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The Relationship Between Student Well-Being and Teacher–Student and Student–Student Relationships: A Longitudinal Approach Among Secondary School Students in Switzerland

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Abstract: The rapid changes in today's world pose a great challenge to student well-being, especially in secondary school, where age-related transitions occur. Many school systems have recognized the importance of fostering both academic achievement and student well-being. Classroom relationships with teachers and peers play a key role in students' academic, social, and emotional development, yet little is known about their longitudinal and reciprocal effects on well-being. This study adopts a multidimensional approach to student well-being, examining its relations with teacher–student closeness and conflict, as well as student–student cohesion, using two waves of data one year apart in a structural equation model (SEM). The participants were Grade 7 (N = 757) and Grade 8 (N = 720) students in Switzerland. The findings reveal no significant associations between student well-being, teacher–student closeness, and peer cohesion. However, teacher–student conflict at measurement point 1 is positively associated with physical complaints and social problems at measurement point 2, while a positive academic self-concept negatively predicts teacher–student conflict over time. These results highlight the impact of teacher–student conflict on student well-being and suggest enhancing the academic self-concept could help mitigate such conflicts. Insights into these relations can help educators and researchers identify and develop useful strategies for promoting student well-being.

Keywords: student well-being; teacher–student relationships; student–student relationships; longitudinal design; structural equation modeling; secondary school

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1. Introduction

Given the rapidly changing and increasingly complex world, coupled with the uncertainties of the future and a rise in mental health problems worldwide (OECD, 2023), well-being has become a priority in both scientific and political agendas. As children and adolescents spend a considerable amount of time in school, the academic environment is likely to have a profound impact on their well-being.

Schools play a crucial role in promoting positive cognitive, emotional, and social experiences, contributing to students' learning and personal growth. Yet, the school environment can also create scenarios fostering negative emotions, including academic disenchantment, educational anxiety, and peer victimization (Tobia et al., 2019). While there is consensus on the importance of student well-being, research on the topic remains

disparate, with a wide variety of definitions and constructs used in academic and policy communities. To address well-being in educational settings, it is necessary to adopt a school-specific perspective, as well-being in school and general subjective well-being may not be identical. Additionally, the multifaceted nature of well-being should be considered by applying a multidimensional construct that considers both students' subjective positive and negative experiences in the school environment, including emotional, cognitive, and physical elements (Hascher, 2007; Putwain et al., 2020).

Satisfying the basic human need for relatedness is key to student well-being across cultures and developmental stages (Martela & Sheldon, 2019) but appears to be particularly important during adolescence when critical attitudes toward school and teaching increase (De Fraine et al., 2005; Eccles et al., 1991). Furthermore, after the transition to secondary school, students encounter the difficulty of entering an entirely new school environment shaped by new social relationships with both teachers and peers. Positive relationships with teachers and classmates contribute to the fulfillment of basic human needs (Ryan & Deci, 2000) and are associated with a wide range of positive outcomes, including increased overall well-being (B. Chen et al., 2015) and reduced mental health problems (Ye et al., 2022). Conversely, negative classroom relationships can lead to higher depressive symptoms (Schwab & Rossmann, 2020) and ill-being (Costa et al., 2015). The coexistence of both types and the interrelated and dynamic nature of relationships in the classroom is suggested by numerous empirical and theoretical frameworks (e.g., Bowlby, 1969; Bronfenbrenner & Morris, 2006; Hughes et al., 2001; Hughes & Chen, 2011). However, research on teacher–student relationships and student–student relationships has largely been conducted in separate lines, applying a multitude of different terms. In Figure S1, we provided a comprehensive overview of the articles included in the fields of student well-being and social relationships, while Figure S2 illustrates a detailed analysis of the predominant terminology utilized in the fields of student well-being and social relationships (see Supplementary Materials).

To date, there has been a limited amount of longitudinal research examining the reciprocal relationship between teacher–student relationships and student–student relationships while considering a multidimensional approach to student well-being, including both positive and negative aspects of the school-related experiences after students have transitioned to secondary school.

To provide an overview of the literature included, Figure S1 provides an overview of the articles included and Figure S2 provides an overview of the main terms used in the field.

The present study seeks to illuminate these intricate dynamics among the various dimensions of student well-being, teacher–student relationships, and student–student relationships. Such an analysis is essential not only to enrich the existing research corpus but also to identify potential interventions aimed at supporting and enhancing student well-being, thereby equipping students to navigate and thrive in the challenges of the future world.

1.1. Student Well-Being

Past research has enriched well-being studies by introducing concepts such as happiness, joy, and life satisfaction, along with the absence of negative emotions and complaints (Diener, 1984; Ryff, 1989; Seligman, 2011). Subsequently, subjective well-being has been conceptualized as a supra-term for positive emotions such as enjoyment, satisfaction, an emotional state of feeling well, or as a multidimensional concept combining cognitive and emotional factors (Hascher, 2010). The increasing emphasis on well-being in the school context has made conceptual ambiguity even more salient. Although there is no unanimous definition of student well-being (StudWB), it is generally recognized that enjoyment and/or happiness are fundamental components and that subjective well-being and StudWB may

not be identical (Hascher, 2004). In accordance with previous works (e.g., Pollard & Lee, 2003) and acknowledging the intricate and multifaceted aspects of StudWB, Hascher (2003) proposed a multidimensional model, highlighting the necessity to account for the complexity of subjective well-being within the school environment. StudWB is understood as the predominance of positive emotions and cognitions toward school life and the entire school context over the negative ones. The model is composed of three positive dimensions (i.e., positive attitudes toward school, enjoyment in school, and positive academic self-concept) and three negative dimensions (i.e., worries in school, physical complaints in school, and social problems in school) as indicators of StudWB (Hascher, 2003). Using this model provides the opportunity to move beyond a one-dimensional perspective on StudWB and explore diverse relationships with various facets of StudWB, thereby acknowledging that students may encounter a wide range of different experiences and emotions in school.

Being in a school environment that does not fulfill students' individual needs may lead to adverse behavioral and motivational outcomes (Eccles et al., 1991). This issue becomes particularly pronounced in secondary education, where StudWB tends to decline (Gunnell et al., 2013; Pietarinen et al., 2014). In the Swiss education system, students enter secondary education in 7th grade, facing changes in their social environment due to new teachers and the need to form new peer relationships. Eighth-grade students face important decisions regarding their professional path, including choosing a profession, securing an apprenticeship, or selecting an upper secondary school. These choices depend on both individual characteristics and academic performance, as well as institutional constraints (school type at the lower secondary level) (BKD, 2022), which might heighten negative emotions in school (Kuusi et al., 2024; Morinaj & Hascher, 2022; Morinaj & Held, 2023; Widlund et al., 2024). Drawing on Bronfenbrenner's (1977) ecological systems theory, at the microsystem level, teachers and peers in the classroom setting directly affect students' experiences in the school environment. Positive relationships with teachers and peers can serve as a buffer against the heightened cognitive and emotional challenges in secondary education (M. B. Bukowski et al., 1993; Eccles & Roeser, 2011; Rubin et al., 2009). On the contrary, the absence of close and warm relationships with teachers can be associated with lower fulfillment in school and self-belief (Bakadorova & Raufelder, 2018; Siedlecki et al., 2014), lower self-evaluations (Williamson & Clark, 1989), and higher levels of stress (Finch et al., 1999). Therefore, classroom relationships can be seen as consistently strong predictors of StudWB (Diener & Seligman, 2002). However, the nature of this interaction may be bidirectional. Students with higher levels of well-being may also have more friends at school and could potentially positively influence the behavior of others, which in turn may have a positive effect on the dynamics of relationships in the classroom (Moore et al., 2018).

1.2. Teacher–Student Relationships

Teacher–student relationships (TSRs) are usually considered to be one of the most important yet complex interpersonal relationships in the classroom context (Robinson, 2022). Social interactions, particularly throughout critical developmental phases like adolescence, can be determinants of successful behavioral (Baker et al., 2008), educational (Cornelius-White, 2007; García-Moya, 2020; Roorda et al., 2017), and emotional (Jennings & Greenberg, 2009; Roeser et al., 2000) outcomes.

According to self-determination theory, the need for relatedness is a basic human need that is essential for personal development (Ryan & Deci, 2000). The theory assumes that students are motivated and have a desire for self-realization and self-growth when the three basic psychological needs (e.g., autonomy, competence, and relatedness) are met (Baumeister & Leary, 1995; Ryan & Deci, 2017).

As postulated by attachment theory (Bowlby, 1969), teachers can be viewed as a secondary or extended attachment bond (Pianta, 1999; Pianta et al., 2003; Verschueren & Koomen, 2012). They offer a secure base that facilitates students' enjoyment of learning and the realization of their potential and aspirations (Verschueren, 2015) and provides support during times of hardship (Hamre & Pianta, 2001). Although the structure of secondary school presents a challenge for the development of close TSRs due to the increased number of different teachers and a corresponding reduction in interaction time (Eccles & Roeser, 2009), close relationships with teachers seem to have an even stronger correlation with students' learning behavior and motivation than in primary school (Jagenow et al., 2015; