (not at all affected) to 5 (very much affected).

**Injury and overtraining.** Amount of serious injuries (defined as the number of time loss from training and competition > 28 days; Bahr et al., 2020) within the past two years were answered on a scale from 0 (none) to 5 (five or more injuries). Athletes reported their average weekly time effort for sport, work, and school and stated the total amount of important competitions/games per year. Descriptive statistics of all study variables are shown in Table 2.

**Data Analysis**

Data were tested for missing values, distributions, and assumptions of univariate and multivariate analyses (Field, 2013). The following statistical analyses were conducted using IBM SPSS 25 and R: (a) descriptive statistics including the clinical cut-off points for anxiety and depressive symptoms; (b) Cronbach α-tests to assess the internal consistency of scales; (c) chi-square and independent sample t-tests to detect gender differences related to the main variables;
a latent profile analysis (LPA) to identify subgroups in athletes based on their well-being, anxiety, and depression scores. The goal of LPA is to sort persons into groups of individuals who are similar to each other but different from other groups (Kongsted & Nielsen, 2017). LPA is a person-centered approach that assumes an underlying latent variable that determines an individual’s group membership (Maysin, 2013). To evaluate the optimal number of latent profiles, Akaike information criteria (AIC), Bayesian information criteria (BIC), sample-adjusted Bayesian information criteria (SABIC), entropy, and average latent profile probability were calculated (Table 1). BIC and SABIC have been shown to perform best for deciding the number of profiles (Nylund, Asparouhov, & Muthén, 2007; Tein, Coxe, & Cham, 2013) since they take model complexity into account and therefore attempt to balance the fit of the latent profile model to the data while favoring the most parsimonious model (Kongsted & Nielsen, 2017). The probabilities are a function of the parameters included in the analysis, where participants are placed into a profile in which they have the highest probability (Maysin, 2013). Due to existence of outliers, low entropy and the use of LPA models, we applied a one-step classify-analyze approach instead of a step-wise approach (Dziak, Bray, Zhang, Zhang, & Lanza, 2016); (e) a MANOVA to determine whether the profiles differed in protective and risk factors; and (f) Kruskal-Wallis rank tests to identify in which of the factors the profiles differed (Table 2).

Results

Mental Well-Being and Symptomatology of Anxiety and Depression in Danish Athletes

To address the study’s first objective, the scores and categories of well-being, anxiety, and depressive of the Danish athletes are presented together with gender differences.

Mental Well-being
The mean score of the SWEMWBS for the total sample was 26.27 ($SD = 3.99$). Fifty-nine percent of athletes expressed average well-being, 22% below and 19% above average, respectively. In general, male athletes ($M = 26.73$, $SD = 3.90$) reported statistically significantly higher mental well-being scores than female athletes ($M = 25.64$, $SD = 4.04$), $t(610) = 3.35$, $p = .001$, Cohen’s $d = .33$. (small to medium effect size; Cohen, 1988).

**Anxiety**

The mean GAD-7 score of the total sample was 4.86 ($SD = 4.19$). In total, 55.7% of the Danish athletes reported minimal symptoms of general anxiety, 30.4% mild symptoms, 10% moderate symptoms (scores 10-14), and 3.9% severe anxiety symptoms (scores $\geq 15$). Chi-square tests indicated gender differences in reporting anxiety symptoms with 20% of females reporting moderate or severe symptoms compared to 9.6% of the male athletes, $x^2 = 19.09$, $df = 3$, $p < .001$, Cramer’s $V = .18$ (medium effect size).

**Depression**

The mean CES-D score for the total sample was 11.27 ($SD = 8.31$) with 77.9% of the Danish athletes describing no or mild depressive symptoms, 12.9% moderate (scores 16-23), and 8.2% with severe depressive symptoms (scores $\geq 24$). Statistically significant gender differences were found in reporting moderate or severe symptoms (27.9% of females compared to 17.7% male athletes), $x^2 = 8.91$, $df = 2$, $p = .012$, Cramer’s $V = .12$ (small to medium effect size).

In summary, 74.8% of the Danish athletes reported no to mild symptoms of anxiety or depression, 14.1% reported one moderate or severe symptom (11.8% for males, 17.4% for females), whereas 11.1% indicated symptoms of both anxiety and depression (i.e., comorbidity: 7.9% for males, 15.4% for females).

**Identifying Latent Mental Health Profiles**
The second objective of the study was to explore the underlying mental health profiles of Danish elite athletes based on their mental well-being, anxiety, and depression scores.

**Model selection**

To select the best model, the fit indices from a two-class solution up to a five-class solution were examined. Table 1 presents the fit indices for each model and shows that the three-profile solution had the lowest BIC and SABIC values. The three-profile solution (with posterior probabilities of .64, .29, .07 and an average latent class probability of .77) was also identified as the most informative for understanding athletes’ mental health since the profiles had clearly distinguishable characteristics (see Table 2 and Figure 1) concerning their mental health state.

**Mental Health Profile Descriptions**

Profile 1 was the largest latent profile containing 64.2% of the athletes (69.5% of the male and 57% of the female athletes) and was termed *flourishing profile*. Athletes within this profile were characterized by above-average well-being scores ($M = 28.02, SD = 3.13$), low anxiety ($M = 2.55, SD = 2.13$) and depression scores ($M = 6.56, SD = 3.71$) (see Table 2). Profile 2, named *moderate mental health profile*, contained 29.3% of athletes (25.1% male and 34.9% female), and was characterized by below-average well-being scores ($M = 23.79, SD = 3.15$), and anxiety and depression scores that indicate mild or moderate symptoms. Profile 3, labeled *languishing profile*, was the smallest of the three profiles containing 6.5% of the sample (5.4% males and 8.1% female athletes) and was characterized by low well-being scores ($M = 20.15, SD = 2.83$), and scores of anxiety ($M = 14.80, SD = 2.75$) and depression ($M = 31.63, SD = 6.46$) that indicate moderate to severe symptoms. Figure 1 displays the three profiles in relation to their well-being categories and the symptomology of anxiety and depression.
Between-Profile Differences in Protective and Risk Factors

The study’s third objective was to examine whether the mental health profiles differed in their perception of the protective and risk factors included in the HAMHS. Table 2 provides an overview of three profiles that emerged of the LPA together with their means, and standard deviations for the protective and risk factors for mental health. A MANOVA test with age, elite sport level, and all 12 protective and risk factors revealed statistically significant differences between the three profiles, \( F(28,1192) = 11.87, p < .001; \) Wilks’ \( \Lambda = .64, \) partial \( \eta^2 = .20. \) Following, non-parametric Kruskal-Wallis tests were applied to check in which of the factors the three profiles differed and how substantial these differences were. We used Bonferroni Holm adjusted \( p \)-values to interpret these multiple comparisons. Epsilon squared values (\( \epsilon^2 \)) are provided as effect size measures for Kruskal-Wallis (Tomczak & Tomczak, 2014). With regard to protective factors, medium to large effect size differences between the profiles were found in the social support received from the private (\( \epsilon^2 = .16 \)) and the sports domain (\( \epsilon^2 = .09 \)), where the flourishing profile scored highest and the languishing profile lowest. Moreover, the profiles differed in relation to how they perceived their sport environment (\( \epsilon^2 = .08 \)) and the hours of sleep (\( \epsilon^2 = .03 \)) where the flourishing profile scores highest and the languishing profile lowest.

With regard to the risk factors, statistically significant differences were found between athletes in the three profiles related to their perceived stressors in the private (\( \epsilon^2 = .14 \)), the sport (\( \epsilon^2 = .13 \)), and the educational/work domain (\( \epsilon^2 = .10 \)). The most substantial differences were found concerning private stress, in which the flourishing profile had a mean of 2.46 (\( SD = 1.17 \)) and the languishing profile scored 4.05 (\( SD = 1.06 \)). Additionally, athletes in the languishing profile had statistically significantly higher workloads per week in terms of hours spent for
training, school and/or work. The three mental health profiles did not differ statistically concerning age, elite sports level, satisfaction with last competition, mindfulness practice, and the number of injuries or competitions.

