



Mental health profiles among 13-16-year-Old Norwegian talent and mainstream students - A prospective person-centered analytical approach

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ABSTRACT

Objectives: To contribute further knowledge about symptoms of anxiety, depression, body concerns, and self-worth among young talent development (TD) and mainstream students by exploring the indicators within-person combinations prospectively, aiming to identify distinct profiles.

Methods: We included 946 students, $n = 168$ (45% girls) from three TD sports schools and one ballet class, $n = 778$ (52% girls) from ten mainstream schools. All were 13–14 years at T1 and 15–16 years at T2. Descriptive statistics were examined via variable-centered approaches: ANOVA and cross-tabulations. Mental health profiles were explored via person-centered approaches: latent profile and latent transition analysis, including profile stability over two years and school type, gender, and perfectionism association with profiles.

Results: TD girls' and boys' anxiety and depression scores did not differ, but girls reported more weight-shape concerns. Mainstream schoolgirls fared worse compared to all others. Four retained profiles (*distressed-body concerned*, *dissatisfied*, *moderate mentally healthy*, *mentally healthy*) showed distinct patterns of co-occurring anxiety, depression, weight-shape concerns, and self-worth. Profile stability was high overall (72–93%). The highest proportion of TD boys was in the *mentally healthy*, TD girls and mainstream boys in *moderate*, and mainstream girls within the *dissatisfied* profile. Noteworthy transitions: TD boys who transitioned were likely changing to healthier profiles and girls to unhealthier. Unhealthier profiles were associated with socially prescribed perfectionism.

Conclusion: TD students fared relatively better than mainstream students. Still, considerable proportions of girls were identified in the unhealthiest profiles. These findings involving young TD and mainstream students propose a need for specific follow-up measures to promote mental health.

1. Introduction

School-aged adolescents' mental health is a public health concern (Inchley et al., 2020). Although most adolescents are doing well, one in seven experience impaired daily life due to mental health problems (IHME, 2019). In the last decade, increased attention has been paid to the mental health of sports-involved adolescents (Walton et al., 2021) and student-athletes (Kegelaers et al., 2022). Essentially, previous studies indicate that adolescent athletes experience lower symptoms of anxiety and depression than non-athletes (Panza et al., 2020), and sports and dance participation may facilitate positive experiences of self-worth

and well-being (Chappell et al., 2021; Eime et al., 2013). Still, experiences of distress, body concerns, and perfectionism related to decreased well-being among youth athletes and dancers require further attention (Quinn et al., 2021; Walton et al., 2021).

Anxiety and depressive symptoms, body concerns, and low self-worth are critical indicators of poor mental health and are reported more frequently in teenage girls than boys (Duchesne et al., 2017; McLean et al., 2021). Similar gender differences are found for student-athletes (Kegelaers et al., 2022). Although gender differences in mental health are consistently reported among adolescents, the explanations for the differences are not extensively studied or well understood

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(Campbell et al., 2021; Patalay & Demkowicz, 2023). Some relevant explanations of emerging gender differences in symptoms of distress during adolescence might relate to girls' experiences of higher pressures and expectations for success in school compared with boys (Wiklund et al., 2012). Further, it is suggested that the higher occurrence of body-related concerns among adolescent girls relates to different societal expectations of appearance for girls compared to boys, by which girls may experience their bodily changes during puberty as developing further away from society's appearance ideals while boys may perceive their bodies as developing closer to the ideals (lean/muscular) (Bearman & Stice, 2008; McLean et al., 2021). Such disparities are especially pronounced in weight-sensitive forms of sports and dance (Sundgot-Borgen et al., 2013).

Only a few studies have as yet explored such mental health indicators, gender differences, and whether there are differences between very young student-athletes and non-student athletes, specifically during their junior high school years (i.e., 12/13–15/16 years old: Brand et al., 2013; see Kegelaers et al., 2022, for a scoping review on student-athletes mental health from various ages). Notably, one of the few previous studies on 12-15-year-old student-athletes and non-student athletes reported that student-athlete girls tended to report fewer mental health symptoms (i.e., panic, posttraumatic stress, and specific phobia) than non-athlete girls.

Adolescents are in a life stage involving physical, emotional, and psychosocial changes that can make them vulnerable to mental health symptoms (Solmi et al., 2022). Early detection of who might be at risk is important. However, we have limited research on mental health development among young student performers at talent development schools (i.e., 12 to 16-year-old students in specialized schools combining academic studies with sports or performing arts for selected students) compared to non-student performers. Given this lack of knowledge and the anticipation that the very young student performers might struggle with mental health issues related to, amongst others, experiencing pressures from performance expectations, preventive work might be needed (Walton et al., 2021). Accordingly, we need more knowledge about adolescent students' mental health status and development to promote healthy development and to facilitate preventive work in different school settings.

1.1. Person-centered approach to mental health

Mental health can be defined as a state of well-being and healthy functioning where individuals realize their potential, manage the normal demands of life, and contribute to their community (WHO, 2022). Based on these views, mental health incorporates individuals' experiences of well-being and self-worth that are not limited to the absence of mental illness.

Previous studies have provided valuable knowledge on the prevalence and associations between anxiety, depression, body concerns, and self-worth among adolescents (Bos et al., 2010; Duchesne et al., 2017). Alternative approaches addressing how levels of positive and adverse mental health coexist within adolescents may contribute to further knowledge of their mental health status (Moore et al., 2019a; Suldo & Shaffer, 2008). The dual-factor model (Greenspoon & Saklofske, 2001) or two-continua model of mental health (Keyes, 2002; Westerhof & Keyes, 2010) are theoretical concepts viewing well-being and psychological distress as representing two separate continua but as related dimensions (Keyes, 2002; Moore et al., 2019a; Suldo & Shaffer, 2008). Aligning with contemporary mental health views, these models consider exclusive assessments of the absence of mental illness as insufficient to cover the heterogeneity in different individuals' mental health (Westerhof & Keyes, 2010).

Studies exploring co-occurring levels of adverse and positive mental health based primarily on indicators of psychological distress and well-being have suggested four mental health profiles as particularly valuable (e.g., Antaramian et al., 2010; Suldo et al., 2016; Suldo & Shaffer, 2008).

These four profiles hypothesized within the dual-factor model are commonly named and characterized as *flourishing* or *complete* mental health with low distress/high well-being, *vulnerable* or *languishing* with low distress/low well-being, *symptomatic but content* with high distress/high well-being, and *troubled* mental health with high distress/low well-being (e.g., Suldo & Shaffer, 2008). Most previous studies have used cut-point strategies that pre-specifies four profiles consistent with the dual-factor model (e.g., Antaramian et al., 2010; Suldo et al., 2016; Lyons, Huebner, & Hills, 2013). In contrast, using a data-driven explorative approach, latent profile analysis (LPA), the number of profiles to retain and the characterization of within-profile patterns can not be pre-determined but relies on a set of criteria related to model fit indices, substantive rationale, and previous literature (Spurk et al., 2020). Unsurprisingly then, the number of mental health profiles retained across studies varies depending on the analytical approach.

Notably, in the present study, we aim to explore mental health profiles based on self-worth instead of specific indicators of well-being – and in addition to indicators of anxiety and depression, we include body weight-shape concerns. To our knowledge, such mental health profiles have not yet been explored among young teenage students from different school contexts cross-sectionally or prospectively. However, some previous studies have provided valuable insight into mental health profiles exploring co-occurring symptoms of distress and well-being using the explorative LPA approach among relevant samples to the present study, i.e., elite athletes (Kuettel et al., 2021) and mainstream students (Moore et al., 2019a; Moore et al., 2019b).

Among elite athletes, three mental health profiles based on indicators of anxiety, depressive symptoms, and well-being have been identified by the LPA approach (Kuettel et al., 2021). Also, using LPA, four mental health profiles were retained based on internalizing and externalizing distress and well-being among mainstream high school students (15–19 years old: Moore et al., 2019a; Moore et al., 2019b). Indeed, these explorative studies found a profile with severe distress/low well-being and a profile with low distress/high well-being (i.e., *complete/flourishing* profile: Kuettel et al., 2021; Moore et al., 2019a; Moore et al., 2019b). Moore et al. (2019a; Moore et al., 2019b) further identified individuals with co-occurring high-average well-being and above-average distress corresponding to the *symptomatic but content* profile of the dual-factor model, which did not emerge in elite athletes (Kuettel et al., 2021). However, no athletes or mainstream students were identified with combined low distress and low well-being (i.e., *vulnerable* profile). Instead, a *moderately mentally healthy* profile emerged, characterized by average well-being and distress. Accordingly, using LPA, the hypothesis of the dual-factor model was only partly supported (Kuettel et al., 2021; Moore et al., 2019a; Moore et al., 2019b).

