

**Development of Students' Social Support Profiles and Their Association With Students' Study Wellbeing**

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### Abstract

Effective social support from teachers, peers and guardians is a key to promoting students' study wellbeing at school. However, little longitudinal research has examined the implications of distinctive combinations of social support for students' study wellbeing. To address this limitation, we measured multiple dimensions of school-related social support (teacher, peer, and guardian support), study engagement and study-related burnout in a sample of 1545 Finnish lower secondary school students in grades 7, 8 and 9 (age 13, girls 51%). Latent transition analyses identified a six-profile solution for each wave of data and revealed substantial inequality in perceived social support. Firstly, we found four profiles where social support from all three sources was experienced either on high, moderate, low, or very low level labelled as *Strong support* (33%), *Moderate support* (43%), *Low support* (13%), and *Exceptionally low support* (3%), respectively. In addition, two "mixed profiles" were found, where a low level of social support from one source was combined with moderate levels of social support from two other sources. These two profiles were labelled as *Adult support* (5%) and *Low teacher support* (3%) profiles. The social support profiles differed from each other in terms of study engagement and study-related burnout, suggesting that social support from specific sources has a somewhat different effect on features of students' study wellbeing. Moreover, the results showed that the experiences of school-related social support and study wellbeing are prone to change, highlighting the importance of each source of support throughout the students' school path.

Keywords: school-related social support, study engagement, school-related study burnout, latent transition analysis

It is frequently suggested that effective social support from teachers, peers and guardians is a crucial precondition for a student to perceive study-related wellbeing at school. Students who experience a high level of social support are most likely to engage in school and experience a low level of study-related burnout (Liu et al., 2016; Estell & Perdue, 2013; Malecki & Demaray, 2002; Virtanen et al., 2018; Wang & Eccles, 2012), which is further associated with students' academic performance and promotes students' completion of their studies without problems (e.g. Bask & Salmela-Aro, 2013; Hamre & Pianta, 2001; Hopson et al., 2014; Wang & Peck, 2013). Although emerging research has focused on the interrelation between social support and students' study wellbeing at school, studies combining the effect of teachers', peers' and guardians' social support simultaneously are rare (see Ciarrochi et al., 2017; Ulmanen et al., 2022a, 2022b). In this study, individual variation in the developmental course of perceived social support from multiple sources during lower-secondary school studies and the way it relates to the experienced study engagement and, in turn, to the risk of experiencing study-related burnout are studied. By using longitudinal latent profile analyses (i.e., latent transition analyses), this three-wave longitudinal study aims to bridge the gap in the literature by exploring 1) the structure and stability of different social support profiles during lower-secondary school (from 7<sup>th</sup> to 9<sup>th</sup> grade) and 2) the association between the different social support profiles and students' study wellbeing including perceived study-related burnout symptoms and study engagement during lower-secondary school studies (i.e. from 7<sup>th</sup> grade to 9<sup>th</sup> grade).

### **School-Related Social Support as a Resource of Students' Study Wellbeing**

School-related social support refers to the students' perceptions of social resource availability (Cohen et al., 2000) and is highly associated with more positive appraisals of one's ability to cope with challenging tasks or negative events. Moreover, it contributes to individual- wellbeing and buffers against potential negative individual or environmental factors (Cohen & Syme, 1985). Prior research has showed that especially emotional and informational support contribute to students' study wellbeing. Emotional support such as caring, trust, encouragement, and

acknowledgement (House, 1981; Malecki & Demaray, 2002) enhance students' emotions and positive attitudes towards schoolwork, meaningfulness of schoolwork (e.g. Liu et al., 2016; Ulmanen et al., 2016a; Wang & Eccles, 2012; Wentzel, Russell & Baker, 2016), as well as protects against study-related burnout (Salmela-Aro, Kiuru, Pietikäinen et al., 2008). Similarly, informational support, such as advice, feedback, affirmation and problem-solving acknowledgement (House, 1981; Malecki & Demaray, 2002), enables students to cope with study-related challenges, and further to facilitate engagement in school (Liu et al., 2016; Ulmanen et al., 2016a; Wang & Eccles, 2013; Wentzel et al., 2016).

Teachers, peers and guardians are preferred as primary sources of school-related social support for students (Estell & Perdue, 2013; Kiefer et al., 2015; Liu et al., 2016, Wentzel, et al., 2016). However, these sources of support vary in terms of their tasks and dynamics (Cheung & Sim, 2017; Hombrados-Mendieta et al., 2012; Tardy, 1985). Outside of the school, guardians play a key role in creating emotionally safe growth conditions for young people and thus in promoting students' access to school. For example, socio-emotional skills learned in interaction with guardians form the basis of students' abilities to interact with others and utilize support from various sources during the school path (Du, Xu, & Fan, 2016; Hombrados-Mendieta et al., 2012; Newton et al., 2014; Takahashi et al., 2015). Teachers, in turn, provide school-related social support by determining the frameworks and contents for the studying (Lickona, 1997; Stornes, Bru & Idsoe, 2008). So, they are not responsible only for building an emotionally safe and positive atmosphere for studying (Kiefer et al., 2015; Roorda et al., 2011; Skinner et al., 2008; Wang & Eccles, 2012), but also for setting the study-related goals and pedagogical practices, which emphasizes the role of the teacher as a primary source of school-related social support (Kiefer et al., 2015; Rice et al., 2013; Ryan & Patrick, 2001; Wang & Eccles, 2012). Shared social support among peers plays a significant role, especially in terms of socialization among students (De Wit et al., 2011; Meeus & Deković, 1995). Unlike relationships between adults and students, relationships between peers are typically perceived as more equal and thus serve as the foundation for student's emotional development, such as student identity work

(De Wit et al., 2011; Juvonen et al., 2000; Rubin et al., 2007). Thus, via peer support students do not only seek out and provide school-related support (Liu et al., 2016; Wang & Eccles, 2012), but also aim to build a sense of belonging among peers (Kiefer et al., 2015; Ulmanen et al., 2014, 2016a), vital for students' positive socioemotional development (De Wit et al., 2011; Juvonen et al., 2000; Rubin et al., 2007; Ryan & Deci, 2000).

Despite their different tasks and dynamics, the sources of support are not separate resources for student; on the contrary, they contribute to and influence each other. For instance, it is assumed that positive relationships give rise to other relationships (Ainsworth et al., 2015 (attachment theory); Rautanen et al., 2020; Ulmanen et al., 2016b). While received support from adults at home promotes students' abilities to interact with others and utilize support from various sources during school (Anthony et al., 2005; Du et al., 2016; Newton et al., 2014; Takahashi et al., 2015), the way teachers interact with students influences the students' ways and opportunities to interact with peers and utilize them as a resource for schoolwork (Engels, et al., 2002; Farmer et al., 2011; Hughes & Chen, 2011; Luckner & Pianta, 2011; Rautanen et al., 2020; Ulmanen et al., 2016b). However, earlier studies suggest that a high level of support from one source does not always guarantee received support from other sources (Ciarrochi et al., 2017; Ulmanen et al., 2022a, 2022b). Particularly in adolescence, students' relationships with teachers, guardians or peers can diverge in such a way that the student may perceive receiving support only from one source and perceiving simultaneously a lack of support from other sources (Ciarrochi et al., 2017; Furrer & Skinner, 2003; Jager, 2011; Scholte et al., 2001; Ulmanen et al., 2022a, 2022b). For example, students may feel accepted and supported by peers, but perceive support from adults as insufficient (Ciarrochi et al., 2017). Alternatively, students perceive support to be available in relationship with teachers or with guardians but have difficulties to identify with peers (Furrer & Skinner, 2003). It has been assumed that dysfunctional social relations and lack of social support from one source may reinforce students to seek out support from the most functional source of social support available (Ryan & Shim, 2012). However, prior research focusing on the divergences and dynamics of students'

social support sources is limited. Moreover, it is unclear whether the lack of social support from one source can be compensated by support from another source in terms of perceiving study-related burnout symptoms or study engagement in different phases of the school path.

In this study, students' study wellbeing is examined by focusing on the students' perceived study engagement and study-related burnout. These factors depict both positive and negative aspects of study wellbeing at school and are central determinants of students' affective orientation toward studying (Salmela-Aro & Read, 2017; cf. the concept of emotional engagement in Fredricks et al., 2004). Study engagement refers to positive and fulfilling study-related experiences including the students' sense of energy, dedication, and absorption during studying (Salmela-Aro & Upadyaya, 2012; Upadyaya & Salmela-Aro, 2013). These dimensions correlate highly with each other and emphasize the students' positive affective reactions towards studying, such as a mental resilience, inspiration regarding studies and finding schoolwork meaningful (Salmela-Aro & Upadyaya, 2012). Study-related burnout refers to a school-related disorder and comprises the dimensions of exhaustion, cynicism towards schoolwork, and a sense of inadequacy (Maslach et al., 2001; Salmela-Aro et al., 2009; Schaufeli et al., 2002). While cynicism is characterized by a loss of interest in schoolwork and not seeing school as meaningful, sense of inadequacy indicates a diminished sense of competence in terms of studying at school. Exhaustion, on the other hand, refers to a state of strain and chronic fatigue. It has been found that the dimensions of study-related burnout do not correlate with each other as strongly as the dimension of study engagement. For example, students may feel highly exhausted and report a high sense of inadequacy but not have cynical attitudes towards schoolwork (Salmela-Aro & Upadyaya, 2014). Similarly, study engagement and study-related burnout can form different combinations (Salmela-Aro & Read, 2017; Schaufeli & Bakker, 2004). In an optimal situation, a relatively low level of study-related burnout is associated with a high level of study engagement (Tuominen-Soini & Salmela-Aro, 2014). However, some students who have engaged in studying, have also reported more concerns about their academic success (Tuominen-Soini & Salmela-Aro, 2014). Thus, it appears that some engaged students thrive on

challenges, while others become exhausted. In order to robustly understand the impact of the different sources of social support on students' study wellbeing, it is important to study the dynamics between the positive (i.e. study engagement) and negative (i.e. study-related burnout) determinants of study wellbeing simultaneously (Salmela-Aro & Read, 2017).