[Please insert Table 2 around here]

**Discussion**

The following key findings of the present study are highlighted: first, Danish athletes expressed slightly higher mental well-being scores \( (M = 26.3) \) than a sample from the Danish general population aged 16-25 \( (M = 25.8; \text{Koushede et al., 2019}) \). These scores are comparable to athletic populations in other countries (e.g., Breslin et al., 2018; Nicholls et al., 2020). Second, symptoms of moderate or severe anxiety and depression were reported by 13.9% and 21.1% of athletes, respectively, with female athletes reporting substantially higher symptom rates than males. Third, three distinctive latent mental health profiles in Danish athletes were detected. Supporting our general study hypothesis, these profiles differed statistically and substantially (medium to large effect sizes) in terms of received social support, perception of the sport environment, and stressors stemming from the private, sport, and educational/work domain.

The overall prevalence of general anxiety symptoms in Danish elite athletes was 13.9% which is similar to the numbers of Swedish (Åkesdotter, et al., 2019) and Australian athletes (Gulliver et al., 2015), but higher than the soccer players from Switzerland and Germany (Junge & Feddermann-Demont, 2016; Junge & Prinz, 2018). The prevalence of moderate or severe depressive symptoms in Danish elite athletes (21.1%) was in line with the results of Kilic et al.’s (2017) study conducted with Danish soccer and handball players, lower than the 27.2% of the Australian athletes (Gulliver et al., 2015), but higher than the 10.6% soccer players in the sample of Junge and Feddermann-Demont (2016). In the Danish population aged 16-24, 24% of women
expressed poor mental health compared to 13% of males, yet measured with a different scale (Sundhedsstyrelsen, 2018) hence making direct comparison difficult. Previous research showed that female athletes are more likely than males to experience CMD (e.g., Appaneal et al., 2009; Rice et al., 2019; Schaal et al., 2011) and our results corroborate these findings. We used the CES-D standard cut-off point of 16 that indicates moderate depressive symptoms. However, Henry, Grant, and Cropsey (2018) have suggested that the optimal cut-off point in special populations can be as high as 23 for women as opposed to 15 for men and therefore, the prevalence rates of the Danish elite athletes (also from a gender perspective) need to be taken with a degree of caution.

**Mental Health Profiles of Danish Elite Athletes**

Three distinctive mental health profiles were found through the LPA. Close to two-thirds (64%) of the Danish athletes are flourishing, around 30% express moderate mental health, whereas the minority of athletes (6.5%) is languishing while simultaneously facing moderate or severe symptoms of anxiety and/or depression. The results in Table 2 indicate that athletes’ depression and anxiety scores had a greater influence (compared to their well-being scores) how athletes were grouped into the different profiles. Figure 1 shows that athletes in the flourishing profile express no to mild symptoms of mental illness but not necessarily above average mental well-being. Hence, the absence of symptoms of mental illness does not automatically indicate genuine mental health in athletes. On the other hand, the chances for athletes facing moderate or severe anxiety (profile 3) to simultaneously experience average or high well-being are small to non-existing. In Keyes’ (2002) original research with a large non-athletic American sample, participants were divided into six groups depending on their mental well-being levels and incidents of a major depression. Most people (56%) were classified in the moderately mentally
healthy profile (moderate mental well-being, no depression), and 17% were pure flourishing (high mental well-being, no depression). Twelve percent were pure languishing (low mental well-being, no depression), and 17% were depressed in combination with low mental well-being. Keyes’ (2002) model proposes that the mental health and the mental illness axes are two related but clearly separable dimensions. The mental health characteristics of the three profiles (Figure 1) identified in our study hence only partly support Keyes’ (2002) notion that mental health and mental illness are clearly separable dimensions in athletes.

**Differences in Protective and Risk Factors Between the Mental Health Profiles**

As hypothesized, athletes in the flourishing profile scored higher in protective and lower in risk factors than athletes in the other two profiles. Distinctive differences were found between profiles concerning their perception of social support from influential persons such as parents, coaches, and friends. Flourishing athletes felt – in a much higher degree than the other two profiles – that they have persons both in the sport, but especially in their private life domain to cheer them up, provide help when needed, and upon whom they can always rely. Our results support previous research which highlights that access to relevant support is key for positive mental health in athletes (e.g., Coyle et al., 2017; Gulliver et al., 2012). On the other hand, low perceived social support (e.g., Gouttebarge et al., 2017) or conflict with coaches (e.g., Prinz, Dvorak, & Junge, 2016) can have a detrimental effect on athletes’ mental health.

A sporting environment that provides athletes with the opportunity to make autonomous decisions, learn through mistakes, and where they can act as role models has been shown to increase the likelihood to reach the elite level (Henriksen et al., 2010). Concerning mental health, autonomy satisfaction (Lundqvist & Raglin, 2015) role-modeling (Sandardos & Chambers, 2019) and positive coaching behavior (Bisset, Kroshus, & Hebard, 2020) can improve athletes’
mental health. Athletes in the languishing mental health profile rated these sport-environmental
cracteristics substantially lower than the other two profiles. Other studies further showed that
teams with problematic environments can lead to increased anxiety and depression, while
supportive environments lead to lower stigmatizing values (Gouttebarge, et al., 2015; Schaal et
al., 2011). Comparing to elite sport environments and subcultures where a “gladiator mentality”
is praised (Coulter, Mallett, & Singer, 2016), the study of Ivarsson et al.’s (2015) found that
players perceiving their sporting environment as supporting experienced higher well-being
compared to players who felt less supported and had poorer relationships with coaches and peers.

Our results showed that the profiles differed especially in their perception of the stressors.
The flourishing profile had in general the lowest stress levels of all groups. The languishing
profile expressed stress levels above 4 (on a 5-point scale) concerning the private, sport, and
educational domains. These findings highlight the need to apply a holistic whole-person view on
athletes (Wylleman et al., 2013) regarding their mental health and to consider the interplay of the
different life domains. Since different stressors are a natural part of every elite sports career
(Arnold & Fletcher, 2012), interventions targeting stress-management and coping strategies can
have beneficial effects in preventing depression (Nixdorf, Beckmann, & Nixdorf, 2019).

Unlike previous studies (e.g., Appaneal et al., 2009; Gouttebarge et al., 2017; Gulliver et
al., 2015; Kilic et al., 2017; Prinz et al., 2016), and to our surprise, we found no statistical
significant differences between mental health profiles concerning the number of injuries. One
explanation could be that we did not ask if athletes are currently injured. Another probable
explanation is that injured Danish athletes have access to well-functioning rehabilitation
networks that can bolster the negative psychological effect related to injury (Podlog & Eklund,
2007). Only a few of the athletes studied conduct mindfulness exercises on a regular base; hence,
no statistical profile differences were detected. Noetel et al.’s (2019) review found that mindfulness studies in sport mainly have focused on performance-related outcomes, with few centered on mental health and thus, the effects of mindfulness on mental health outcomes in elite athletes remain unclear.

**Strengths and Limitations of the Study**

The principal strength of our study is the large sample size of Danish elite athletes that allowed us to find underlying mental health profiles within a heterogeneous sample that consisted of both genders representing many different sports and elite levels (from semi-elite to world-class; Swann, Moran, & Piggott, 2015). Compared to previous studies that primarily have looked at the relationship between risk factors and CMD in athletes (e.g., Gouttebarge et al., 2015; Rice et al., 2019), we applied a holistic-ecological approach towards athletes’ mental health and included both risk and protective factors when comparing the different mental health profiles. Latent profile analysis is a relatively rarely used statistical method within the field of sport psychology and has the advantage over traditional cluster analyses to determine the number of profiles using specific model fit indices (Maysin, 2013). However, model selection is not a straightforward process where both statistical fit indices together with theoretical and conceptual considerations need to be considered (Kongsted & Nielsen, 2017). Since entropy and average latent class probability were rather low in our LPA model (Tein et al., 2013), further studies with elite athletes are needed to support the three-profile solution detected within our sample.

A general weakness of this study is the cross-sectional design using self-reported measurements of athletes about their mental health condition and their perception of support and stressors in the same instrument. This enhances the possible impacting of common method variance (CMV), defined as “variance that is attributable to the measurement method rather than
to the constructs the measures represent” (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003, p. 879). CMV creates a false internal consistency, that is, an apparent correlation among variables generated by their common source. By guaranteeing anonymity, randomizing items when answering the scales, and displaying mental health variables and protective/risk factor variables in different sections of the questionnaire, we followed some of Podsakoff et al. (2003) recommendations to minimize CMV during data collection. Future research should aim to include experts’ ratings on symptoms of anxiety and depression to determine whether the proposed clinical cut-off points of the included scales can be used in an elite sports context.

Stress was assessed with single-item questions for the three domains (i.e., personal, sport, school/work), and a broader scope of measurement could improve the reliability. We only asked one question related to the athletic performance (i.e., satisfaction with past competition) and we believe that other performance-related variables such as general career satisfaction could be included. As discussed earlier, injuries should not only be assessed by the number of past injuries but also by severity, duration, and type of injury (Bahr et al., 2020).

**Practical Implications and Recommendations for Future Research**

Reviewing the main results of the study, several factors of the study are related to supporting athletes’ balance their life between sport and non-sport environments. Important factors in this study such as social support and characteristics of the sports environment – and on the opposite side – stressors from the different life domains can act as a resource or barrier for their career development and mental health. Bringing this idea forward, when coordination and communication between key stakeholders (e.g., coaches, parents, teachers) in these environments are high, and a common philosophy concerning mental health is shared, then these integrated
efforts and factors can help to reduce unnecessary stress and promote mental health (Henriksen, Storm, Kuettel, Linnér, & Stambulova, 2019).

Athletes should be periodically checked if they are flourishing or languishing. We believe that HAMHS has the potential to be utilized as a monitoring tool, supporting interventions responding to athletes’ needs (Purcell, Gwyther, & Rice, 2019). For example, athletes in the languishing profile may benefit best from a combined therapy of psychiatric and psychological care followed by well-being interventions, whereas athletes in the moderate mental health profile will benefit best from preventative well-being strategies alone. Furthermore, when interventions are conducted on the individual (e.g., Nixdorf et al., 2019) or the environmental level (e.g., Breslin et al., 2018), the HAMHS could be used to assess if interventions affect athletes’ mental health over time. Most of the athletes in this study are engaged in a dual career and expressed the highest stress-levels related to the educational/work domain. Therefore, to study the role of dual-career environments (Henriksen, Storm, & et al., 2019), critical within-career transitions (e.g., Morris, Tod, & Eubank, 2017), and the transition out of elite sports (Kuettel, Boyle, & Schmid, 2017) could be future avenues to investigate the dynamic mental health state of athletes.

Conclusions

The present findings suggest that most Danish athletes experience medium to high mental well-being, and report no or minor symptoms of anxiety or depression. The prevalence rates of anxiety and depression in Danish elite athletes resemble the numbers of the Danish population and athletes from other countries. Female athletes express lower mental well-being and higher rates of anxiety and depressive symptoms than male athletes. Languishing athletes generally receive lower social support, perceive higher stress levels, and rate their sporting environment less autonomy-supportive compared to flourishing athletes. To foster positive mental health in
elite athletes, a tailored and holistic approach is needed which spans from preventative components (e.g., endorsing athletes’ coping resources, positive sporting culture) to early interventions (e.g., sessions with a qualified mental health professional), to specialist mental health care (e.g., treatment and medication), depending on the athlete’s mental health profile.

Acknowledgements

We would like to thank the Danish Sport Federations for their assistance with the data collection. This research was supported in part by Team Denmark (grant nr. 2018-5). We would like to express our gratitude to Dr. Andreas Ivarsson and the two anonymous reviewers for their critical and insightful comments on earlier drafts of this paper.
References


Table 1

Model fit indices for the latent profile analyses models based on mental well-being, anxiety, and depression scores

<table>
<thead>
<tr>
<th>Solution</th>
<th>Log-likelihood</th>
<th>AIC</th>
<th>BIC</th>
<th>SABIC</th>
<th>Entropy</th>
<th>Sample proportions</th>
<th>Average latent class probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two profiles</td>
<td>-5055.09</td>
<td>10148.18</td>
<td>10232.10</td>
<td>10171.78</td>
<td>.58</td>
<td>.78; .22</td>
<td>.82</td>
</tr>
<tr>
<td>Three profiles</td>
<td>-5017.50</td>
<td>10093.00</td>
<td>10221.09</td>
<td>10129.02</td>
<td>.66</td>
<td>.64; .29; .07</td>
<td>.77</td>
</tr>
<tr>
<td>Four profiles</td>
<td>-5002.18</td>
<td>10082.36</td>
<td>10254.61</td>
<td>10130.79</td>
<td>.71</td>
<td>.47; .24; .23; .06</td>
<td>.75</td>
</tr>
<tr>
<td>Five profiles</td>
<td>-4987.37</td>
<td>10072.73</td>
<td>10289.15</td>
<td>10133.58</td>
<td>.71</td>
<td>.47; .23; .17;</td>
<td>.70</td>
</tr>
</tbody>
</table>

Note. AIC = Akaike information criterion, BIC = Bayesian information criteria, SABIC = sample-adjusted Bayesian information criteria.
Table 2  
Comparison between mental health profiles on relevant protective and risk factors related to athletes’ mental health (MH)

<table>
<thead>
<tr>
<th>Profiles</th>
<th>Full sample (n = 612)</th>
<th></th>
<th>Profiles</th>
<th></th>
<th>Profiles</th>
<th></th>
<th>Profiles</th>
<th></th>
<th>Effect size</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M (SD)</td>
<td>Range (actual)</td>
<td>SK</td>
<td>K</td>
<td>M (SD)</td>
<td>Profile 1 (n = 393)</td>
<td>M (SD)</td>
<td>Profile 2 (n = 179)</td>
<td>M (SD)</td>
<td>Profile 3 (n = 40)</td>
</tr>
<tr>
<td>Well-being (SWEMWBS)</td>
<td>26.27 (3.99)</td>
<td>12-35</td>
<td>-.23</td>
<td>.32</td>
<td>28.02a (3.13)</td>
<td>23.79b (3.15)</td>
<td>20.15, (2.83)</td>
<td>.39*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety (GAD-7)</td>
<td>4.86 (4.19)</td>
<td>0-21</td>
<td>1.11</td>
<td>.98</td>
<td>2.55a (2.13)</td>
<td>7.71b (2.57)</td>
<td>14.80, (2.75)</td>
<td>.59*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression (CED-D)</td>
<td>11.27 (8.31)</td>
<td>0-51</td>
<td>1.28</td>
<td>2.01</td>
<td>6.56a (3.71)</td>
<td>17.02b (4.74)</td>
<td>31.63, (6.46)</td>
<td>.64*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>18.99 (4.29)</td>
<td>14-39</td>
<td>1.55</td>
<td>2.67</td>
<td>18.94, (4.46)</td>
<td>19.07, (4.08)</td>
<td>19.13, (3.57)</td>
<td>.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elitesport level</td>
<td>2.13 (1.23)</td>
<td>1-5</td>
<td>.78</td>
<td>-.61</td>
<td>2.07 (1.29)</td>
<td>2.23 (1.23)</td>
<td>2.33 (1.31)</td>
<td>.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Personal protective factors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social support private</td>
<td>51.67 (9.33)</td>
<td>19-65</td>
<td>-.77</td>
<td>.23</td>
<td>54.27a (8.13)</td>
<td>48.44b (9.14)</td>
<td>40.98, (9.74)</td>
<td>.16*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hours of sleep</td>
<td>8.43 (0.85)</td>
<td>6-11</td>
<td>.07</td>
<td>.27</td>
<td>8.53a (0.82)</td>
<td>8.29b (0.83)</td>
<td>8.05b (0.99)</td>
<td>.03*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfaction with last competition</td>
<td>3.27 (1.32)</td>
<td>1-5</td>
<td>-.31</td>
<td>-1.12</td>
<td>3.34 (1.32)</td>
<td>3.18 (1.29)</td>
<td>3.00 (1.34)</td>
<td>.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mindfulness minutes per day</td>
<td>4.43 (9.63)</td>
<td>0-60</td>
<td>2.47</td>
<td>5.81</td>
<td>4.49 (10.12)</td>
<td>4.12 (8.56)</td>
<td>5.15 (9.38)</td>
<td>.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sport-environment protective factors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social support sport</td>
<td>46.90 (10.50)</td>
<td>14-65</td>
<td>-.45</td>
<td>-.02</td>
<td>49.18a (8.99)</td>
<td>44.35b (9.40)</td>
<td>37.08c (12.89)</td>
<td>.09*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sport environment</td>
<td>41.97 (5.59)</td>
<td>10-50</td>
<td>-.16</td>
<td>6.14</td>
<td>42.99a (5.17)</td>
<td>40.42b (5.66)</td>
<td>39.23b (5.46)</td>
<td>.08*</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Personal risk factors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stress private</td>
<td>2.80 (1.26)</td>
<td>1-5</td>
<td>.04</td>
<td>-.11</td>
<td>2.46a (1.17)</td>
<td>3.25b (1.19)</td>
<td>4.05c (1.06)</td>
<td>.14*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stress education and/or work</td>
<td>3.57 (1.19)</td>
<td>1-5</td>
<td>-.68</td>
<td>-.07</td>
<td>3.32a (1.21)</td>
<td>3.97b (1.03)</td>
<td>4.33b (0.94)</td>
<td>.10*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of injuries in past two years</td>
<td>0.92 (1.01)</td>
<td>0-5</td>
<td>1.11</td>
<td>1.14</td>
<td>0.89 (1.03)</td>
<td>0.96 (0.99)</td>
<td>1.00 (0.82)</td>
<td>.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total effort hours per week</td>
<td>49.73 (12.34)</td>
<td>19-72</td>
<td>.02</td>
<td>.90</td>
<td>49.03a (12.18)</td>
<td>49.72a (11.93)</td>
<td>56.64b (13.83)</td>
<td>.02*</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sport-environmental risk factors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stress sport</td>
<td>3.23 (1.16)</td>
<td>1-5</td>
<td>-.40</td>
<td>-.82</td>
<td>2.93a (1.13)</td>
<td>3.70b (1.02)</td>
<td>4.05b (0.93)</td>
<td>.13*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of competitions per year</td>
<td>23.06 (16.71)</td>
<td>2-80</td>
<td>1.51</td>
<td>4.08</td>
<td>24.29 (17.00)</td>
<td>20.65 (16.34)</td>
<td>21.88 (14.93)</td>
<td>.01</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. SK = Skewness, K = Kurtosis. Means with different subscripts are statistically different from another. H-values for Kruskal-Wallis are statistically significant (*) with a Bonferroni Holm correction. Epsilon-squared ($\varepsilon^2$) effect sizes for differences between profiles are .01 ~ small; .06 ~ medium; >.14 ~ large (Cohen, 1988).
Note. The percentages displayed above the bars show how each profile is distributed within the categories of well-being, anxiety, and depression.
## Supplementary table

*Participants' characteristics by type of sports including their mental well-being scores and symptomatology of anxiety and depression*

<table>
<thead>
<tr>
<th>Sports</th>
<th>Age  M (SD)</th>
<th>n (%)</th>
<th>% female athletes</th>
<th>% junior athletes</th>
<th>Well-being M (SD)</th>
<th>n (%) moderate anxiety symptoms</th>
<th>n (%) severe anxiety symptoms</th>
<th>n (%) moderate depressive symptoms</th>
<th>n (%) severe depressive symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athletics</td>
<td>20.4 (3.1)</td>
<td>41 (6.7)</td>
<td>56</td>
<td>51</td>
<td>25.5 (4.3)</td>
<td>4 (9.8)</td>
<td>1 (2.4)</td>
<td>6 (15.0)</td>
<td>4 (9.8)</td>
</tr>
<tr>
<td>Badminton</td>
<td>17.7 (2.5)</td>
<td>21 (3.4)</td>
<td>38</td>
<td>71</td>
<td>27.1 (3.3)</td>
<td>3 (14.3)</td>
<td>0 (-)</td>
<td>3 (14.3)</td>
<td>0 (-)</td>
</tr>
<tr>
<td>Basketball</td>
<td>21.9 (4.0)</td>
<td>26 (4.2)</td>
<td>54</td>
<td>35</td>
<td>23.6 (3.4)</td>
<td>4 (15.4)</td>
<td>3 (11.5)</td>
<td>6 (23.1)</td>
<td>4 (15.4)</td>
</tr>
<tr>
<td>Cycling</td>
<td>22.8 (4.9)</td>
<td>17 (2.8)</td>
<td>35</td>
<td>18</td>
<td>26.3 (2.4)</td>
<td>1 (5.9)</td>
<td>1 (5.9)</td>
<td>0 (-)</td>
<td>1 (5.9)</td>
</tr>
<tr>
<td>Golf</td>
<td>21.5 (5.4)</td>
<td>23 (3.8)</td>
<td>52</td>
<td>43</td>
<td>25.4 (4.1)</td>
<td>3 (13.0)</td>
<td>1 (4.3)</td>
<td>3 (13.0)</td>
<td>2 (8.7)</td>
</tr>
<tr>
<td>Handball</td>
<td>18.5 (3.1)</td>
<td>41 (6.7)</td>
<td>68</td>
<td>65</td>
<td>26.3 (3.9)</td>
<td>4 (9.8)</td>
<td>1 (2.4)</td>
<td>5 (12.2)</td>
<td>3 (7.3)</td>
</tr>
<tr>
<td>Ice Hockey</td>
<td>15.9 (0.3)</td>
<td>23 (3.8)</td>
<td>0</td>
<td>100</td>
<td>26.3 (3.7)</td>
<td>4 (17.4)</td>
<td>0 (-)</td>
<td>3 (13.0)</td>
<td>3 (13.0)</td>
</tr>
<tr>
<td>Orienteering</td>
<td>21.5 (4.1)</td>
<td>17 (2.8)</td>
<td>53</td>
<td>47</td>
<td>24.7 (5.4)</td>
<td>1 (5.9)</td>
<td>2 (11.8)</td>
<td>2 (11.8)</td>
<td>4 (23.5)</td>
</tr>
<tr>
<td>Sailing</td>
<td>23.5 (3.2)</td>
<td>13 (2.1)</td>
<td>39</td>
<td>15</td>
<td>26.8 (4.9)</td>
<td>2 (15.4)</td>
<td>0 (-)</td>
<td>4 (30.8)</td>
<td>1 (7.7)</td>
</tr>
<tr>
<td>Soccer</td>
<td>17.6 (2.6)</td>
<td>270 (44.1)</td>
<td>33</td>
<td>81</td>
<td>26.7 (3.7)</td>
<td>25 (9.3)</td>
<td>8 (3.0)</td>
<td>34 (12.6)</td>
<td>19 (7.0)</td>
</tr>
<tr>
<td>Swimming</td>
<td>18.6 (3.2)</td>
<td>18 (2.9)</td>
<td>67</td>
<td>33</td>
<td>23.9 (3.9)</td>
<td>5 (27.8)</td>
<td>4 (22.2)</td>
<td>4 (22.2)</td>
<td>3 (16.7)</td>
</tr>
<tr>
<td>Tennis</td>
<td>15.5 (3.0)</td>
<td>34 (5.6)</td>
<td>56</td>
<td>100</td>
<td>28.8 (3.9)</td>
<td>1 (3.1)</td>
<td>0 (-)</td>
<td>1 (3.1)</td>
<td>0 (-)</td>
</tr>
<tr>
<td>Triathlon</td>
<td>23.7 (6.8)</td>
<td>26 (4.2)</td>
<td>31</td>
<td>34</td>
<td>26.8 (3.8)</td>
<td>2 (8.0)</td>
<td>0 (-)</td>
<td>3 (12.0)</td>
<td>1 (3.8)</td>
</tr>
<tr>
<td>Volleyball</td>
<td>21.1 (4.1)</td>
<td>23 (3.8)</td>
<td>57</td>
<td>22</td>
<td>26.1 (3.8)</td>
<td>0 (-)</td>
<td>3 (13.0)</td>
<td>2 (9.5)</td>
<td>3 (13.0)</td>
</tr>
<tr>
<td>Various sport</td>
<td>25.6 (6.1)</td>
<td>19 (3.1)</td>
<td>68</td>
<td>16</td>
<td>24.4 (4.8)</td>
<td>3 (15.8)</td>
<td>0 (5.3)</td>
<td>4 (21.1)</td>
<td>2 (10.5)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>19.0 (4.3)</td>
<td>612 (100)</td>
<td>42</td>
<td>64</td>
<td>26.3 (3.9)</td>
<td>61 (10.0)</td>
<td>24 (3.9)</td>
<td>79 (12.9)</td>
<td>50 (8.2)</td>
</tr>
</tbody>
</table>

*Note.* Mental well-being scores range from 7-35 with higher values representing higher well-being. Symptoms of anxiety (scores 10-14 for moderate; 15-21 for severe) are related to the cut-off points of GAD-7. Symptoms of depression (scores 16-23 for moderate; 24-60 for severe) are related to the cut-off points of CES-D. Various sport contain sports (kayak, rowing, sports dance, windsurfing) with fewer than 10 participants.