Critical differences have been reported between different profiles in terms of individuals with higher levels of well-being combined with lower levels of distress (*complete* and *moderately mentally healthy*) reporting higher levels of protective factors (e.g., social support) and lower levels of risk factors (e.g., stress) than those in other profiles (Kuettel et al., 2021; Moore et al., 2019a). Also, when experiencing high levels of distress, a buffering role of well-being might be possible, as demonstrated among high school students with a *symptomatic but content* profile who reported higher life satisfaction than those with lower levels of well-being but high distress (*troubled* profile: Moore et al., 2019a).

Providing mental health profile estimates related to gender seems valuable, considering the frequently reported gender differences reported in other mental health research (Duchesne et al., 2017; Kegelaers et al., 2022). More female (8.1%) than male (5.4%) elite athletes have been classified with the combination of high distress/low well-being, and conversely, more males (69.5%) than females (57%) with coexisting low distress/high well-being (Kuettel et al., 2021). Gender proportions in mental health profiles were not reported among high school students, but the coexistence of high distress/low well-being included the lowest proportion of students (*troubled* 4–10%). Hence, more students experienced high co-occurring distress and well-being

(*symptomatic but content* 20–31%), low distress with high well-being (*complete profile* 20–55%), or average distress and well-being across four school years (32–49%: *moderate mentally healthy* profile; Moore et al., 2109a; 2019b).

Gaining knowledge of mental health profiles and their stability over time can be valuable for the early detection of students at risk of developing mental health symptoms (Moore et al., 2019b). For instance, Moore et al. (2019b) used the robust but rarely used approach, LTA, to explore mental health profile stability and transition over time. Low stability was reported among students with co-occurring high distress and low well-being (*troubled*: 39% remained; Moore et al., 2019b). In contrast, rather high stability was estimated among students with co-occurring low distress and high well-being (*complete mental health*; 73% remained), for which those transitioning out tended to go to the neighboring *moderate mentally healthy* profile. This may suggest that extreme transitions (e.g., from healthiest to unhealthiest mental health profile) are unlikely (Moore et al., 2019b). Similar transition patterns in mental health profiles have not been explored in young student-athletes or other performers.

1.2. Mental health and perfectionism

Perfectionism is a critical factor associated with adolescent anxiety and depressive symptoms, body concerns, and lowered self-worth (Affrunti & Woodruff-Borden, 2014; Flett & Hewitt, 2022; Vacca et al., 2021). For young performers in achievement domains such as sports, dance, and school, being perfectionistic might mean achieving success is necessary to feel a sense of self-worth (Flett & Hewitt, 2022). Still, limited research has explored young student-athletes' and dancers' perfectionism related to common mental health risk factors (i.e., anxiety, depressive symptoms, and body concerns; Hill et al., 2018). Given that demanding performance environments may generate perfectionistic tendencies (Flett & Hewitt, 2014, 2022), exploring potential associations between mental health profiles and perfectionism is likely to be illuminating.

An established perfectionism model differentiates between self-oriented (SOP) and socially prescribed perfectionism (SPP; Flett et al., 2016). SOP involves self-directed demands of perfection with exaggerated attention to avoiding imperfection and failures, and the need to obtain perfection to perceive a sense of worth. SPP involves the perception that others (e.g., parents, coaches) require perfection of oneself (Hewitt & Flett, 1991). Although SOP has been related to distress and body concerns, SPP is a more consistent and stronger predictor of mental health symptoms (Flett et al., 2022). For instance, O'Connor et al. (2010) found SPP to be a stronger predictor than SOP for increased levels of depressive symptoms over time. Also, a concept akin to SPP known as evaluative concerns perfectionism predicted increases in adolescents' anxiety (Damian et al., 2017) and body weight-shape concerns over time (Boone et al., 2014). Extending previous research, we aim to provide further knowledge by exploring the effect of SOP and SPP on different mental health profiles based on specific positive and adverse mental health indicators.

1.3. The present study

In this study, we explored the following research questions:

- I) Are symptoms of anxiety, depression, body concerns, and self-worth different between female and male talent development and mainstream students?
- II) (a) Which mental health profiles emerge based on indicators of anxiety and depressive symptoms, body concerns, and self-worth? (b) How stable are adolescents' mental health profiles over two years? (c) How are perfectionism, gender, and school type (talent development vs. mainstream school) associated with mental health profiles two years apart? (d) What are the

estimated profile proportions within each profile for girls and boys from each school type? (e) Which transition patterns are displayed among girls' and boys' talent development and mainstream students?

2. Methods

2.1. Participants

We recruited adolescents from 13 schools in large regions south of Norway: three talent development (TD) sports schools and ten mainstream schools. The first year in Norwegian lower secondary sports schools starts in the autumn semester of 8th grade when students are 12/13 years old. The last year is the 10th grade of lower secondary school, and students are 15/16 years when they graduate in the spring semester. This study included all the private sports schools in Norway for this age group at time 1 (T1). The athletes represented both team sports (football, handball, ice hockey, basketball, volleyball) and individual sports (alpine skiing, biathlon, athletics, cross-country skiing, climbing, cycling, diving, equestrian sports, freestyle skiing, gymnastics, martial arts/combat sports, motocross, rowing, swimming, sailing, skateboarding, tennis, triathlon, windsurfing). One of the mainstream schools included a TD class of young high-ability classical ballet students. Accordingly, in this study, TD students refer to both athletes and ballet students. Since the data collection was conducted during the spring semester, the students were 13–14 years old at T1 and 15–16 at time 2 (T2). The total T1-T2 sample comprised 946 adolescents (50.4% girls), including 168 TD school students ($n = 158$ athlete-students and $n = 10$ ballet students, 45% TD girls) and 778 (52% girls) mainstream students.

2.2. Ethics statement and Procedure and

The Regional Committee for Medical and Health Science Research Ethics in Southern Norway approved the study (project number: 2015/1358). All eligible students received written and oral information about the study. It included voluntary participation and their right to withdraw at any time without stating a reason. Written informed consent was obtained from all students and parents/legal guardians at T1 and T2 if the student was <16 years old. All participating students conducted the self-report measures during one school hour in the presence of the first author and research assistants.

2.3. Self-report measures

2.3.1. Anxiety and depressive symptoms

The short version of the Revised Children's Anxiety and Depression Scale was used to assess symptoms of general anxiety (15 items) and depression (10 items) (RCADS-25; Ebesutani et al., 2012). Items are rated on a four-point Likert scale from *never* (0) to *always* (3). Higher scores indicate greater severity, with cut-off scores for anxiety: girls ≥ 26 , boys ≥ 22 , and depressive symptoms: girls ≥ 17 , boys ≥ 16 . The omega coefficients for anxiety (T1 $\omega = 0.86$, T2 $\omega = 0.85$) and depression (T1 $\omega = 0.85$, T2 $\omega = 0.86$) were good.

2.3.2. Body weight and shape concerns

A brief 11-item version (Friborg et al., 2013) of the Eating Disorder Examination-Questionnaire (EDE-Q 6.0, Fairburn, 2009) was used to assess body weight-shape concerns (WCSC). Items are rated on a seven-point scale from *not at all* or *no days* (0) to *very much* or *all days* (6). Examples include: *Has your weight influenced how you think about (judge) yourself as a person?* and *Has your shape influenced how you think about (judge) yourself as a person?* Higher scores indicate elevated concerns; clinical mean cut-off score ≥ 4.0 (Fairburn, 2009). The omega coefficients were good (T1 and T2 $\omega = 0.95$).

2.3.3. Self-worth

Five items from the Norwegian version of Harter's Self-Perception Profiles for Adolescents – Revised (SPPA-R; Wichström, 1995) were used to assess global self-worth. Items are rated on a four-point Likert scale from *describes me very poorly* (1) to *describes me very well* (4). Higher scores indicate better self-worth. The omega coefficients were good (T1 $\omega = 0.88$, T2 $\omega = 0.89$).

2.3.4. Perfectionism

The Child Adolescent Perfectionism Scale (CAPS; Flett et al., 2000; Flett et al., 2016) was used to assess perfectionism, i.e., self-oriented perfectionism (SOP: 12 items) and socially prescribed perfectionism (SPP: 10 items). Items are rated on a five-point Likert scale from *false* (1) to *very true* (5). Examples include: *I try to be perfect in everything I do* (SOP), *My family expects me to be perfect* (SPP), and *My teachers expect my work to be perfect* (SPP). The omega coefficients for SOP (T1 $\omega = 0.86$, T2 $\omega = 0.87$) and SPP were good (T1 and T2 $\omega = 0.88$).

2.3.5. Statistical analyses

We used SPSS (IBM SPSS Statistics version 28) for missing data analysis and descriptive statistics. Mplus 8.7 (Muthén & Muthén, 1998–2021) was used for factor analysis, latent profile, and latent transition analyses in which full-information maximum likelihood (FIML) was used to handle missing data (Lang & Little, 2018). FIML includes individuals with both complete and partial data, analyzing them simultaneously and adjusting model estimates according to all available information (Collins & Lanza, 2010). Our longitudinal analysis thus included all available data from students participating on one or both measurement occasions. FIML also offers less biased estimates when data are missing at random than complete case analysis/listwise deletion (Enders, 2022). Accordingly, the available data ($n = 946$) consisted of students answering at two time points ($n = 520$) and responders at only T1 ($n = 233$) or T2 ($n = 193$).

Analyses were conducted in the following steps: (1) Confirmatory factor analysis (CFA); (2) longitudinal factorial invariance across time; (3) descriptive statistics for each measurement occasion using ANOVA tests for continuous data and cross-tabulations (anxiety, depression, weight-shape concerns cut-scores) with Chi-square tests for categorical data to detect differences between female and male TD and mainstream students; (4) latent profile analysis (LPA) to explore mental health profiles based on anxiety and depressive symptoms, weight-shape concerns, and self-worth; (5) latent transition analysis (LTA) to explore stability and transition probabilities between profiles over two years; and (6) adding SOP, SPP, gender, and school type as covariates to examine their influence on profile membership at T1 and T2.

2.3.6. Factor analyses

Preliminary CFA and longitudinal factorial invariance tests were conducted to verify the psychometric properties of all measures. Standardized factor scores estimated in standardized units ($M = 0$, $SD = 1$) were saved and used as indicators in the LPA and LTA (Morin et al., 2016). The model estimations are provided in the supplementary material.

2.3.7. Latent profile and latent transition analyses – person-centered analytical approach

The model building of the LTA started with examining the cross-sectional latent profile models to verify that the same number of profiles would reemerge at both time points. To decide the number to retain, we estimated 1–6 profile solutions with freely estimated variances (Nylund-Gibson & Choi, 2018). In the second step, we examined measurement invariance, contrasting two models; one non-invariance model with all parameters freed and varying across time, and one full invariant model with all parameters constrained to equality across time (Collins & Lanza, 2010). Both models were estimated without the autoregressive pathway between time points, as is included in the LTA.

The primary interest in LTA is latent transition probabilities. Hence, the third step included the autoregressive relation between T1 and T2, estimating the individuals' probability of latent profile status at T2 ($t + 1$) conditioned on profile status at T1 (Time t) (Collins & Lanza, 2010). Finally, covariates (SOP, SPP, gender, school type) were added. Two models were estimated: (1) a baseline model to test the influence of the covariates on the start point of the transitions and (2) a main effect model to test the influence of the covariates on the T1 and T2 profile variables (see Figure S3 supplementary material; Muthén, 2021).

Model fit was compared to a combined set of fit indices; Log-Likelihood ratio (LL), Akaike's Information Criterion (AIC), Bayesian Information Criterion (BIC), and adjusted BIC (aBIC: Nylund-Gibson & Choi, 2018; Nylund et al., 2007). Models with the lowest AIC, BIC, and aBIC values indicate a better fit (Spurk et al., 2020). To decide the number of profiles to retain, we further evaluated the elbow plot of the fit indices. Adding profiles to the LPA stopped when no substantial improvements were observed (see supplementary material figures S1 and S2). The standardized index value entropy (0 = *terrible*, 1 = *perfect classification*) indicated whether the categorization and separation of individuals to correct profiles were adequate, with values of ≥ 0.8 optimal and 0.6–0.8 suggested as tenable certainty (Spurk et al., 2020). Bootstrap Likelihood Ratio Test (BLRT) and Lo-Mendell-Rubin adjusted likelihood ratio test (aLMR-LRT) with non-significant p -values ($> .05$) suggested the $k-1$ profile model was supported (Nylund et al., 2007). Notably, BLRT tends to overestimate the number of profiles to retain (Morin & Marsh, 2015). Finally, we evaluated LPA models by the profiles' interpretability, previous studies, and theory (Nylund-Gibson & Choi, 2018). LTA models were evaluated by similar fit indices as the cross-sectional LPA's, i.e., LL, AIC, BIC, and aBIC.

3. Results

3.1. Preliminary assessments

Missing value analysis showed less than 5% missing data at T1 and T2 among those who responded to the questionnaires. Little's MCAR test assumed data were missing completely at random ($\chi^2(111) = 134.47$, $p = .064$). The sample size ($n = 946$) for accurately identifying the correct number of latent profiles met the recommendations of a sample size of approximately 500 (Nylund et al., 2007; Spurk et al., 2020).

3.2. Factor analyses

Confirmatory factor analyses and longitudinal factorial invariance tests are provided in the supplementary material, Table S2. Longitudinal factorial invariance was tested by using the fixed-factor method of scaling, contrasting 1) configural invariance, 2) weak factorial invariance, and 3) strong factorial invariance (Little, 2013). The final models showed an overall acceptable fit, and changes in the goodness-of-fit indices for measurement invariance across time were within the acceptable cutoffs: $\Delta CFI/TLI \leq 0.010$ and $\Delta RMSEA \leq 0.015$ (see supplementary material, Table S2 for further details).

3.3. Cross-sectional mental health findings

Descriptive data with effect sizes for all variables by gender and school type are reported in Table 1. We found significant differences between groups on all variables except SOP. Post-hoc tests revealed that mainstream student girls reported significantly ($p < .01$) higher anxiety and depressive symptoms and lower self-worth than all other groups. TD boys reported significantly higher self-worth than all others at T2. All girls reported significantly higher levels of weight-shape concerns than boys ($p < .01$), and mainstream girls reported higher levels than TD girls ($p < .001$). One in four mainstream girls and one in 10 TD girls scored above the strict clinical cut-off for weight-shape concerns at T2. SPP was higher in mainstream students than TD boys ($p < .05$). TD girls' SPP did

Table 1
Descriptive statistics of the mental health indicators and the perfectionism covariates.

	Boys TD school T1 n = 74; T2 n = 71	Boys mainstream T1 n = 281; T2 n = 277	Girls TD school T1 n = 69; T2 n = 58	Girls mainstream T1 n = 329; T2 n = 307	All T1 n = 753; T2 n = 713		
	mean [95% CI]	mean[95% CI]	mean [95% CI]	mean[95% CI]	mean [95% CI]	p	ω ²
Time 1							
Anxiety	7.03 _a [6.06, 8.00]	8.06 _a [7.43, 8.68]	9.13 _a [7.86, 10.39]	12.79 _b [11.95, 13.63]	10.12 [9.63, 10.61]	<.001	.121
Depression	5.11 _a [4.38, 5.83]	5.47 _a [4.98, 5.96]	6.07 _a [5.27, 6.87]	8.45 _b [7.82, 9.08]	6.79 [6.43, 7.15]	<.001	.084
WCSC	0.56 _a [0.39, 0.74]	0.90 _{a, b} [0.77, 1.03]	1.24 _b [0.95, 1.53]	2.30 _c [2.11, 2.49]	1.51 [1.40, 1.63]	<.001	.199
Self-Worth	3.55 _a [3.46, 3.65]	3.40 _a [3.33, 3.46]	3.40 _a [3.27, 3.54]	2.94 _b [2.86, 3.02]	3.21 [3.16, 3.26]	<.001	.128
SOP	3.17 [3.00, 3.33]	3.00 [2.88, 3.03]	3.09 [2.89, 3.29]	3.02 [2.92, 3.11]	3.02 [2.96, 3.12]	.187	.002
SPP	2.04 _a [1.88, 2.20]	2.45 _{b, d} [2.35, 2.55]	2.16 _{a, d} [1.94, 2.38]	2.40 _{b, d} [2.38, 2.58]	2.40 [2.34, 2.46]	<.001	.025
Time 2							
Anxiety	6.84 _a [5.79, 7.89]	7.17 _a [6.57, 7.78]	9.18 _a [7.57, 10.78]	12.69 _b [11.91, 13.48]	9.68 [9.20, 10.17]	<.001	.163
Depression	5.59 _a [4.68, 6.51]	6.09 _a [5.58, 6.61]	7.67 _a [6.34, 9.01]	9.90 _b [9.25, 10.55]	7.82 [7.42, 8.21]	<.001	.119
WCSC	0.52 _a [0.35, 0.69]	0.88 _a [0.75, 1.01]	1.56 _b [1.18, 1.94]	2.39 _c [2.19, 2.59]	1.55 [1.43, 1.67]	<.001	.168
Self-Worth	3.51 _a [3.39, 3.62]	3.26 _b [3.18, 3.34]	3.16 _b [3.00, 3.32]	2.79 _c [2.71, 2.87]	3.07 [3.02, 3.13]	<.001	.134
% above cut-score:	%	%	%	%	%	p	χ²
T1 Anxiety	0 _a	1.8 _a	1.5 _{a, b}	8.0 _b	4.3	<.001	19.64
T1 Depression	1.4 _a	3.6 _a	1.4 _a	9.8 _b	5.9	<.001	16.83
T1 WCSC	1.4 _a	2.9 _a	4.3 _a	21.6 _b	11.1	<.001	66.35
T2 Anxiety	0 _a	1.4 _a	1.7 _{a, b}	6.5 _b	3.5	.002	14.77
T2 Depression	2.8 _a	3.3 _a	6.9 _{a, b}	15.0 _b	8.6	<.001	29.26
T2 WCSC	0 _a	3.7 _a	10.3 _b	25.2 _c	13.2	<.001	71.72
							φ _c
							.16
							.15
							.30
							.14
							.20
							.32

Note. T1 = time 1; T2 = time 2. SOP = Self-Oriented Perfectionism; SPP = Socially Prescribed Perfectionism; WCSC = weight-shape concerns. p = p-value = between groups. Subscripts: different column labels (e.g., b c) = statistically mean different scores, p < .05. ω² = omega-squared effect size: small = 0.01 - 0.06, medium = 0.06 - 0.14, large ≥ 0.14. φ_c = Cramer's V effect size: small < 0.2, medium = 0.2 - 0.6, large > 0.6.

not differ from other groups.

3.4. Mental health profiles - latent profile and transition analysis models

Step 1: Cross-Sectional LPA Models

Fit indices for each time point are presented in Table 2. Guided by a combination of fit indices, the fit continued to improve with the number of profiles added (2–6). The six-profile solution revealed the lowest AIC, BIC, and aBIC. Contrasting the three-vs. four-profile solution showed noticeable improvements in model fit for the four-profile solution. The four-vs. five- and six-profile solutions did not substantially improve fit, nor did the five- and six-profile solutions add theoretically valuable meaning. The four-profile solution was deemed the most informative and was retained (Figure 1).

Step 2: Measurement Invariance of the Latent Mental Health Profiles across Time

Table 2
Fit statistics for the preliminary cross-sectional latent profile models.

K	# fp	LL	Scaling	AIC	BIC	aBIC	ΔAIC	ΔBIC	BLRT p	aLMR-LRT p	Entropy
T1											
1	8	-4123.54	1.401	8263.07	8300.06	8274.66	-	-	-	-	-
2	17	-3054.37	1.312	6142.73	6221.34	6167.36	-2120.34	-2079.72	<.001	<.001	.880
3	26	-2626.21	1.263	5304.41	5424.64	5342.08	-838.32	-796.70	<.001	<.001	.912
4	35	-2422.96	1.372	4915.92	5077.76	4966.63	-388.49	-346.88	<.001	.047	.884
5	44	-2287.96	1.319	4663.93	4867.38	4727.67	-251.99	-210.38	<.001	.139	.885
6	53	-2202.07	1.262	4510.01	4755.09	4586.79	-153.92	-112.29	<.001	.109	.880
T2											
1	8	-3904.78	1.174	7825.56	7862.11	7836.71	-	-	-	-	-
2	17	-3004.20	1.205	6042.39	6120.07	6066.09	-1783.17	-526.97	<.001	<.001	.882
3	26	-2711.15	1.186	5474.29	5593.10	5510.54	-568.10	-555.55	<.001	<.001	.894
4	35	-2548.26	1.339	5166.53	5326.46	5215.33	-307.76	-266.64	<.001	.089	.880
5	44	-2468.84	1.223	5025.68	5226.74	5087.03	-99.72	-128.30	<.001	.092	.849
6	53	-2400.56	1.235	4907.13	5149.31	4981.02	-118.55	-106.01	<.001	.135	.865

Note. K = number of profiles estimated; # fp = number of free parameters; LL = log-likelihood; Scaling = scaling correction factor for robust maximum likelihood estimates; BIC = Bayesian Information Criterion; aBIC = Sample-size adjusted BIC; BLRT = bootstrapped likelihood ratio test; aLMR-LRT = Lo-Mendell-Rubin adjusted likelihood ratio test; p = p-value.

Table 3 provides the model fit for two contrasted LPTA models. The full invariant model showed a better fit than the non-invariant model, indicating measurement invariance.

Step 3: Latent Transition Modelling of Mental Health Profiles

Figure 1 displays mean factor scores for anxiety, depressive symptoms, weight-shape concerns, and self-worth within each profile for the total sample. The figure legends present the estimated proportions within each profile at each time point. We intended to be descriptive when naming the profiles in a manner related to how the combinations of positive and negative indicators occurred in each profile. The four retained mental health profiles were characterized and named: 1) *distressed-body concerned*: high, above-average anxiety, depressive symptoms (2.0 SD) and weight-shape concerns (1.4 SD), and low, below-average self-worth (-1.4 SD); 2) *dissatisfied*: above-average anxiety, depressive symptoms (0.4 SD), and weight-shape concerns (0.5 SD) combined with below-average self-worth (-0.5 SD), 3) *moderate mentally healthy*: below-average anxiety, depressive symptoms (-0.3 SD)

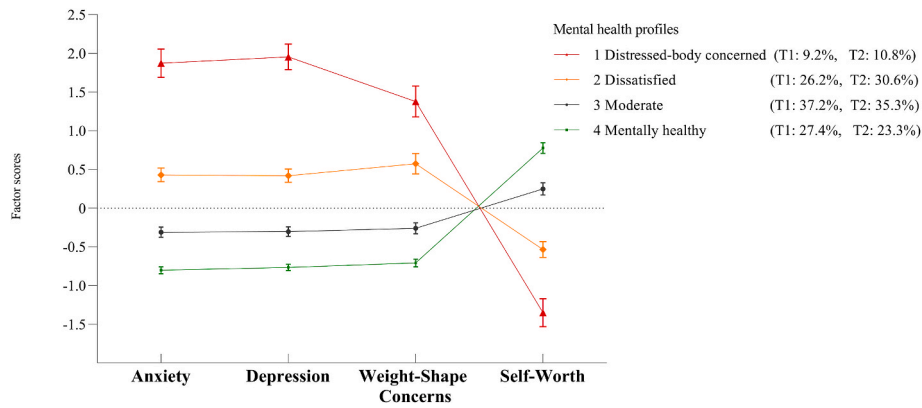


Figure 1. Latent Transition Analysis Four Profile Solution with Four Mental Health Indicators, Mean Factor Scores, and 95% CI within Each Latent Profile Note. The final LTA model; constrained with equal means and variances across time.

Table 3

Fit statistics for the measurement invariance of the profiles across time and latent transition analysis models.

	# fp	LL	Scaling	AIC	BIC	aBIC	Entropy
Measurement invariance^a							
Non-invariance, all parameters freely estimated	70	6377.88	1.394	12895.76	13235.41	13013.10	.870
Full invariance, all parameters constrained equal across time	38	-6400.67	1.592	12877.34	13061.72	12941.04	.868
Regular Latent Transition Analysis Model (LTA)							
C2 profile variable on C1 profile variable ^b	47	-5946.03	1.426	11986.06	12214.11	12064.84	.891
LTA Transition Probabilities Influenced by Covariates							
Baseline; covariates influencing the start point of transitions:							
C1 profile conditioned by gender school.grp t1SOP t1SPP	59	-5781.18	1.335	11680.37	11966.59	11779.21	.894
Main Effect Model:							
C1-C2 on gender school grp t1SOP t1SPP	71	-5755.58	1.318	11653.17	11997.60	11772.11	.897

Note. ^a Measurement invariance estimated without including the autoregressive relations between each latent profile (C) variables. ^b C1 = Latent profile variable at T1, C2 = Latent profile variable at T2. Regular LTA model = latent profile variable C2 regressed onto the latent profile variable at T1 (C1). # fp = number of free parameters; LL = Log Likelihood; Scaling = scaling correction factor for robust maximum likelihood estimates; AIC = Akaike's Information Criterion; BIC = Bayesian Information Criterion; aBIC = Sample-Size Adjusted BIC.

and weight-shape concerns (-0.2 SD), and above-average self-worth (0.2 SD); and 4) *mentally healthy*: low to below-average anxiety and depressive symptoms (-0.8 SD), and weight-shape concerns (-0.7 SD) and above-average self-worth (0.8 SD). The *moderate* profile was the most common in the total sample (T1 n = 352, T2 n = 333), followed by the *dissatisfied* (T1 n = 248, T2 n = 289), *mentally healthy* (T1 n = 259, T2 n = 221), and *distressed-body concerned* profile (T1 n = 86, T2 n = 102; Figure 1). The proportions within each profile changed somewhat over time. The tendency was that overall proportions increased in the *distressed-body concerned* and *dissatisfied* profiles. Accordingly, the proportions decreased in the *moderate* and *mentally healthy* profiles.

The *dissatisfied* profile revealed the highest stability for the total sample, estimating that 93% maintained their status from T1 to T2. The *mentally healthy* profile was the least stable, for which 72% remained across time. No adolescents in the *distressed-body concerned* or *dissatisfied* profiles at T1 were estimated to transit to the *mentally healthy* profile at T2 (Table 4).

Covariates' influence on profile status is presented in Table 5. Adolescents with higher SPP were more likely to be in the *distressed-body concerned*, *dissatisfied*, and *moderate* profiles compared to the *mentally healthy* at T1. At T2, SPP was a significant predictor for being identified within the *distressed-body concerned* vs. *dissatisfied* and in the *distressed-body concerned* vs. *moderate* profile. SOP was not a significant predictor of profile status at T1. At T2, lower SOP was associated with less likelihood of being identified within the *distressed-body concerned* vs. the *moderate* profile.

School type was a significant predictor at T1 but not T2. Mainstream students were more likely than TD students to be in the *distressed-body concerned*, *dissatisfied*, or *moderate* profiles compared to the *mentally healthy* at T1. Gender influenced profile statuses at both time points.

Table 4

Final LTA model. Latent Transition Probability Estimates for Each Latent Profile Variable.

Profiles	Transition probabilities to Time 2 profiles			
	1 Distressed-body concerned	2 Dissatisfied	3 Moderate	4 Mentally healthy
Time 1				
1	.781	.111	.109	.000
2	.054	.926	.019	.000
3	.014	.133	.797	.055
4	.015	.072	.195	.718

Note. Time 1 profile probability in rows, time 2 in columns. Diagonal (bold) = probability estimates for maintaining a profile classification; off-diagonal = transition probability estimates.

Girls were more likely than boys to be in the *distressed-body concerned*, *dissatisfied*, or *moderate* profiles compared to the *mentally healthy* at T1 and T2.

We provide detailed transition probability estimates and estimated profile proportions within each profile for girls and boys from each school type in Table 6. Most TD boys were identified in the *mentally healthy* profile (>50%), followed by the *moderate*, *dissatisfied*, and *distressed-body concerned*. Most TD girls (>40%) were in the *moderate* profile, followed by the *dissatisfied*, *mentally healthy*, and *distressed-body concerned*. Most mainstream boys were in the *moderate* (>40%), followed by *mentally healthy*, *dissatisfied*, and *distressed-body concerned*. Most mainstream girls were in the *dissatisfied* profile (>40%), followed by *moderate*, *distressed-body concerned*, and *mentally healthy*.

The transition probability estimates showed a pattern where girls

Table 5
Multinomial logistic regressions for the effects of each covariate on profile membership.

		Distressed-body concerned (1) vs. Mentally Healthy (4)	Dissatisfied (2) vs. Mentally Healthy (4)	Moderate (3) vs. Mentally Healthy (4)	Dissatisfied (2) vs. Moderate (3)	Distressed-body concerned (1) vs. Moderate (3)	Distressed-body concerned (1) vs. Dissatisfied (2)
		OR [95% CI]	OR [95% CI]	OR [95% CI]	OR [95% CI]	OR [95% CI]	OR [95% CI]
Time 1	SPPT1	3.9 _{[2.2, 6.9]*}	2.9 _{[1.9, 4.4]*}	1.7 _{[1.2, 2.5]*}	1.7 _{[1.2, 2.3]*}	2.2 _{[1.4, 3.6]*}	1.3 _[.8, 2.3]
	SOPT1	1.5 _[.8, 2.6]	1.1 _[.8, 1.7]	1.0 _[.7, 1.5]	1.1 _[.8, 1.6]	1.5 _[.9, 2.3]	1.3 _[.8, 2.3]
	School	11.3 _{[3.3, 39.1]*}	3.1 _{[1.7, 5.6]*}	2.0 _{[1.2, 3.3]*}	1.6 _[.9, 2.9]	5.7 _{[1.7, 19.5]*}	3.6 _{[1.0, 13.0]*}
	Gender	22.3 _{[10.2, 48.8]*}	9.0 _{[5.6, 14.5]*}	2.5 _{[1.6, 3.8]*}	3.6 _{[2.4, 5.6]*}	9.0 _{[4.4, 18.6]*}	2.5 _{[1.2, 5.2]*}
Time 2	SPPT1	1.9 _[.7, 5.5]	0.7 _[.3, 1.7]	.6 _[.3, 1.2]	1.2 _[.6, 2.7]	3.2 _{[1.3, 8.1]*}	2.6 _{[1.1, 6.0]*}
	SOPT1	.4 _[.2, 1.3]	1.0 _[.4, 2.2]	1.3 _[.6, 2.6]	.8 _[.3, 1.8]	.3 _{[.1, .9]*}	.5 _[.2, 1.2]
	School	1.9 _[.4, 9.2]	1.5 _[.5, 5.0]	1.1 _[.4, 2.9]	1.4 _[.4, 4.5]	1.8 _[.4, 7.9]	1.2 _[.3, 5.3]
	Gender	33.9 _{[10.0, 114.6]*}	8.0 _{[3.1, 21.1]*}	4.1 _{[1.5, 11.1]*}	1.9 _[.9, 4.0]	8.2 _{[3.0, 22.3]*}	4.2 _{[1.6, 10.8]*}

Note. *p < .05. t1 = time 1; MH = mental health; SOP = self-oriented perfectionism; SPP = socially prescribed perfectionism; School mainstream = 1; Gender girl = 1.

Table 6
Detailed latent transition probability estimates and proportion of students for each latent profile variable.

Time 1	Time 1 profile size	Detailed Transition Probabilities to Time 2 profiles				Time 2 profile size
		1 Distressed-body concerned	2 Dissatisfied	3 Moderate	4 Mentally healthy	
Boys TD school						
1	0.5%	.504	.222	.274	.000	0.4%
2	7.6%	.011	.954	.035	.000	10.7%
3	40.3%	.001	.067	.762	.140	36.1%
4	51.6%	.000	.012	.074	.914	52.8%
Boys mainstr.						
1	2.0%	.701	.159	.140	.000	1.9%
2	16.1%	.022	.953	.025	.000	21.2%
3	45.7%	.003	.097	.822	.078	42.9%
4	36.2%	.002	.029	.127	.843	34.0%
Girls TD school						
1	6.0%	.841	.098	.062	.000	6.7%
2	28.9%	.042	.940	.018	.000	35.0%
3	43.8%	.008	.135	.816	.042	40.9%
4	21.4%	.008	.065	.203	.725	17.3%
Girls mainstr.						
1	14.6%	.920	.055	.025	.000	17.7%
2	41.5%	.079	.909	.012	.000	45.9%
3	33.7%	.021	.180	.778	.021	30.1%
4	10.2%	.030	.129	.289	.553	6.3%

Note. mainstr. = mainstream students. Time 1 profile probability in rows, time 2 in columns. The diagonal (bold) = probability estimates for maintaining a profile classification; the off-diagonal = transition probability estimates

who transitioned likely changed to more unhealthy profiles over time. The *mentally healthy* profile was the least stable for girls, with 45% of mainstream girls and 28% of TD girls changing to another at T2. In contrast, most boys in the *mentally healthy profile* at T1 remained at T2 (91% TD, 84% mainstream). Few boys were in the *distressed-body concerned* profile, and it was the least stable among boys. The highest stability was found for the *distressed-body concerned* profile in mainstream girls (92% remained), while the *dissatisfied* profile was most stable in TD girls and all boys (>94% remained). Over 90% of girls and boys within both school types with co-occurring above-average anxiety, depressive symptoms, weight-shape concerns, and below-average self-worth (*dissatisfied* profile) at age 13/14 were still in the *dissatisfied* group two years later (Table 6).

4. Discussion

In this study, we explored young TD and mainstream students' symptoms of anxiety, depression, weight-shape concerns and self-worth, and mental health profiles based on the four indicators prospectively. Key findings include the retention of four informative profiles and the identification of the highest proportions within the *mentally healthy* profile among TD boys, the *moderate* among TD girls and mainstream boys, and the *dissatisfied* profile among mainstream girls. Profile stability was overall high across time, but noteworthy transitions were found:

more TD boys transitioned into healthier profiles, and more girls transitioned out of healthier profiles. The unhealthier profiles were associated with socially prescribed perfectionism. Overall, the findings indicated that young TD students fared relatively better than mainstream students, especially compared to mainstream girls. Next, we discuss our findings in more depth.

4.1. TD school and mainstream students' mental health

Our findings of mainstream girls reporting higher anxiety and depressive symptoms, weight-shape concerns, and lower self-worth than boys are consistent with gender differences reported previously (Duchesne et al., 2017; McLean et al., 2021). In contrast, average anxiety and depressive symptoms in TD girls and boys did not differ, which aligns with a previous study on youth athletes (Weber et al., 2018). Interestingly, these gender similarities are inconsistent with most mental health studies on older student-athletes (Kegelaers et al., 2022), indicating that gender differences in distress symptoms emerge later in adolescent TD students than in mainstream students. Further explorations of this hypothesis, as well as when gender differences in distress symptoms may emerge in TD students, might be particularly valuable for developing targeted preventive measures in TD school settings.

Similar to a previous study on age-matched students' mental health (Brand et al., 2013), we found no profound differences between TD

student boys and mainstream boys, in contrast to the two girl groups. The lower anxiety and depressive symptoms and higher self-worth in TD girls compared to mainstream girls may be related to the beneficial factors associated with sports and dance participation (Chappell et al., 2021; Eime et al., 2013; Panza et al., 2020).

In line with results from McLean et al. (2021), more girls reported weight-shape concerns above the clinical level compared to boys, albeit fewer TD than mainstream girls. However, we consider the fact that 10% of TD girls were above clinical cut-off as worrisome, considering that these weight-shape indicators may represent clinically significant body dissatisfaction related to eating disorders (Carter et al., 2001; Friborg et al., 2013). Furthermore, body dissatisfaction is considered an important risk factor for developing relative energy deficiency in sports (RED-s; Mountjoy et al., 2018), by which severe health and performance consequences related to a developing body have been reported (Ackerman et al., 2019). Since young TD students are understudied, further exploration is warranted to help identify risk and protective factors during the important developmental years.

4.2. Mental health profiles

The latent profile modeling yielded four distinct profiles (*distressed-body concerned*, *dissatisfied*, *moderate*, and *mentally healthy*), by which individuals within each profile shared similar levels and patterns on the positive and adverse mental health indicators.

Adopting an explorative approach to studying mental health through profiles or using variable-centered approaches to study unique indicators depends on which may provide the most novel and useful information for a field. We acknowledge that the emerging profiles identified through LPA can be viewed on a continuum with co-occurring high/average/low symptoms of anxiety, depression, weight-shape concerns, and low/average/high self-worth. That is, no profiles revealed a pattern of within-person combinations in terms of discontinuity, like the 'symptomatic but content' profile in the dual factor framework (Moore et al., 2019a). Our findings might be anticipated due to previous studies on the association between similar mental health indicators, as in the present study, persistently show that low self-worth is associated with higher symptoms of anxiety, depression, and body concerns and vice versa (Bos et al., 2010; Duchesne et al., 2017). However, this study provides further knowledge of such associations by their coexistence to varying degrees and proportions of students in four different profiles.

Due to different indicators used to explore mental health profiles in this study compared to other studies exploring co-occurring levels of adverse and positive mental health by LPA (e.g., Kuettel et al., 2021; Moore et al., 2019a; Moore et al., 2019b), direct comparison and interpretation of our findings should be cautioned. Still, some comparisons are relevant to address. For instance, although we identified the fewest students in the *distressed-body concerned* profile (9–11% of the total sample at T1 and T2, respectively), these adolescents displayed worrisome combinations on all four profile indicators; high above-average symptoms of anxiety and depression, weight-shape concerns, and low below-average self-worth. Notably, adolescents with a similarly unhealthy profile of coexisting high distress/low well-being did expectedly report lower life satisfaction than those with healthier profiles (Moore et al., 2019a). The higher self-worth reported among our students in healthier profiles than their peers in unhealthier profiles suggests that interventions aiming to strengthen students' well-being should focus on strengthening self-worth.

4.2.1. Overall stability and transition between mental health profiles

The majority of students remained in the same profile over two years. The *mentally healthy* profile was the least stable (72% remained), and specific stability estimates corroborate a *mentally healthy* profile reported among older US high school students (i.e., *complete mental health*, 73% remained; Moore et al., 2019b). However, the overall stability of nearly 80% within the *distressed-body concerned* profile contrasted with

Moore et al.'s (2019b) finding of low stability in their unhealthiest profile (i.e., *troubled mental health*: 39% remained). Divergent findings from our study may reflect differences in age, school contexts, a longer study period, and mental health indicators used. Still, the high likelihood of being in, and staying in, an unhealthy profile is a great cause for concern that warrants attention from researchers and practitioners alike.

Congruent with a previous LTA study (Moore et al., 2019b), radical changes in mental health profiles were less likely than transitioning into a neighboring profile. For instance, we did not find any transitions from the *distressed-body concerned* to the *mentally healthy* profile or vice versa. However, the overall transition directions revealed a tendency among those who changed their profile to transition to an unhealthier profile, which may reflect other reports of the emergence of mental health problems during the early teens (Solmi et al., 2022). Thus, it seems of crucial value that school personnel are being educated on these matters and have the means to intervene early.

4.2.2. Gender and schooltype stability and transition patterns

The mental health profiles were based on mental health factors that more girls than boys tend to struggle with during the first teenage years (Duchesne et al., 2017; McLean et al., 2021). Accordingly, the most likely patterns of girls transitioning into unhealthier profiles over time might be expected. In contrast, TD boys were more likely to transition to a healthier profile, while mainstream boys' transitions revealed a varied pattern. The present study is the first to explore mental health profiles among both TD and mainstream students over time. Hence, further studies are required to explore whether the findings, including the transition tendencies, may be replicated using similar indicators and larger samples.

4.2.3. Perfectionism, gender, school type, and profile proportions

Congruent with the perfectionism literature (Flett & Hewitt, 2022), SPP predicted the likelihood of belonging to more unhealthy mental health profiles. Notably, as the first study to confirm the undesirable correlates of SPP in distinct mental health profiles among school-aged students, these findings contribute further to answering calls for increased attention to SPP (Curran & Hill, 2019; Flett et al., 2022).

More girls were identified in the *distressed-body concerned* and *dissatisfied* profiles at both time points than boys, which corresponds with general studies on anxiety, depressive symptoms, body concerns, and self-worth among adolescents (Duchesne et al., 2017, 2021; McLean et al., 2021). Furthermore, our study provided insight into students' mental health profiles from different school contexts, for which displaying unhealthy profiles was more likely among mainstream students than TD students at T1. The fact that school type was not predictive of profile classification at T2 might, as we suggested earlier, point to a later emergence of mental health symptoms in TD students.

Among TD students, we estimated that almost no boys were in the *distressed-body concerned* profile, but nearly one in ten boys was in the second most unhealthy and stable, *dissatisfied* profile. While this comprises no severe psychological distress or weight-shape concerns, the relatively low self-worth might have negative implications for these TD boys' well-being. For TD girls, we found corresponding proportions (6–7%) in the most unhealthy profile, as did Kuettel et al. (2021) with older female elite athletes (8%). Due to the young age of the TD students in our study, intervention studies might be needed along with longer follow-up periods for students with different mental health profiles to facilitate healthy development.

4.3. Strengths, limitations, and future directions

A novel feature of this study is the inclusion of adolescent girls and boys representing both TD and mainstream schools. Specifically, prospective insights into mental health profiles, including positive and adverse mental health indicators, that were simultaneously explored via latent profile and latent transition analysis are a strength. The model-

based analytical approach for exploring such profiles is advised in the literature over an a-priori-determined clusters approach (Spurk et al., 2020), for which this study provided detailed accounts of distinct mental health profiles with robust estimates. However, comparing the present study's four-profile solution across studies testing the dual-factor model hypothesis should be considered carefully due to some different mental health indicators.

A limitation is that the profile modeling was based only on internalizing mental health indicators. Given that girls and boys in the age group studied frequently report different mental health problems, indicators of externalizing problems might be used in future studies. Further, regular health screening for early detection of students at risk for mental health problems might be beneficial and possible in TD schools. It might also be valuable in future studies to address different school contexts (TD vs. mainstream) regarding the adolescents' experiences with having appropriate access to support persons (e.g., school nurses and psychologists). Also, it is important to study potential causes behind high rates of mental ill-being, one of which might be motivational climates/environments.

Although the approach of our study examining individuals' mental health give valuable documentation on adolescents' mental health status from different school contexts, we will underscore the importance of not getting stuck in an individualistic approach to problem-solving. However, to be clear, with so many young people struggling, systems-level approaches are likely to be the only truly effective way forward.

5. Conclusion

The present findings indicated that TD school students fared relatively better than mainstream students. Selection and contextual matters might be important, and it is possible that mental health symptoms emerge later in TD students. Notwithstanding, a considerable proportion of students, especially girls, from both school types were identified in the unhealthiest profiles (i.e., *distressed-body concerned and dissatisfied*). Moreover, socially prescribed perfectionism is a likely risk factor for unhealthier profiles. This study has gained valuable insight into TD and mainstream students' mental health. However, more research is needed to identify risk and protective factors that make it more likely for young TD and mainstream students to develop and remain within unhealthy vs. healthy profiles. Such studies might contribute to developing pertinent and effective educational programs for both TD and mainstream schools.

Declaration of competing interest

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

The authors have no known conflicts of interest that would have the potential to influence the present study.

Data availability

Data will be made available on request.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.psychsport.2023.102474>.

References

- Ackerman, K. E., Holtzman, B., Cooper, K. M., Flynn, E. F., Bruinvels, G., Tenforde, A. S., Popp, K. L., Simpkin, A. J., & Parziale, A. L. (2019). Low energy availability surrogates correlate with health and performance consequences of Relative Energy Deficiency in Sport. *British Journal of Sports Medicine*, 53(10), 628–633. <https://doi.org/10.1136/bjsports-2017-098958>
- Affrunti, N. W., & Woodruff-Borden, J. (2014). Perfectionism in pediatric anxiety and depressive disorders. *Clinical Child and Family Psychology Review*, 17(3), 299–317. <https://doi.org/10.1007/s10567-014-0164-4>
- Antaramian, S. P., Huebner, E. S., Hills, K. J., & Valois, R. F. (2010). A dual-factor model of mental health: Toward a more comprehensive understanding of youth functioning. *American Journal of Orthopsychiatry*, 80(4), 462. <https://doi.org/10.1111/j.1939-0025.2010.01049.x>
- Bearman, S. K., & Stice, E. (2008). Testing a gender additive model: The role of body image in adolescent depression. *Journal of Abnormal Child Psychology*, 36, 1251–1263. <https://doi.org/10.1007/s10802-008-9248-2>
- Boone, L., Soenens, B., & Luyten, P. (2014). When or why does perfectionism translate into eating disorder pathology? A longitudinal examination of the moderating and mediating role of body dissatisfaction. *Journal of Abnormal Psychology*, 123(2), 412–418. <https://doi.org/10.1037/a0036254>
- Bos, A. E., Huijding, J., Muris, P., Vogel, L. R., & Biesheuvel, J. (2010). Global, contingent and implicit self-esteem and psychopathological symptoms in adolescents. *Personality and Individual Differences*, 48(3), 311–316. <https://doi.org/10.1016/j.paid.2009.10.025>
- Brand, R., Wolff, W., & Hoyer, J. (2013). Psychological symptoms and chronic mood in representative samples of elite student-athletes, deselected student-athletes and comparison students. *school mental. Health*, 5(3), 166–174. <https://doi.org/10.1007/s12310-012-9095-8>
- Campbell, O. L., Bann, D., & Patalay, P. (2021). The gender gap in adolescent mental health: A cross-national investigation of 566,829 adolescents across 73 countries. *SSM-population health*, 13, Article 100742. <https://doi.org/10.1016/j.ssmph.2021.100742>
- Carter, J. C., Stewart, D. A., & Fairburn, C. G. (2001). Eating disorder examination questionnaire: Norms for young adolescent girls. *Behaviour Research and Therapy*, 39(5), 625–632. [https://doi.org/10.1016/S0005-7967\(00\)00033-4](https://doi.org/10.1016/S0005-7967(00)00033-4)
- Chappell, K., Redding, E., Crickmay, U., Stancliffe, R., Jobbins, V., & Smith, S. (2021). The aesthetic, artistic and creative contributions of dance for health and well-being across the lifecycle: A systematic review. *International Journal of Qualitative Studies on Health and Well-Being*, 16(1), Article 1950891. <https://doi.org/10.1080/17482631.2021.1950891>
- Collins, L. M., & Lanza, S. T. (2010). *Latent class and latent transition analysis: With applications in the social, behavioral, and health sciences*. Wiley.
- Curran, T., & Hill, A. P. (2019). Perfectionism is increasing over time: A meta-analysis of birth cohort differences from 1989 to 2016. *Psychological Bulletin*, 145(4), 410. <https://doi.org/10.1037/bul0000138>
- Damian, L. E., Negru-Subtirica, O., Stoeber, J., & Baban, A. (2017). Perfectionistic concerns predict increases in adolescents' anxiety symptoms: A three-wave longitudinal study. *Anxiety, Stress & Coping*, 30(5), 551–561. <https://doi.org/10.1080/10615806.2016.1271877>
- Duchesne, A.-P., Dion, J., Lalonde, D., Bégin, C., Émond, C., Lalonde, G., & McDuff, P. (2017). Body dissatisfaction and psychological distress in adolescents: Is self-esteem a mediator? *Journal of Health Psychology*, 22(12), 1563–1569. <https://doi.org/10.1177/1359105316631196>
- Ebesutani, C., Reise, S. P., Chorpita, B. F., Ale, C., Regan, J., Young, J., Higa-McMillan, C., & Weisz, J. R. (2012). The revised Child anxiety and depression scale-short version: Scale reduction via exploratory bifactor modeling of the broad anxiety factor. *Psychological Assessment*, 24(4), 833–845. <https://doi.org/10.1037/a0027283>
- Eime, R. M., Young, J. A., Harvey, J. T., Charity, M. J., & Payne, W. R. (2013). A systematic review of the psychological and social benefits of participation in sport for children and adolescents: Informing development of a conceptual model of health through sport. *International Journal of Behavioral Nutrition and Physical Activity*, 10(1), 1–21. <https://doi.org/10.1186/1479-5868-10-98>
- Enders, C. K. (2022). *Applied missing data analysis* (2nd ed.). Guilford Publications.
- Fairburn, C. G. (2009). Eating disorder examination (edition 16.0.D) and eating disorder examination questionnaire (EDE-Q 6.0). In C. G. Fairburn (Ed.), *Cognitive therapy and eating disorders* (pp. 265–313). Guildford Press.
- Flett, G. L., & Hewitt, P. L. (2014). The perils of perfectionism in sports' revisited: Toward a broader understanding of the pressure to be perfect and its impact on athletes and dancers. *International Journal of Sport Psychology*, 45(4), 395–407.
- Flett, G. L., & Hewitt, P. L. (2022). *Perfectionism in childhood and adolescence: A developmental approach*. American Psychological Association.
- Flett, G. L., Hewitt, P. L., Besser, A., Su, C., Vaillancourt, T., Boucher, D., Munro, Y., Davidson, L. A., & Gale, O. (2016). The Child-Adolescent Perfectionism Scale: Development, psychometric properties, and associations with stress, distress, and psychiatric symptoms. *Journal of Psychoeducational Assessment*, 34(7), 634–652. <https://doi.org/10.1177/0734282916651381>
- Flett, G. L., Hewitt, P. L., Boucher, D. J., Davidson, L. A., & Munro, Y. (2000). *The child-adolescent perfectionism scale: Development, validation, and association with adjustment*. Unpublished manuscript.
- Flett, G. L., Hewitt, P. L., Nepon, T., Sherry, S. B., & Smith, M. (2022). The destructiveness and public health significance of socially prescribed perfectionism: A review, analysis, and conceptual extension. *Clinical Psychology Review*, Article 102130. <https://doi.org/10.1016/j.cpr.2022.102130>
- Friborg, O., Reas, D. L., Rosenvinge, J. H., & Rø, Ø. (2013). Core pathology of eating disorders as measured by the eating disorder examination questionnaire (EDE-Q):

- The predictive role of a nested general (g) and primary factors. *International Journal of Methods in Psychiatric Research*, 22(3), 195–203. <https://doi.org/10.1002/mpr.1389>
- Greenspoon, P. J., & Saklofske, D. H. (2001). Toward an integration of subjective well-being and psychopathology. *Social Indicators Research*, 54(1), 81–108. <https://doi.org/10.1023/A:1007219227883>
- Hewitt, P. L., & Flett, G. L. (1991). Perfectionism in the self and social contexts: Conceptualization, assessment, and association with psychopathology. *Journal of Personality and Social Psychology*, 60(3), 456–470. <https://doi.org/10.1037/0022-3514.60.3.456>
- Hill, A. P., Mallinson-Howard, S. H., & Jowett, G. E. (2018). Multidimensional perfectionism in sport: A meta-analytical review. *Sport, Exercise, and Performance Psychology*, 7(3), 235–270. <https://doi.org/10.1037/spy0000125>
- IHME Institute for Health Metrics and Evaluation. (2019). *Global burden of disease study*. Retrieved from <https://vizhub.healthdata.org/gbd-results/>. (Accessed 8 June 2022).
- Inchley, J. C., Stevens, G. W., Samdal, O., & Currie, D. B. (2020). Enhancing understanding of adolescent health and well-being: The health behaviour in school-aged children study. *Journal of Adolescent Health*, 66(6), S3–S5. <https://doi.org/10.1016/j.jadohealth.2020.03.014>
- Kegelaers, J., Wylleman, P., Defruyt, S., Praet, L., Stambulova, N., Torregrossa, M., Kenttä, G., & De Brandt, K. (2022). The mental health of student-athletes: A systematic scoping review. *International Review of Sport and Exercise Psychology*, 1–34. <https://doi.org/10.1080/1750984X.2022.2095657>
- Keyes, C. L. (2002). The mental health continuum: From languishing to flourishing in life. *Journal of Health and Social Behavior*, 207–222. <https://doi.org/10.2307/3090197>
- Kuettel, A., Pedersen, A. K., & Larsen, C. H. (2021). To flourish or languish, that is the question: Exploring the mental health profiles of Danish elite athletes. *Psychology of Sport and Exercise*, 52, Article 101837. <https://doi.org/10.1016/j.psychsport.2020.101837>
- Lang, K. M., & Little, T. D. (2018). Principled missing data treatments. *Prevention Science*, 19(3), 284–294. <https://doi.org/10.1007/s11221-016-0644-5>
- Little, T. D. (2013). *Longitudinal structural equation modeling*. Guilford press.
- Lyons, M. D., Huebner, E. S., & Hills, K. J. (2013). The dual-factor model of mental health: A short-term longitudinal study of school-related outcomes. *Social Indicators Research*, 114, 549–565. <https://doi.org/10.1007/s11205-012-0161-2>
- McLean, S. A., Rodgers, R. F., Slater, A., Jarman, H. K., Gordon, C. S., & Paxton, S. J. (2021). Clinically significant body dissatisfaction: Prevalence and association with depressive symptoms in adolescent boys and girls. *European Child & Adolescent Psychiatry*, 1–12. <https://doi.org/10.1007/s00787-021-01824-4>
- Moore, S. A., Dowdy, E., Nylund-Gibson, K., & Furlong, M. J. (2019a). An empirical approach to complete mental health classification in adolescents. *School Mental Health*, 11(3), 438–453. <https://doi.org/10.1007/s12310-019-09311-7>
- Moore, S. A., Dowdy, E., Nylund-Gibson, K., & Furlong, M. J. (2019b). A latent transition analysis of the longitudinal stability of dual-factor mental health in adolescence. *Journal of School Psychology*, 73, 56–73. <https://doi.org/10.1016/j.jsp.2019.03.003>
- Morin, A. J., & Marsh, H. W. (2015). Disentangling shape from level effects in person-centered analyses: An illustration based on university teachers' multidimensional profiles of effectiveness. *Structural Equation Modeling: A Multidisciplinary Journal*, 22(1), 39–59. <https://doi.org/10.1080/10705511.2014.919825>
- Morin, A. J., Meyer, J. P., Creusier, J., & Biétry, F. (2016). Multiple-group analysis of similarity in latent profile solutions. *Organizational Research Methods*, 19(2), 231–254. <https://doi.org/10.1177/1094428115621148>
- Mountjoy, M., Sundgot-Borgen, J., Burke, L., Ackerman, K. E., Blauwet, C., Constantini, N., Lebrun, C., Lundy, B., Melin, A., & Meyer, N. (2018). International olympic committee (IOC) consensus statement on relative energy deficiency in sport (RED-S): 2018 update. *International Journal of Sport Nutrition and Exercise Metabolism*, 28(4), 316–331. <https://doi.org/10.1123/ijsnem.2018-0136>
- Muthén, B. (2021). Using Mplus to do latent transition analysis and random intercept latent transition analysis. Retrieved from <https://www.statmodel.com/Webtalk2.shtml>. (Accessed 6 March 2022).
- Muthén, L. K., & Muthén, B. O. (1998-2021). *Mplus version 8.7 user's guide*.
- Nylund-Gibson, K., & Choi, A. Y. (2018). Ten frequently asked questions about latent class analysis. *Translational Issues in Psychological Science*, 4(4), 440. <https://doi.org/10.1037/tps0000176>
- Nylund, K. L., Asparouhov, T., & Muthén, B. O. (2007). Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study. *Structural Equation Modeling: A Multidisciplinary Journal*, 14(4), 535–569.
- O'Connor, R. C., Rasmussen, S., & Hawton, K. (2010). Predicting depression, anxiety and self-harm in adolescents: The role of perfectionism and acute life stress. *Behaviour Research and Therapy*, 48(1), 52–59. <https://doi.org/10.1016/j.brat.2009.09.008>
- Panza, M. J., Graupensperger, S., Agans, J. P., Doré, I., Vella, S. A., & Evans, M. B. (2020). Adolescent sport participation and symptoms of anxiety and depressive symptoms: A systematic review and meta-analysis. *Journal of Sport & Exercise Psychology*, 42(3), 201–218. <https://doi.org/10.1123/jsep.2019-0235>
- Patalay, P., & Demkowicz, O. (2023). Debate: Don't mind the gap—why do we not care about the gender gap in common mental health difficulties? *Child and adolescent mental health*. <https://doi.org/10.1111/camh.12647>
- Quinn, B. J., Scott, C., & Stracciolini, A. (2021). Special considerations for growing dancers. *Physical Medicine and Rehabilitation Clinics*, 32(1), 75–86. <https://doi.org/10.1016/j.pmr.2020.09.005>
- Solmi, M., Radua, J., Olivola, M., Croce, E., Soardo, L., Salazar de Pablo, G., Il Shin, J., Kirkbride, J. B., Jones, P., & Kim, J. H. (2022). Age at onset of mental disorders worldwide: Large-scale meta-analysis of 192 epidemiological studies. *Molecular Psychiatry*, 27(1), 281–295. <https://doi.org/10.1038/s41380-021-01161-7>
- Spurk, D., Hirschi, A., Wang, M., Valero, D., & Kauffeld, S. (2020). Latent profile analysis: A review and “how to” guide of its application within vocational behavior research. *Journal of Vocational Behavior*. , Article 103445. <https://doi.org/10.1016/j.jvb.2020.103445>
- Suldo, S. M., & Shaffer, E. J. (2008). Looking beyond psychopathology: The dual-factor model of mental health in youth. *School Psychology Review*, 37(1), 52–68. <https://doi.org/10.1080/02796015.2008.12087908>
- Suldo, S. M., Thalji-Raitano, A., Kiefer, S. M., & Ferron, J. M. (2016). Conceptualizing high school students' mental health through a dual-factor model. *School Psychology Review*, 45(4), 434–457. <https://doi.org/10.17105/SPR45-4.434-457>
- Sundgot-Borgen, J., Meyer, N. L., Lohman, T. G., Ackland, T. R., Maughan, R. J., Stewart, A. D., & Müller, W. (2013). How to minimise the health risks to athletes who compete in weight-sensitive sports review and position statement on behalf of the Ad Hoc Research Working Group on Body Composition, Health and Performance, under the auspices of the IOC Medical Commission. *British Journal of Sports Medicine*, 47(16), 1012–1022. <https://doi.org/10.1136/bjsports-2013-092966>
- Vacca, M., Balleio, A., & Lombardo, C. (2021). The relationship between perfectionism and eating-related symptoms in adolescents: A systematic review. *European Eating Disorders Review*, 29(1), 32–51. <https://doi.org/10.1002/erv.2793>
- Walton, C. C., Rice, S., Hutter, R. V., Currie, A., Reardon, C. L., & Purcell, R. (2021). Mental health in youth athletes: A clinical review. *Advances in Psychiatry and Behavioral Health*, 1(1), 119–133. <https://doi.org/10.1016/j.ypsc.2021.05.011>
- Weber, S., Puta, C., Lesinski, M., Gabriel, B., Steidten, T., Bär, K.-J., Herbsleb, M., Granacher, U., & Gabriel, H. H. (2018). Symptoms of anxiety and depression in young athletes using the hospital anxiety and depression scale. *Frontiers in Physiology*, 9, 182. <https://doi.org/10.3389/fphys.2018.00182>
- Westerhof, G. J., & Keyes, C. L. (2010). Mental illness and mental health: The two continua model across the lifespan. *Journal of Adult Development*, 17, 110–119. <https://doi.org/10.1007/s10804-009-9082-y>
- WHO. (2022). Mental health: Strengthening our response. Retrieved from <https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response>. (Accessed 20 October 2022).
- Wichstrøm, L. (1995). Harter's Self-Perception Profile for adolescents: Reliability, validity, and evaluation of the question format. *Journal of Personality Assessment*, 65(1), 100–116. https://doi.org/10.1207/s15327752jpa6501_8
- Wiklund, M., Malmgren-Olsson, E.-B., Öhman, A., Bergström, E., & Fjellman-Wiklund, A. (2012). Subjective health complaints in older adolescents are related to perceived stress, anxiety and gender—a cross-sectional school study in Northern Sweden. *BMC Public Health*, 12, 1–13. <https://doi.org/10.1186/1471-2458-12-993>