### **Individual Differences and Developmental Change in Social Support and Study Wellbeing**

Students' social support trajectories have typically been found to follow a descending trend with the progression of school years (Bokhorst et al., 2010; De Wit et al., 2011; Eccles et al., 1993; Malecki & Demaray, 2002; Weyns et al., 2018; Özdemir & Özdemir, 2020). However, studies adopting a person-centered approach suggest that perceived social support does not necessarily decrease similarly among all students, but students follow individual developmental trends. While some students experience a relatively low or decreasing level of social support throughout the school years, others do not have any problems at any stage of the school path (e.g. Ciarrochi et al., 2017; Jager, 2011; Scholte et al., 2001). Similarly, stable and decreasing trend in students' experienced study wellbeing has been found (De et al., 2011; Janosz et al., 2008; Li & Lerner, 2011; Roeser et al., 1999; Tuominen-Soini & Salmela-Aro, 2014).

Studies have also showed gender differences in students received social support and perceived study wellbeing. Girls typically perceive higher levels of peer support and utilize more peers as a resource for schoolwork than boys (Ciarrochi et al., 2017; Hombrados-Mendieta et al., 2012; Rautanen et al., 2020; Ulmanen et al., 2022a, 2022b). They are also more likely than boys to report a higher level of study engagement than boys (Liu et al., 2016; Ulmanen et al., 2022a, 2022b; Wang & Eccles, 2012). However, it has also been found that girls are more prone to feeling concerns about their academic success, and further suffer higher levels of study-related burnout than boys (Kiuru et al., 2008, Salmela-Aro, Kiuru, & Nurmi, 2008; Salmela-Aro et al., 2009), particularly in terms of experiencing exhaustion and inadequacy (Salmela-Aro & Tynkkynen, 2012). Instead, boys report more cynical attitudes towards studying than girls (Bask & Salmela-Aro, 2013).

Accordingly, earlier research suggests that there are individual differences in the

development of perceived social support and study wellbeing during students' school years.

However, longitudinal studies combining both school-related social support and study wellbeing including perceived study engagement and study-related burnout are rare. In this study, students' social support profiles, the stability and change in these profiles and their association with students' study wellbeing are examined throughout the students' lower secondary school years. Further, the interrelation between the different social support profiles and student gender are explored.

### **Aim of the Study**

The first aim of the study was to explore the structure and stability of social support profiles in lower-secondary school. We hypothesized that it is possible to identify student profiles, in which social support from different sources is perceived equally/similarly, but at different levels. Moreover, we expected that social support from different sources diverge in such way that students may perceive support from one or two sources, but lack of support from other sources (Ciarrochi et al., 2017; Furrer & Skinner, 2003; Ulmanen et al., 2022a, 2022b) (**Hypothesis 1**). The second aim of the study was to examine whether students move between profiles. We hypothesized that student membership in specific social support profiles will likely remain stable from 7<sup>th</sup> to 9<sup>th</sup> grade. More specifically, if students will move from one profile to another, they are more likely to move between profiles with a quite similar level of support than between strongly divergent social support profiles (Ciarrochi et al., 2017; Weyns et al., 2018; Özdemir & Özdemir, 2020) (**Hypothesis 2**). The third aim of the study was to examine how social support profiles associate with perceived study engagement and study-related burnout and whether school-related social support from one source can compensate for the lack of support from one or two other sources in terms of perceived study engagement and study-related burnout. We hypothesized that students in the profiles with more support from different sources will generally experience more study engagement and less study-related burnout symptoms than those receiving less support (Ciarrochi et al., 2017; Estell & Perdue, 2013; Furrer & Skinner, 2003; Kiefer et al., 2015; Salmela-Aro, Kiuru, Pietikäinen et al., 2008; Skinner et al., 2008; Ulmanen et al., 2022a, 2022b) (**Hypothesis 3**). Finally, we examined to what extent



students' gender predict their likelihood of membership in the identified social support profiles.

Given that girls typically adjust to school better than boys, it was assumed that girls would be more likely to belong to highly supported profiles compared to boys (Lam et al., 2012; Liu et al., 2016; Ulmanen et al., 2022a, 2022b; Wang & Eccles, 2012) (**Hypothesis 4**).

## Method

### Participants and Procedures

The data for this study were collected as a part of the larger national School Matters research project by utilizing clustered hierarchical sampling (Snijders & Bosker, 2012) during three consecutive academic semesters. The follow-up sample consisted of grade 7 (n=1545, 51% girls, age 13), grade 8 (1293, 51% girls, age 14), and grade 9 (1239, 51% girls, age 15) students from 26 Finnish comprehensive schools and 95 different class. The schools in the sample were situated throughout the country and varied in size (50-1,255 students) and location (rural/urban). In Finland, comprehensive school is 9 years of compulsory general schooling for all children aged 7-16 (Finnish National Agency for Education, 2017). It comprises a primary school level (grades 1-6) and a lower secondary school level (grades 7-9). At the lower secondary level, a subject teacher system is applied, causing diversity of teacher and peer relations.

The data was collected in the schools during the students' school day by researchers. They introduced the students to the study, instructed them to fill in the questionnaire, and collected the written questionnaires from the students. Before conducting the study, parents gave informed consent for their children to participate in the study. The students were informed that participating in the research was voluntary, that it was not a school assignment, and that their teachers or parents would not see any individual student's answers. The total response rate was 89% at the first measurement point.

This study was not preregistered. Research permissions from students, guardians and schools do not allow sharing of original data and study materials; hence, they are not available. The

study analysis code (i.e. Mplus analysis) is available from the corresponding author upon reasonable request. The ethical principles of the Finnish National Board on Research Integrity have been followed in conducting the study. The *Development of students' social support profiles and their association with students' study wellbeing* study did not require an ethics review in Finland (cf. Finnish Advisory Board for Research Integrity 2009).

## Measures

### ***Perceived Social Support***

We used teacher support, peer support and guardian support scales to assess students' perceived support for schoolwork (Rautanen et al., 2020; see also Rautanen et al., 2022a, 2022b; Soini et al., 2022; Ulmanen et al., 2022a, 2022b). The *Teacher support* scale assessed emotional support (i.e. respect, empathy, and care) as well as problem-focused informational support from teachers that helps in achieving learning goals ( $\alpha = .95$  in grade 7, 8 and 9; 11 items). The *Peer support* scale measured emotional and informational support that specifically targets learning activities. It comprised items concerning both giving and receiving social support for schoolwork, as well as items that describe the available support and enacted support ( $\alpha = .93$  in grade 7,  $\alpha = .92$  in grade 8 and 9; 10 items). Finally, the *Guardian support* scale assessed students' perception of frequency of guardians' emotional and informational social support for schoolwork ( $\alpha = .85$  in grade 7 and 8,  $\alpha = .87$  in grade 9; 7 items) (see Lukin, 2013). Guardians are understood in this study as any adult at a student's home including their parents. Students rated peer and teacher support using a 7-point Likert-type scale ranging from 1 (Not true at all) to 7 (Very true). Adult support at home was rated using a 5-point Likert type scale ranging from 1 (Never) to 5 (Very often). The items for all scales are presented in the Supplemental Online in Table S1.

### ***Study Wellbeing***

**Study-Related Burnout.** The *Study-related burnout* scale comprised three subscales to assess student study-related exhaustion ( $\alpha = .74$  in grade 7, and  $\alpha = .75$  in grade 8,  $\alpha = .76$  in grade 9; 3 items), cynicism, ( $\alpha = .81$  in grade 7,  $\alpha = .82$  in grade 8,  $\alpha = .83$  in grade 9; 2 items), and sense of

inadequacy ( $\alpha = .73$  in grade 7,  $\alpha = .75$  in grade 8,  $\alpha = .79$  in grade 9; 2 items) (Table S1). Participants utilized a 7-point Likert scale (1 = *Not true at all* to 7 = *Very true*) to rate their study-related burnout. The scale has been adapted from the School-Burnout Inventory (SBI) (Salmela-Aro et al., 2009). Consistent with previous studies of older students, our confirmatory factor analysis (CFA) analyses supported the use of the three-factor structure of study-related burnout instead of the general factor structure (Salmela-Aro et al., 2009).

**Study Engagement.** The *Study engagement* scale assessed students' energy, dedication, and absorption in studying ( $\alpha = .94$  in grade 7, 8 and 9; 9 items). Participants utilized a 7-point Likert scale (1 = *Not true at all* to 7 = *Very true*) to rate their study engagement. The scale has been adapted from the Schoolwork Engagement Inventory (EDA) (Salmela-Aro & Upadyaya, 2012) (Table S1). CFA-analyses supported the use of general factor structure instead of the three-factor structure in terms of study engagement.

## Analyses

### ***Measurement Models and Measurement Invariance of the Scales***

Confirmatory factor analysis (CFA) was conducted to examine the general factor structure of the scales used in the study and their measurement invariance across three time waves. The parameters of the models were estimated using the maximum likelihood robust (MLR) estimation method available in Mplus 8.00 (Muthén & Muthén, 1998–2017) in conjunction with the complex option that considered the nesting of students in schools and classes (Muthén & Satorra 1995; Peugh 2010). Students who dropped out of the study after T1 and did not return to the study in T3 ( $n=306$ ) did not differ statistically significantly from students that answered at least two stages of the research, in terms of measured variables. Typical reasons for students to drop out of the study included that they were absent from school the day data was collected, or they had changed to another school that was not included in this study. In addition, the number of missing values for each variable was low (Supplemental Material, Table S3) and the missingness in the variables at one measurement occasion was not related to higher or lower scores in the same variable at the time of

other measurements. Therefore, the models were estimated based on the data from all respondents who completed the questionnaires at least at the first wave of data utilizing Full Information MLR estimation (FIML) that uses all the data available to estimate the model without imputing the data. CFA for each scale at each age cohort achieved acceptable fit after modifications of two added residual covariances at maximum. Moreover, the longitudinal CFA supported scalar invariance for each scale (Table S2). The procedure regarding measurement models and their longitudinal invariance across three time waves are detailed in the Supplemental Material. In addition, the descriptive results of the variables are presented in the Supplemental Material in Table S3.

### ***Latent Profile Analyses***

Prior to conducting the LTA, Latent profile analysis (LPA) (Berlin et al., 2014) was conducted separately at each measurement point to identify distinct subgroups of students using the three social support dimensions as profile indicators (teacher support, peer support and guardian support). This was done to ensure that the same number of profiles would be identified at each time point. The optimal number of profiles was identified by estimating 1 to 9 latent profile solutions separately at each of the measurement times. The procedures used to select the optimal number of profiles are detailed in the Supplemental Material. They supported and converged on a 6-profile solution at each time point.

### ***Latent Transition Analyses***

Latent transition analysis (LTA) was conducted to test the similarity of the chosen LPA solutions of different time points and students' transitions between profiles. LTA involved four steps (Morin et al., 2016). First, we integrated the selected profile solution in a single LPA longitudinal model of configural similarity without any other constraints. Second, the *structural* similarity of profile solutions was tested, meaning that equality constraints across time waves on the means of profile indicators were included in the model. Thirdly, the *dispersion* similarity of the profiles was tested by including equality constraints across time waves on the variances of the profile indicators. Finally, the *distributional* similarity of profile solutions across time waves was tested by constraining

the class probabilities to equality across time waves. According to Morin and colleagues (2016), the similarity hypothesis remains valid when at least two of the following three information criteria, Consistent Akaike (CAIC), Bayesian (BIC), or sample-size adjusted BIC (ABIC), are lower in a model that contains more constraints on similarity. The profile similarity results are presented in Table 1. Compared to the initial model of configural similarity, the next models (structural similarity, dispersion similarity, and distributional similarity) resulted in lower values at least two of the three information criteria (CAIC, BIC, and ABIC), thereby supporting the distributional similarity of this six-profile solution across time points (Fernet et al., 2020; Morin, et al., 2016). In other words, the similarity test showed that the number of profiles (i.e. *configural* similarity), means of the profile indicators (*structural* similarity), variances of the profile indicators (*dispersion* similarity), and sizes of the profiles (*distributional* similarity) are equal across time waves. Further, to examine the within-person stability of students between different profiles, the explanatory and predictive similarity of the profile solution, the model of distributional similarity was converted to a complete LTA model using the manual auxiliary three-step approach (Asparouhov & Muthén, 2014; Fernet et al., 2020; Ciarrochi et al., 2017).

### ***Outcomes and Predictors of Profile Memberships***

The *explanatory* similarity of the LTA model was examined by including outcomes (study engagement and subscales of study-related burnout) in the final LTA solution. The within-profile means of these outcomes were examined to determine if they were equal across time points (Asparouhov & Muthén, 2014, 2021; Fernet, et al., 2020; Ciarrochi et al., 2017). First, we estimated the models where outcomes were freely estimated at each time point (*free relations with outcomes*), and secondly, we estimated the model where outcomes were constrained to equality across time points (*invariant relations with outcomes*). We used the MODEL CONSTRAINT command of Mplus to systematically test mean-level differences across pairs of profiles and within any specific profile (Raykov & Marcoulides, 2004). As shown in Table 1, compared with the model where the relations between profiles and outcomes were freely estimated across measurement times, the

model of *explanatory* similarity resulted in lower values for all information criteria (see Table 1), thus supporting the explanatory similarity of the profiles (Fernet et al., 2020; Ciarrochi et al., 2017).

Multinomial logistic regressions were conducted to test the relations between a predictor (gender) and the likelihood of memberships into the various profiles by including a predictor (gender) to the final LTA model of distribution similarity (Fernet et al., 2020; Ciarrochi et al., 2017). In these analyses, gender was allowed to predict the profiles estimated at all time points. Four alternative models were contrasted (Fernet et al., 2020; Ciarrochi et al., 2017). First, we considered a null effects model in which the relations between the demographic and the profiles were constrained to be zero. Secondly, we tested whether the effect of gender on profile transitions differed from one profile to another so that the relations between gender and profile memberships were freely estimated at each time point (*Profile-specific free relations with predictors*). Third, the relation between gender and profile membership were still freely estimated across measurement times but constrained to equality across profiles (*free relations with predictors*). Last, the predictive similarity of the profiles was tested by including the equality constraints across time waves on the logistic regression coefficients. As with the outcomes, the last model of predictive similarity resulted in lower values for the CAIC, BIC and ABIC when compared to the alternative models showing that the relations between gender and profiles were similar across time points, and that the gender did not directly contribute to the prediction of specific profile to-profile transition (see Table 1) (Fernet et al., 2020; Ciarrochi et al., 2017).

[Insert Table 1 here]

## Results

### Social Support Profiles and Their Stability

By using latent profile and latent transition analyses we examined students' holistic social support experience by simultaneously taking into account perceived school-related social support from teachers, peers and guardians. We found six different profiles, which were consistent across three measurement points (see Table 1 for results from the similarity of the profiles). The chosen

model of distributional similarity is illustrated in Figure 1 (the exact within-profile means and variances of the indicators are reported in Table S5 of the Supplemental Material). Consistent with **Hypothesis 1** we found four profiles in which students perceived social support from teachers, guardians and peers rather similarly, but on high, moderate, low, or very low levels (Figure 1). The profiles were labelled as *Strong support* (33.1%), *Moderate support* (42.5%), *Low support* (13.3%), and *Exceptionally low support* (3.1%). In addition to these, two “mixed profiles” were identified, where a low level of social support from one source was combined with moderate levels of social support from two other sources. These two profiles were labelled as *Adult support* (4.6%) and *Low teacher support* (3.3%). The *Adult support* profile describes students with a moderately high level of teacher and guardian support combined with a remarkably low level of peer support. Further, the *Low teacher support* profile describes students with average levels of peer and guardian support combined with a lack of teacher support.

[Insert Figure 1 here]

The results showed, as hypothesized (H2), a moderate level of within-person stability in the *Moderate*, *Strong*, *Low* and *Low teacher support* profile memberships (see Table 2). These profiles showed to be fairly stable over time with a varying probability (56% - 86%) of staying in the same profile. The level of within-person stability of the *Moderate* (at T1: 64%; at T2: 76%), *Low* (at T1: 61%; at T2: 86%), and *Low teacher support* (at T1: 66%; at T2: 77%) profiles increased but decreased in the *Strong support* profile over time (at T1: 72%; at T2: 56%). Students' memberships in the *Adult* and *Exceptionally low support* profiles were less stable (i.e., probabilities of staying in the same profile varied between 30% and 47%) suggesting that the experience of the adult supported students and exceptionally low supported students was quite situational.

Further, according to **Hypothesis 2**, if students moved from one profile to another, transitions occurred most likely between adjacent profiles, where social support was perceived at a quite similar level. For example, strongly supported students (Profile 1) were most likely to transition to the *Moderate support* profile (at T1: 22%, T2: 43%), moderately supported students (Profile 2) to

the *Strong support* (T1: 17%, T2: 0%) or to the *Low support* profile (T1: 10%, T2: 17%), and exceptionally low supported students (Profile 6) to the *Low support* profile (at T1 29% and at T2 37%). Encouragingly, students corresponding to the *Low support* profile were most likely to make a positive transition into the *Moderate support* profile at T1 (32.7%). However, the share of such positive transitions from the *Low support* profile remained marginal as the stability of the profile strengthened after grade 8 (at T2).

Further, students corresponding to the *Adult support* profile were most likely to make a positive transition to the *Moderate* (T1: 41%, T2: 32%) or *Strong support* (T1: 22%, T2: 0%) profiles during lower-secondary school years. However, the share of such positive transition decreased and the share of negative transition to the *Low* (T1: 0%, T2: 16%) and *Exceptionally low support* (T1: 6%, T2: 8%) profiles increased after eight grade. Further, results regarding the peer and guardian supported students (Profile 5) showed that they were most likely to transition to the *Low support* profile at T1 (21%), which shows that a perceived lack of teacher support associated with students' risk of moving away from other support sources as well. Positively, 12 percent of peer and guardian supported students also make a transition to the *Moderate support* profile at both time points.

[Insert Table 2 here]

### **Study Engagement and Study-related Burnout in Different Social Support Profiles**

The results of the explanatory similarity of the profiles showed that the relations between profiles and outcomes are highly consistent across outcomes (see Table 1). The means of the outcomes within each profile are reported in Table S6 in Supplemental Material and illustrated in Figure 1. According to **Hypothesis 3**, the results suggested that students in profiles with more support will generally experience more study engagement and less study-related burnout than those with less support. More precisely, the examination of the profiles, where social support was perceived relatively equally from different sources, showed that study engagement was highest in the *Strong support* profile followed by the *Moderate* and the *Low support* profile and the lowest in the *Exceptionally low support* profile. Respectively, the results showed that members of the *Strong*



*support* profile did not perceive study-related burnout symptoms, whereas members of the *Exceptionally low support* profile perceived them at a very high level, especially in terms of cynicism. Interestingly, students in the *Moderate support* profile perceived statistically significantly more study exhaustion and inadequacy than students in the *Low support* profile, whilst students in the *Low support* profile perceived statistically significantly more cynicism towards studying, but the study exhaustion and inadequacy in terms of studying were perceived as below the average level.

Yet, the comparison of the mixed profiles i.e. the *Adult support* and *Low teacher support* profiles with other profiles revealed the unique results of the role of different sources of support in the construction of students' study engagement and study-related burnout. For example, students corresponding to the *Low teacher support* and *Moderate support* profiles did not differ statistically significantly in terms of peer and guardian support (see Table S5). However, students with lacking teacher support (Profile 5) reported statistically very significantly more study-related burnout and less study engagement than moderately supported students (Profile 2) (Figure 1, Table S6). This result shows that the average level of peer and guardian support were not enough to fully compensate a lack of teacher support, but it associated with students' decreased level of study engagement and a heightened risk of suffering study-related burnout (**hypothesis 3**).

Further, in the *Adult support* profile, a lack of peer support combined with low levels of both study engagement and study-related burnout. The comparison of the *Adult support* profile and the *Moderately supported* profile (which differs from the *Adult support* profile especially for peer support and slightly for guardian support, see Table S5) showed that adult supported students (Profile 4) perceived statistically significantly lower study-related burnout symptoms. Yet, the difference in study engagement between adult (Profile 4) and moderately supported students (Profile 2) was not statistically significant (Figure 1, Table S6). These results indicate that a lack of peer support alone was not associated with the severe symptoms of study-related burnout or a diminished level of study engagement, and that the guardian support could partially compensate for the lack of peer support in terms of students' study wellbeing.

### **Predictive Similarity**

As with the outcomes, the results supported the predictive similarity of the model and showed that the relations between gender and profiles are similar across time points. The results from multinomial logistic regression are reported in Table 3. As expected (**Hypothesis 4**), girls were more likely to have stronger support from all sources than boys. The results suggested that girls are more likely than boys to be members of *Moderate support* and *Strong support* profiles compared to the *Low support* and *Exceptionally low support* profiles. Girls also presented a higher likelihood than boys to be members of the *Low teacher support* profile relative to all other profiles. Interestingly, boys presented a higher likelihood than girls to be members of the *Adult support* profile relative to all other profiles. However, the difference was not statistically significant between the *Adult support* and *Exceptionally low support* profiles.

[Insert Table 3 here]

### **Discussion**

In this study, we examined lower-secondary school students' perceived social support from teachers, peers, and guardians as a relational system, where all source of support are interrelated and contribute to students' study wellbeing, including study engagement and study-related burnout. By applying a longitudinal person-centered approach, we showed that perceived social support from one source typically associate with support from other sources (see Ainsworth, Blehar, Waters, & Wall, 1978 (attachment theory); Ciarrochi et al., 2017; Ulmanen et al., 2016b): majority of students represented the profiles, where social support from different sources is perceived equally (the *Average, Strong, Moderate or Low support* profiles). Only 8 percent of students represented mixed profiles, where a moderate or high level of support from two sources combined with a lack of support from one source.

Previous research suggests that adults play a significant role in contributing to a relational system, where support from all sources is perceived available (Rautanen et al., 2020; Ulmanen et al., 2016b). Both teacher and guardian support have been found to have direct and indirect influences

on students' abilities to seek and utilize school-related social support in a school environment.

Adults create a framework for students to share mutual support, as well as indirectly contribute to supportive behavior among students through the quality of the adult-students relationship (Anthony et al., 2005; Du et al., 2016; Engels, et al., 2002; Hughes & Chen, 2011; Luckner & Pianta, 2011; Newton et al., 2014; Rautanen et al., 2020; Takahashi et al., 2015; Ulmanen et al., 2016b). Compared to previous research, the results of this study emphasize in a unique way guardians' indirect, but very significant, influence on students' opportunities to form supportive relationships with significant support source in school. In the mixed social support profiles, divergence occurred only in terms of teachers and peers, showing that a lack or low level of school-related social support from guardians always associated with a lack or low level of school-related social support from teachers and peers. This result suggests that it is hard for teachers to counteract students' negative home influences at school, and students are likely to display the same patterns of interaction with teachers and peers that they have adopted in their relationships with guardians (e.g. Howes & Hamilton, 1992; O'Connor, 2010; Pianta & Steinberg, 1992).

The results showing that students' social support experience diverged in terms of peers, differed from our previous study regarding younger students (Ulmanen et al., 2022b). In the primary school context, we did not find an adult-supported profile with lacking peer support (see also Ciarrochi et al., 2017). This result may be explained by the developmental change students encounter in adolescence. In adolescence, students' interests become more focused and their need to identify peers who share similar interests (Berndt, 1982) and who are similar in terms of social and cognitive abilities increases (Clark & Ayers, 1992; Selfhout, Branje, & Meeus, 2007; Solomon, & Knafo, 2007). That may reduce adults' opportunities to influence peer relationships and students may become isolated and lose peer support despite strong adult support. It might also be that a more complex high school environment diminishes some students' opportunities to form supportive relationships with their peers (Jindal-Snape & Miller, 2008).

### **Transitions Between Profiles**

In line with previous studies suggesting that social support is a quite stable construct (e.g. Hardy et al., 2002; Hughes et al. 2008; Jerome, Hamre, & Pianta, 2009, O'Connor, 2010), our results showed that the entity of the social support system is constructed already at the beginning of lower secondary school and a majority of students were likely to remain in the same social support profile or move to a parallel profile. Moreover, a low support experience tended to be more stable than a high support experience: while the stability of the *Strong support* profile weakened, the stability of the other, "poorer" social support profiles strengthened over time (except for the *Exceptionally low support* profile). This result is in line with previous findings about the stability of the students' conflict relationships with teachers (Jerome et al., 2009; Spilt et al., 2012), peers (Hardy, Bukowski, & Sippola, 2002) and guardians (Driscoll & Pianta, 2011), indicating the difficulty of implementing a positive change in social relationships. However, this study captured in a unique way the stability of students' holistic support experience from different sources simultaneously (see also Ciarrochi et al., 2017).

Minor changes in the social support experience were detected. Results show that positive changes in social support happened more likely after seventh than after eighth grade: The probability of increase in perceived social support decreased and negative changes increased during the school years. The results are consistent with previous findings showing that perceived social support from different sources is reduced during students' school years (Bokhorst et al., 2010; De Wit et al., 2011; Eccles et al., 1993; Malecki & Demaray, 2002; Weyns et al., 2018; Özdemir & Özdemir, 2020). It might be that during grade 7 (i.e. just after the transition from primary to lower-secondary school in Finland), when students are seeking their place and way to participate in the school community, they are more responsive and open to form new relationships and the needed support is perceived as more positive. However, maintaining such a positive mood in social relationships does not seem to be self-evident as the lower-secondary school studies progress. Rather, a conscious effort is required on the behalf of teachers and guardians to keep up with the changing needs of the student (see Sawyer et al., 2018).

Students having problems with one source of support were on a knife-edge: while others succeeded to improve their holistic support experience, others totally isolated themselves from interaction over time (Vollet, 2017). Consistent with earlier findings, teachers and guardian support showed to be particularly helpful for adolescents who were socially isolated among peers (e.g. Williams, Ciarrochi, & Heaven, 2012). Yet, students with only adult support (Profile 4) were also at a risk of isolating from other relationships as well (i.e. transition to the *Low* or *Exceptionally low support* profile), and this risk increased as the studies progressed. Similarly, students with a lack of teacher support and a moderate level of peer and guardian support (the *Low teacher support* profile) were at a risk of transitioning to the “poorer” social support profiles (to the *Low support* and *Exceptionally low support* profiles). It might be that a prolonged experience of a lack of support from one source is likely to trigger a cycle of alienation, in which the student begins to feel support from other sources as also insufficient and withdraws from interaction.

#### **Study Engagement and Study Burnout in Different Social Support Profiles**

Social support profiles differed from each other in terms of study engagement and study-related burnout. In general, school-related emotional and informational support from different sources was associated with study engagement and protected against study-related burnout, while the lack of support raised the risk of study-related burnout and lack of study engagement (e.g. Ciarrochi et al., 2017; Estell & Perdue, 2013; Furrer & Skinner, 2003; Kiefer et al., 2015; Kiuru et al., 2008; Salmela-Aro, Kiuru, Pietikäinen et al., 2008; Skinner et al., 2008; Virtanen et al., 2016). Especially, perceived study engagement went hand in hand with the perceived school-related social support. However, only students with strong support from all sources were strongly engaged and strongly protected from study-related burnout symptoms (the *Strong support* profile) (see also Salmela-Aro & Read, 2017; Schaufeli & Bakker, 2004) suggesting that each source of social support plays an important role in the development and maintenance of students' positive and fulfilling study-related experiences (see Salmela-Aro & Upadyaya, 2014; Vollet, 2017).

The comparison of the mixed profiles with other profiles highlighted the importance of

teacher support in promoting students' study wellbeing in a unique way. For example, the comparison of the *Low teacher support* profile to the *Moderately supported* profile showed that peer and guardian support perceived at an average level were not sufficient to compensate a lack of teacher support in terms of students' study wellbeing; students in the *Low teacher support* profile tend to report statistically very significantly more study-related burnout symptoms and less study engagement than moderately supported students (Profile 2). Although the importance of teacher support for students' study wellbeing and learning outcomes has been well identified in previous studies (e.g. Furrer & Skinner, 2003; Jiang et al., 2013; Tennant et al., 2015; Virtanen et al., 2016; Wang & Eccles, 2012, Özdemir & Özdemir, 2020), this result suggests the influence of a lack of teacher support on the nature of peer support have. It may be that perceived peer support turns against students' study wellbeing when students share worries and anxieties related to schoolwork with each other without receiving support from a teacher (see Ulmanen et al., 2014, 2016a). Also, the results regarding the *Adult support* profile highlight the complex nature of peer support and the primary role of teachers as well as guardians in protecting students from study-related burnout symptoms. The results suggest that a lack of peer support combined with teacher and guardian support did not associate with the heightened study-related burnout symptoms, but students in this profile reported study-related exhaustion, cynicism and inadequacy at very low levels and study engagement at an average level. Yet, it should be noted that only adult supported students reported the statistically significantly lower study engagement than strongly supported students (Profile 1), which underlines the importance of each source of support and the adults' responsibility to constantly aim to develop an emotionally safe learning environment, where students are able to seek, receive and share support with each other.

### **The Role of Gender**

Gender influenced the results in an expected way. Girls were more likely than boys to perceive a strong or moderate level of support from all sources, while boys were more likely than girls to totally isolate from social relationships (Lam et al., 2012; Liu et al., 2016; Wang & Eccles,

2012). Moreover, girls sought support from peers (the *Low teacher support* profile) and less from adults (the *Adult support* profile) suggesting that girls are more likely to share school-related issues in their close relationship (Blyth & Foster-Clark, 1987; Ulmanen et al., 2022a; Rueger et al., 2008). However, the finding that peer support together with a lack of teacher support, combined with severe symptoms of study-related burnout, occurred especially among girls, is new (The *Low teacher support* profile). It may partly explain earlier findings about girls' stronger tendency to experience study-related burnout than boys (Kiuru, et al., 2008, Salmela-Aro, Kiuru, & Nurmi, 2008; Salmela-Aro & Tynkkynen, 2012). Girls may have higher expectations of teacher support and, on the other hand, may be more adept than boys at taking advantage of peer support despite a lack of teacher support. However, seeking strong peer support may turn against students' study wellbeing and the symptoms of study-related burnout may spread if negative emotions are related to schoolwork in peer relationships (see Kiuru et al. 2008; Ulmanen et al., 2014, 2016a).

#### **Study Limitations and Implications for Future Research**

This study has several limitations. Firstly, this study does not address predictive effects of social support profiles and students' study wellbeing i.e. whether the change in social support is caused by the change in study wellbeing or vice versa. Previous research suggests that the interrelation between perceived social support and study wellbeing might be bidirectional (Hughes & Chen, 2011; Hughes et al. 2008; Rautanen et al., 2022a). Engaged students might be more responsive and eager for support as well as to provide and ask for help with studies compared to their less engaged peers. In turn, prolonged anxiety, cynicism and sense of inadequacy may add to students' risk of falling into a negative spiral, where negative study-related emotions and attitudes diminish the students' way to seek and provide support (e.g. Hughes & Chen, 2011). In this study, for example, moderately supported students' (Profile 2) increased symptoms of study-related exhaustion and inadequacy associated with increased risk to transit to the poorer social support profiles as time progress. More research is needed to achieve understanding the dynamic interrelation between students' social support and study wellbeing. Also, the possible mediators

(such as social competence) between different sources of support need to be studied further to better understand social support from different sources as a relational system (e.g. Ciarrochi et al., 2002; Elias & Haynes, 2008). In addition, to better understand the predictors of individual-level variability, it would be important to examine, for example, the effects of students' socioeconomic status on social support and study wellbeing in future research (e.g. Chen et al., 2018). Last, our study is based on students' self-reported support. The use of multiple informants and multiple methodologies to assess social processes would provide a more comprehensive perspective of social support and study wellbeing. It must also be taken account that the scales for teacher support and peer support have only tested among Finnish students (Rautanen et al., 2020, 2022a, 2022b; Soini et al., 2022; Ulmanen et al., 2022a, 2022b). Further validation of the scales in other countries and school systems is needed.

### **School Implications**

Teachers play a key role in the school context in contributing to students' study wellbeing not only directly, but also indirectly via encouraging peer support (Kiuru et al., 2015; Rautanen et al., 2020; Ulmanen et al., 2016b). Knowing this, teachers should be supported in forming a school environment that counteracts negative contextual factors such as unstable family conditions. That may require the development of pedagogical practices that enable teachers to better identify the individual needs of students and to provide support accordingly. For example, the facilitating of a peer culture that promotes sharing, care and encouragement, as well as advice and feedback among peers, would provide all students with an opportunity to practice social skills, enhance self-esteem and further engage in studying (see Pickens-Cantrell, 2016). Moreover, it would free up teachers' resources in their work to identify the individual needs of students and to provide support accordingly.

Finally, the longitudinal analysis showed that, students' school experience is at risk of changing to a significantly less positive situation in the middle phase of lower-secondary school studies, despite a positive beginning. The results also indicate the challenges associated with facing



the changing needs of young people in adolescence (Eccles & Roeser, 2011; Sawyer et al., 2018). It would be very important to support guardians and teachers to maintain positive relationships with students throughout the developmental stages when students face rapid physical, cognitive, and psychosocial growth (Sawyer et al., 2018). In other words, it is critical to build a support network that seeks to promote fitting social support from each potential source into to the changing individual needs of the students. For this to occur, the development of cooperation between home and school and between teachers in a school community serve as an important resource.

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**Table 1***Results from the Latent Profile Analyses and Latent Transition Analyses*

Model	LL	#fp	Scaling	CAIC	BIC	ABIC	entropy
<i>Longitudinal latent profile analysis</i>							
Configural similarity	-18300.02	78	1.3618	37250.77	37172.77	36924.99	.686
Structural similarity	-18341.08	42	1.4529	37032.56	36990.56	36857.14	.680
Dispersion similarity	-18353.75	36	1.6038	37007.84	36971.84	36857.48	.680
Distributional similarity	-18355.71	33	1.6017	36986.34	36953.73	36848.90	.681
Latent transition analyses	-4851.991	65	.7382	10246.26	10181.26	9974.77	.727
<i>Explanatory similarity for burnout indicators</i>							
Free relations with outcomes	-19889.34	128	1.1568	40846.56	40718.56	40311.93	.780
Invariant relations with outcomes	-19961.60	92	1.1207	40690.74	40598.74	40306.48	.782
<i>Explanatory similarity for engagement</i>							
Free relations with outcomes	-9655.87	86	.9894	20029.23	19943.23	19670.02	.768
Invariant relations with outcomes	-9682.47	74	.9357	19982.31	19908.31	19673.22	.763
<i>Predictive similarity</i>							
Null-effects model	-4814.53	65	.7379	10170.57	10105.57	9899.09	.728
Profile-specific free relations with pr.	-4763.41	140	.6441	10693.18	10553.18	10108.43	.733
Free relations with predictors	-4775.43	80	.8241	10217.34	10137.34	9883.20	.733
Invariant relations with predictors	-4783.36	70	.8437	10149.89	10079.89	9857.52	.730

*Note.* LL = Model LogLikelihood; #fp = Number of free parameters; Scaling = scaling factor; CAIC = the

Consistent Akaike Information Criterion; BIC = Bayesian Information Criterion; ABIC = the sample-size

adjusted BIC.

**Table 2***Transition Probabilities for the Latent Transition Analyses*

<i>Transition probabilities to Time 2 profiles</i>						
	Strong	Moderate	Low	Adult	Low teacher	Exceptionally low
<i>Time 1 profiles (n=1545)</i>						
Strong	.718	.216	.029	.010	.025	.002
Moderate	.167	.642	.100	.014	.061	.015
Low	.006	.327	.608	.000	.000	.059
Adult	.224	.413	.000	.302	.000	.061
Low teacher	.000	.124	.212	.000	.664	.000
Exceptionally low	.064	.143	.292	.000	.037	.465
<i>Transition probabilities to Time 3 profiles (n=1239)</i>						
	Strong	Moderate	Low	Adult	Low teacher	Exceptionally low
<i>Time 2 profiles (n=1293)</i>						
Strong	.559	.430	.000	.002	.006	.003
Moderate	.000	.760	.172	.000	.061	.008
Low	.025	.000	.856	.043	.041	.035
Adult	.000	.317	.160	.444	.000	.080
Low teacher	.039	.120	.000	.000	.775	.066
Exceptionally low	.000	.139	.368	.052	.000	.442



**Table 3***Results from Multinomial Logic Regression for The Effects of gender on Profile Membership*

<i>Variable</i>	Strong vs. Expect. low		Moderate vs. Expect. low		Low vs. Expect. low	
	Coef. (SE)	OR	Coef. (SE)	OR	Coef. (SE)	OR
Male	-.682 (.253)**	.506	-.721 (.249)**	.486	-.156 (.269)	.529
	Adult vs. Expect. low		Low teacher vs. Expect. low		Strong vs. Low teacher	
	Coef. (SE)	OR	Coef. (SE)	OR	Coef. (SE)	OR
Male	.652 (.449)	1.919	-1.411 (.322)**	.244	.729 (.229)**	2.073
	Moderate vs. Low teach.		Low vs. Low teacher		Adult vs. Low teacher	
	Coef. (SE)	OR	Coef. (SE)	OR	Coef. (SE)	OR
Male	.689 (.226)**	1.993	1.255 (.254)**	3.506	2.063 (.427)**	7.866
	Strong vs. Adult		Moderate vs. Adult		Low vs. Adult	
	Coef. (SE)	OR	Coef. (SE)	OR	Coef. (SE)	OR
Male	-1.334 (.380)**	.264	-1.373 (.380)**	.253	-.808 (.399)*	.446
	Strong vs. Low		Moderate vs. Low		Strong vs. Moderate	
	Coef. (SE)	OR	Coef. (SE)	OR	Coef. (SE)	OR
Male	-.526 (.141)**	.591	-.565 (.139)**	.568	.039 (.106)	1.040

*Notes.* \*\*:  $p \leq .002$ ; \*:  $p < .05$ . SE: standard error of the coefficient; OR: Odds Ratio. Female is the

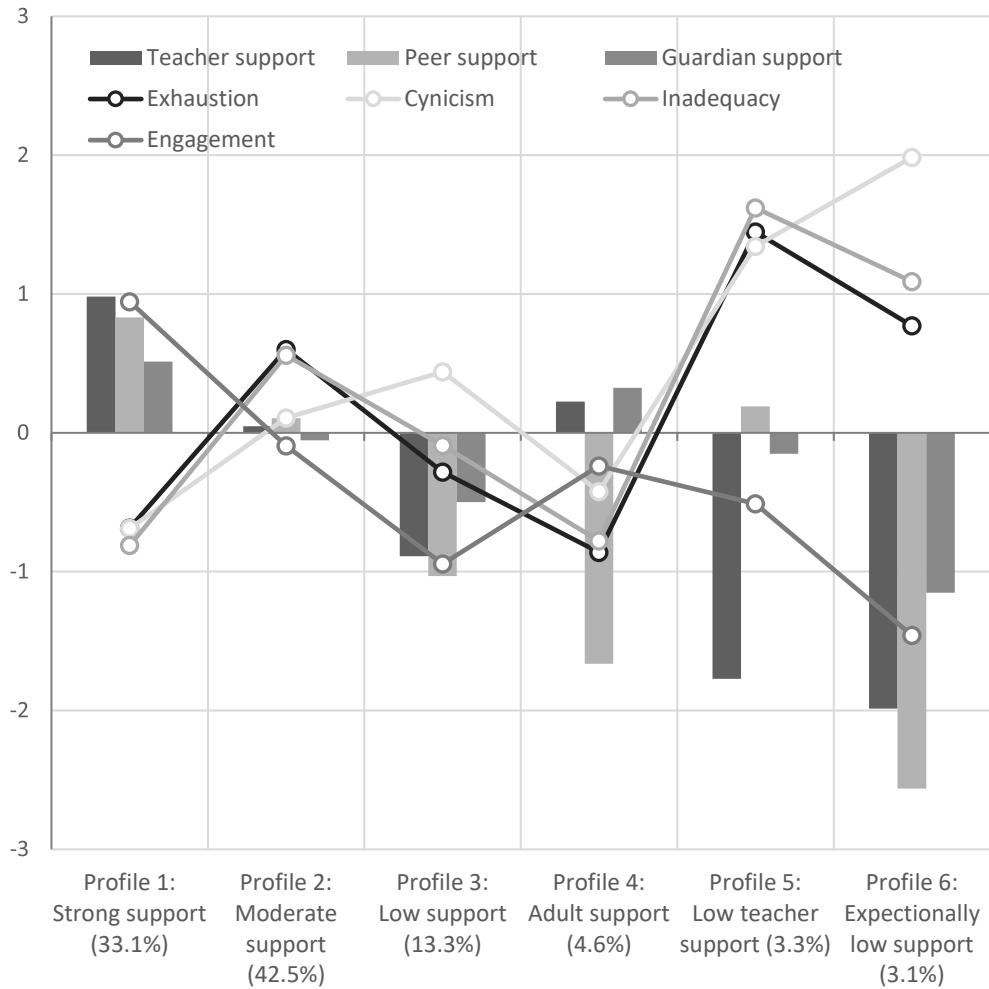
reference group for male. The coefficients and OR reflects the effects of the predictors on the

likelihood of membership into the first listed profile relative to the second listed profile.

**Figure 1**

*Latent Profiles Based on the Longitudinal Model of Distributional similarity and Outcome Levels*

*Across the Six Profiles at Each Time Point (N=1545)*



## Supplemental Material

### Development of Students' Social Support Profiles and Their Association With Students' Study

#### Wellbeing

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#### Sections

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**Table S1**

*Items for the Scales of Teacher Support, Peer Support, Guardian Support, Study Burnout, and Study Engagement*

Teacher support (11 items)
<ol style="list-style-type: none"> <li>1. My teachers give me encouragement and support.</li> <li>2. Problems are addressed in a constructive manner at my school.</li> <li>3. I am treated with respect.</li> <li>4. I often receive constructive feedback from teachers.</li> <li>5. I am treated equally.</li> <li>6. I can openly discuss problems related to my studies with teachers.</li> <li>7. I feel that my teachers appreciate the work I have done for my studies.</li> <li>8. The teachers are interested in my opinions.</li> <li>9. I feel that my teachers care about me.</li> <li>10. I often receive encouraging feedback from my teachers.</li> <li>11. The teachers listen to the students at my school.</li> </ol>
Peer support (10 items)
<ol style="list-style-type: none"> <li>1. I want to help others in their studies.</li> <li>2. My classmates' encouragement inspires me in my studies.</li> <li>3. I want my friends to do well in school.</li> <li>4. I have the courage to ask others for help with my studies.</li> <li>5. I have the courage to offer my friends help with their studies.</li> <li>6. I feel it is easy for others to ask me for help.</li> <li>7. I am sure that my classmates think of me as helpful.</li> <li>8. I support my friends in their studies.</li> <li>9. I know when my friends need help with their studies.</li> <li>10. I am able to encourage also the students who have a different attitude to studying than mine.</li> </ol>
Guardian support (7 item)
How often has an adult at home...
<ol style="list-style-type: none"> <li>11. wanted to see what kinds of homework you have?</li> <li>12. asked what you have been recently taught?</li> <li>13. asked how you are doing in your studies?</li> <li>14. asked if you need help with your homework or in preparing for an exam?</li> <li>15. told you that school is important?</li> <li>16. asked you if you are satisfied with your studying?</li> <li>17. praised you for doing well in your studies?</li> </ol>
Study burnout (7 items)
<ol style="list-style-type: none"> <li>1. I feel drowned by my school work.</li> <li>2. I feel like my studies are no longer important</li> <li>3. I feel inadequate in relation to my studies.</li> <li>4. I often sleep poorly due to issues with my school work.</li> <li>5. Going to school feels like a waste of time to me</li> <li>6. I spend a lot of time worrying about my studies outside of school time.</li> <li>7. I often feel that I am failing in my studies</li> </ol>
Study engagement (9 items)
<ol style="list-style-type: none"> <li>1. When I study, I feel like I am bursting with energy.</li> </ol>

- 
2. I find my studies to be full of meaning and purpose.
  3. Time flies when I'm studying.
  4. When studying, I feel strong and vigorous.
  5. I am enthusiastic about my studies.
  6. When I am studying, I forget everything else around me.
  7. My studies inspire me.
  8. When I get up in the morning, I feel like going to class.
  9. I can get carried away by my studies.
- 

### **Preliminary Confirmatory Factor Analyses**

Preliminary measurement models were estimated using Mplus 8.0 (Muthén & Muthén, 1998-2017). Confirmatory factor analysis (CFA) models were conducted separately for the latent variables of teacher support, peer support, guardian support, and study engagement. The burnout subscales including inadequacy, cynicism, and exhaustion were estimated in the same model. These first-order factors were first estimated separately for each time point (Time 1:  $n = 1493$ ; Time 2:  $n = 1292$ ; Time 3:  $n=1239$ ). Then, longitudinal models were estimated across three time points. All latent variables were allowed to correlate across time-points. The measurement invariance of the latent constructs over time was tested by assessing (1) configural invariance, (2) metric invariance, and (3) scalar invariance (Chen, 2007; Cheung & Rensvold, 2002).

Goodness-of-fit was evaluated using the following three absolute goodness-of-fit indices: (1) chi-squared test; (2) root mean square error of approximation (RMSEA); and (3) standardized root mean square residual (SRMR) (Chen, 2007; Cheung & Rensvold, 2002). Because the chi-squared test is sensitive to sample size, the use of relative goodness-of-fit indices is also strongly recommended in the case of large sample sizes (Bentler & Bonett, 1980). Consequently, the Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI) were also used to evaluate model fit. A  $\Delta CFI$  and  $\Delta TLI$  of .010 or less and a  $\Delta RMSEA$  of .015 or less between two subsequent models supports the invariance hypothesis (Chen, 2007; Cheung & Rensvold, 2002). The results from the estimated models are reported in Table S2 (at each time point, and longitudinally). These results showed that scalar invariance was supported for each scale.

**Table S2***Goodness-of-Fit Statistics of the Longitudinal Confirmatory Factor Analytic Models*

Model	$\chi^2(df)$	CFI	TLI	RMSEA	90% CI	$\Delta\chi^2(df)$	$\Delta$ CFI	$\Delta$ TLI	$\Delta$ RMSEA
<b>Teacher support</b>									
Time 1	370.49*(43)	.954	.941	.071	.065-.078				
Time 2	454.993*(43)	.943	.927	.087	.080-.094				
Time 3	426.579*(43)	.945	.930	.085	.078-.092				
M1	1914.08*(456)	.944	.935	.049	.046-.051	-	-	-	-
M2	1952.58*(476)	.943	.937	.048	.046-.050	24.993(20)	-.001	.002	-.001
M3	2065.97*(496)	.940	.936	.048	.046-.051	122.185*(20)	-.003	-.001	.000
<b>Peer support</b>									
Time 1	424.59*(33)	.927	.901	.088	.080-.095				
Time 2	350.51*(33)	.923	.895	.086	.078-.095				
Time 3	396.27*(33)	.917	.887	.094	.086-.103				
M1	1551.79*(366)	.929	.916	.049	.046-.051		-	-	-
M2	1579.99*(384)	.929	.916	.048	.046-.050	24.580(18)	.000	.000	.000
M3	1652.99*(402)	.926	.919	.048	.046-.050	72.621*(18)	-.003	.003	.000
<b>Guardian support</b>									
Time 1	138.72*(14)	.952	.929	.076	.065-.088				
Time 2	134.44*(13)	.950	.919	.085	.072-.098				
Time 3	136.30*(13)	.953	.925	.088	.075-.101				
M1	617.97*(165)	.955	.943	.045	.041-.049	-	-	-	-
M2	650.89*(177)	.953	.944	.044	.041-.048	30.723*(12)	-.002	.001	-.001
M3	736.76*(189)	.946	.940	.046	.043-.050	93.999*(12)	-.007	-.004	.002
<b>Burnout (three factor model)</b>									
Time 1	128.11*(10)	.955	.904	.089	.076-.103				
Time 2	138.10*(9)	.975	.941	.073	.057-.089				
Time 3	136.54*(10)	.953	.902	.102	.087-.117				
M1	508.69*(129)	.965	.943	.047	.042-.051		-	-	-
M2	586.47*(140)	.959	.938	.049	.044-.053	80.637*(11)	.000	.002	.000
M3	631.80*(148)	.955	.936	.049	.045-.053	47.336(8)	-.004	-.002	.002
<b>Study engagement (one-factor model)</b>									
Time 1	241.89*(27)	.964	.952	.073	.065-.082				
Time 2	188.95*(27)	.970	.960	.069	.060-.078				
Time 3	231.92*(27)	.983	.960	.065	.049-.082				
M1	972.61*(294)	.968	.962	.041	.038-.044	-	-	-	-
M2	1022.75*(310)	.966	.962	.041	.038-.044	49.178*(16)	-.002	.000	.000
M3	1093.59*(326)	.964	.961	.042	.039-.044	74.038*(16)	-.002	-.001	.001

*Note.* M1 = Baseline model, M2 = Factor loadings constrained equal, M3 = Measurement intercepts constrained equal;  $\chi^2$  = chi-squared test of exact fit; *df* = degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = root mean square error of approximation; 90% CI = 90% confidence interval of the RMSEA;  $\Delta\chi^2$  = chi-square difference test, \**p*<.01.

**Table S3***Observed Variables Correlations, their Means and Standard deviations*

Variables	N	Correlations																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1 Teacher support T1	1493	-																				
2 Teacher support T2	1272	.57	-																			
3 Teacher support T2	1234	.47	.64	-																		
4 Peer support T1	1541	.59	.33	.25	-																	
5 Peer support T2	1293	.36	.55	.33	.57	-																
6 Peer support T3	1239	.27	.36	.49	.46	.61	-															
7 Guardian support T1	1543	.35	.19	.17	.31	.18	.20	-														
8 Guardian support T2	1292	.22	.33	.24	.16	.28	.22	.59	-													
9 Guardian support T3	1237	.15	.16	.30	.12	.16	.29	.54	.66	-												
10 Engagement T1	1491	.59	.38	.30	.55	.34	.27	.35	.25	.20	-											
11 Engagement T2	1272	.34	.59	.39	.30	.50	.31	.21	.35	.18	.58	-										
12 Engagement T3	1234	.27	.36	.51	.23	.29	.45	.19	.24	.29	.49	.63	-									
13 Exhaustion T1	1490	-.33	-.28	-.23	-.13	-.13	-.11	-.10	-.15	-.11	-.28	-.24	-.18	-								
14 Exhaustion T2	1272	-.24	-.30	-.22	-.02	-.05	-.03	-.05	-.14	-.09	-.15	-.21	-.15	.52	-							
15 Exhaustion T3	1234	-.17	-.19	-.25	.05	.02	.03	-.61	-.12	-.13	-.09	-.10	-.17	.43	.56	-						
16 Cynicism T1	1492	-.42	-.33	-.27	-.42	-.36	-.31	-.26	-.17	-.15	-.52	-.41	-.30	.43	.16	.07	-					
17 Cynicism T2	1272	-.32	-.47	-.30	-.32	-.42	-.30	-.17	-.22	-.10	-.39	-.56	-.36	.29	.35	.11	.55	-				
18 Cynicism T3	1233	-.27	-.35	-.40	-.24	-.29	-.37	-.21	-.22	-.25	-.30	-.37	-.51	.25	.26	.35	.42	.52	-			
19 Inadequacy T1	1482	-.39	-.32	-.25	-.23	-.24	-.20	-.15	-.17	-.14	-.37	-.31	-.22	.66	.36	.27	.53	.34	.27	-		
20 Inadequacy T2	1271	-.31	-.38	-.25	-.15	-.20	-.17	-.10	-.16	-.08	-.26	-.34	-.23	.42	.66	.37	.30	.52	.35	.47	-	
21 Inadequacy T3	1233	-.25	-.29	-.35	-.05	-.09	-.13	-.12	-.17	-.20	-.20	-.25	-.31	.38	.45	.70	.21	.26	.50	.39	.51	-
Mean		4.8	4.61	4.51	5.13	5.09	4.98	3.76	3.59	3.53	3.71	3.55	3.38	3.39	3.62	3.77	2.64	2.68	2.67	3.25	3.45	3.58
SD		1.26	1.35	1.29	1.16	1.15	1.16	.78	.81	.85	1.36	1.32	1.3	1.52	1.55	1.63	1.57	1.63	1.61	1.58	1.65	1.71
Scale		1-7	1-7	1-7	1-7	1-7	1-7	1-5	1-5	1-5	1-7	1-7	1-7	1-7	1-7	1-7	1-7	1-7	1-7	1-7	1-7	1-7

*Note.* All correlations were statistically significant at the  $p < .05$  level.

### Latent Profile Analysis

To ensure that the same number of social support profiles would be identified at each of the time points we conducted a latent profile analysis (LPA) for each time wave separately (Berlin et al., 2014). The mean scores of social support indicators (including teacher support, peer support and guardian support) were used as profile indicators. For each time wave, we examined solutions including 1 to 9 latent profiles. To determine the most appropriate number of latent profiles, we examined theoretical conformity and the substantive meaning of the profiles as well as statistical compatibility of the profile solution with the data. Firstly, several statistical fit indices were applied to determine the most appropriate number of latent profiles. The subsequent models were compared with the Vuong-Lo-Mendell-Rubin (VLMR) likelihood ratio test, the Lo-Mendell-Rubin adjusted likelihood ratio test (aLRT), and the bootstrapped likelihood ratio test (BLRT). A statistically significant test result ( $p < .05$ ) indicates that a model with  $k$  classes fits the data better than a model with one latent class fewer, i.e.,  $k-1$  classes (Nylund et al., 2007). Secondly, Consistent Akaike (CAIC), Bayesian (BIC), and sample-size Adjusted BIC (ABIC) information criteria were employed to examine the goodness-of-fit of the model with the data (Bauer & Curran, 2003; Nylund et al., 2007). Lower values in these fit indices indicate better model fit. However, due to the large data size, the information criteria may support the addition of new profiles without reaching the minimum value (Morin et al., 2016). Therefore, graphs formed from information criteria ("elbow plots") were utilized in the selection of a suitable profile solution. According to Morin and his colleagues (2011), the optimal solution can be identified from a plateau of graphs, i.e. from the location after which decrease of information criteria become negligible. When interpreting the results, it should be noted that these indicators may not clearly support the choice of a particular profile solution. The simulation studies indicate that BIC, CAIC, and aLRT tend to underestimate the number of classes, whereas the ABIC and BLRT tend to overestimate it (Diallo et al., 2017). Further, the entropy values were examined. They assess the accuracy with which models classify individuals into their most likely class



ranging from 0 to 1, with higher scores representing better distinction between latent profiles (Nylund et al., 2007).

The results of the information criteria and statistical significance for the different profile solutions at three different time points are presented in Table S4 and in Figures S1, S2 and S3. The graphs show that the values of CAIC and BIC reach the minimum value for 5 and 6 profiles, and ABIC decreased continuously (at T1 and T2) or up to the eighth profile solution (at T3). Moreover, the statistical significance of BLRT was maintained at each time point until at least the sixth profile solution. Accordingly, profile solutions from five to seven were selected for further content review.

The model of the five profile solutions included profiles in which social support from different sources was experienced at a very low, low, moderate, or high level. In addition, the model included a profile in which teacher support was rated as low but peer support and guardian support as strong. Compared to the five-profile solution, the addition of a sixth profile identified a theoretically and substantively interesting profile, where peer support was perceived as very low and adult support as quite strong. In contrast, the addition of the seventh profile no longer brought additional information but divided the low teacher support profile into smaller parts, so that the profiles were distinguished only by the number of students belonging to it. In conclusion, theoretical and substantive examination along with information criteria gave the most solid indication of the six-class model at each time point.

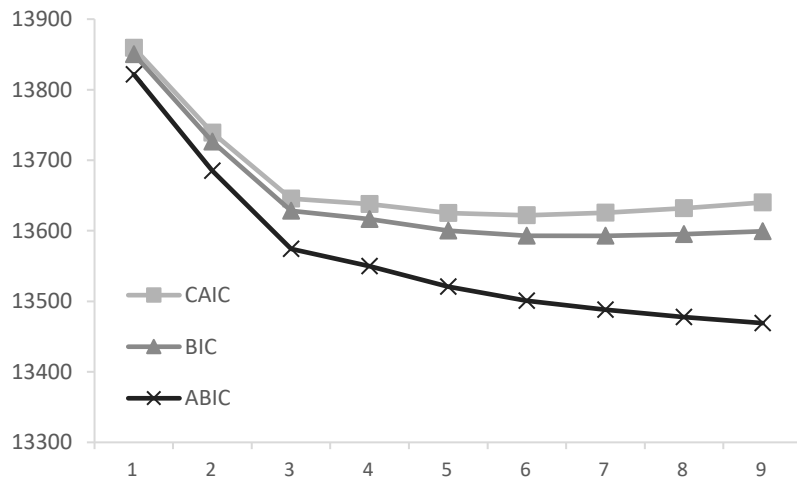
**Table S4***Results from the Latent Profile Analysis Model Estimated Separately at Each Time Point*

M	LL	#fp	Scaling	CAIC	BIC	ABIC	Entropy	VLMR	aLRT	BLRT
<i>Time 1 (n=1543)</i>										
1	-6892.15	9	1.2264	13859.39	13850.39	13821.80	N/A	N/A	N/A	N/A
2	-6815.35	13	1.1969	13739.15	13726.15	13684.85	.776	.000	.000	.000
3	-6751.79	17	1.2804	13645.41	13628.41	13574.40	.803	.000	.000	.000
4	-6731.22	21	1.3045	13637.63	13616.63	13549.92	.827	.090	.097	.000
5	-6708.26	25	1.3142	13625.10	13600.10	13520.68	.784	.098	.105	.000
6	-6689.96	29	1.2445	13621.87	13592.87	13500.74	.789	.032	.035	.000
7	-6675.22	33	1.3202	13625.76	13592.76	13487.92	.791	.260	.273	.000
8	-6661.70	37	1.3591	13632.09	13595.09	13477.55	.796	.449	.458	.000
9	-6649.11	41	1.5087	13640.28	13599.28	13469.03	.801	.762	.769	.000
<i>Time 2 (n=1293)</i>										
1	-5971.75	9	1.1355	12016.97	12007.97	11979.38	N/A	N/A	N/A	N/A
2	-5907.49	13	1.3959	11921.13	11908.13	11866.83	.822	.035	.039	.000
3	-5853.26	17	1.3519	11845.31	11828.31	11774.31	.766	.006	.007	.000
4	-5828.88	21	1.3023	11829.22	11808.22	11741.51	.764	.137	.143	.000
5	-5806.54	25	1.1758	11817.20	11792.20	11712.79	.752	.003	.003	.000
6	-5793.51	29	1.2258	11823.80	11794.80	11702.68	.767	.267	.277	.000
7	-5781.45	33	1.2648	11832.34	11799.34	11694.52	.737	.291	.301	.000
8	-5772.99	37	1.2110	11848.07	11811.07	11693.54	.747	.363	.371	.095
9	-5762.49	41	1.1347	11859.74	11818.74	11688.50	.738	.124	.133	.013
<i>Time 3 (n=1239)</i>										
1	-5819.07	9	1.1282	11711.24	11702.24	11673.65	N/A	N/A	N/A	N/A
2	-5763.76	13	1.1176	11633.11	11620.11	11578.82	.863	.000	.000	.000
3	-5732.20	17	1.2192	11602.47	11585.47	11531.47	.786	.008	.009	.000
4	-5712.90	21	1.1297	11596.36	11575.36	11508.65	.830	.005	.006	.000
5	-5697.95	25	1.1635	11598.95	11573.95	11494.54	.720	.080	.087	.000
6	-5688.70	29	1.2006	11612.93	11583.93	11491.82	.736	.282	.293	.000
7	-5681.86	33	1.3216	11631.75	11598.75	11493.93	.707	.652	.660	.064
8	-5673.30	37	1.1553	11647.11	11610.11	11492.59	.758	.394	.404	.040
9	-5667.66	41	1.1670	11627.31	11627.31	11497.08	.682	.421	.426	.333

*Note.* M = Model; LL = Model LogLikelihood; #fp = Number of free parameters; Scaling = scaling factor; CAIC = Consistent Akaike Information Criterion; BIC = Bayesian Information Criterion; ABIC = the sample-size adjusted BIC; VLMR = Vuong-Lo-Mendell-Rubin likelihood ratio test, aLRT = Lo-Mendell-Rubin Adjusted Likelihood ratio test; BLRT = Bootstrap Likelihood ratio test.

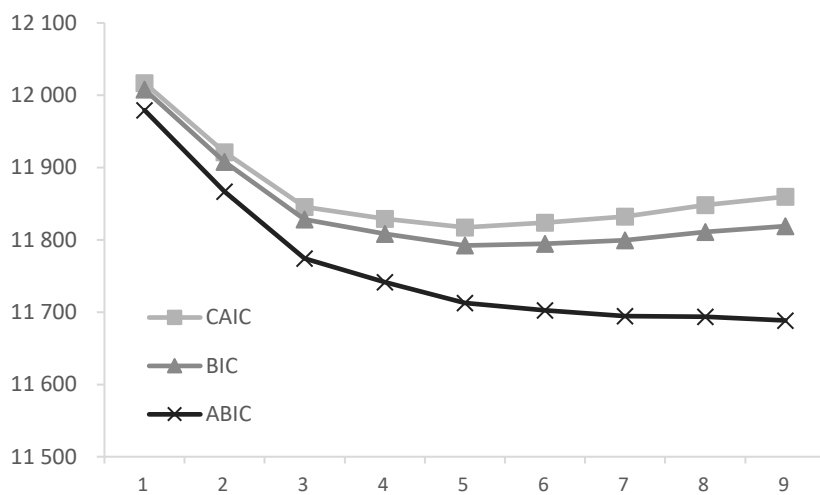
**Figure S1**

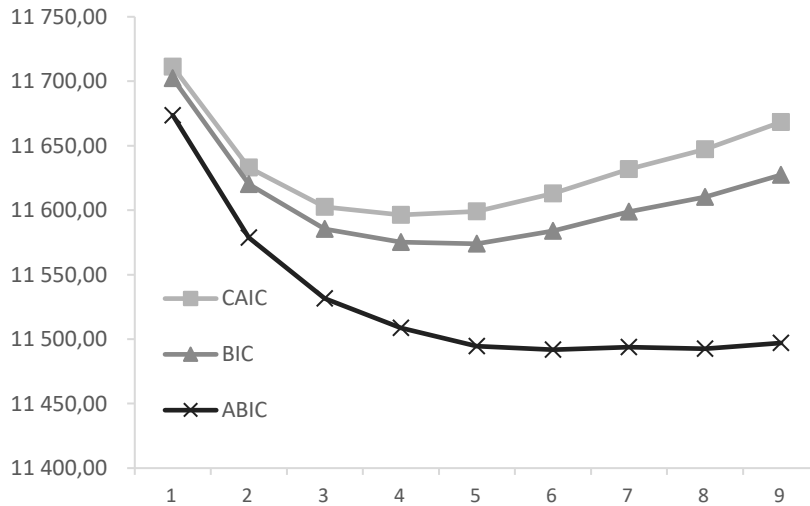
*Elbow Plot of the Information Criteria for the Latent Analyses at Time 1*



**Figure S2**

*Elbow Plot of the Information Criteria for the Latent Analyses at Time 2*



**Figure S3***Elbow Plot of the Information Criteria for the Latent Analyses at Time 3***Table S5***Detailed Results from the Final Model of Longitudinal Latent Profile Analysis (Distributional Similarity)*

Profiles	Teacher support		Peer support		Guardian support	
	Mean	CI	Mean	CI	Mean	CI
Strong	.981 <sub>1</sub>	.894; 1.068	.832 <sub>1</sub>	.720; .943	.513 <sub>b</sub>	.433; .593
Moderate	.049 <sub>b</sub>	-.058; .154	.105 <sub>a</sub>	.011; .199	-.054 <sub>c</sub>	-.122; .015
Low	-.889 <sub>1</sub>	-1.212; -.567	-1.031 <sub>1</sub>	-1.160; -1.031	-.499 <sub>a</sub>	-.643; -.499
Adult	.225 <sub>b1</sub>	-.416; .867	-1.662	-2.156; -1.168	.324 <sub>b1</sub>	-.045; .692
Low teacher	-1.771 <sub>a</sub>	-1.904; -1.638	.190 <sub>a1</sub>	-.341; .722	-.151 <sub>ac1</sub>	-.384; .082
Exceptionally low	-1.987 <sub>a1</sub>	-2.176; -1.798	-2.562 <sub>1</sub>	-2.896; -2.228	-1.151	-1.425; -.876

*Note.* Indicators are factor scores with the mean of 0 and a standard deviation of 1; CI=95% Confidence Interval.

Means within a column sharing the same letter and means within a row sharing the same number are not significantly different at the  $p < .05$  level.

**Table S6***Differences in mean values of outcomes between profiles*

	Exhaustion		Cynicism		Inadequacy		Study Engagement	
	Mean	CI	Mean	CI	Mean	CI	Mean	CI
Strong	-.685	-.745; -.626	-0.689	-.720; -.657	-.811 <sub>a</sub>	-.856; -.767	.945	.872; 1.018
Moderate	.602 <sub>a</sub>	.511; .692	.109	.001; .216	.559	.462; .656	-.094 <sub>a</sub>	-.158; -.030
Low	-.282	-.455; -.108	0.441	.114; .767	-.092	-.334; .150	-.943 <sub>c</sub>	-1.070; -.815
Adult	-.860	-.959; -.761	-0.422	-.556; -.289	-.779 <sub>a</sub>	-.905; -.653	-.238 <sub>abc</sub>	-.980; .504
Low teacher	1.447	1.313; 1.581	1.344	1.091; 1.597	1.621	1.527; 1.714	-.511 <sub>b</sub>	-.774; -.249
Except. low	.772 <sub>a</sub>	.338; 1.206	1.984	1.785; 2.184	1.090	.745; 1.435	-1.458	-1.593; -1.324

*Note.* Indicators are factor scores with a mean of 0 and a standard deviation of 1; CI=95% Confidence Interval.

Means within a column sharing the same subscripts are not significantly different at the  $p < .05$  level.

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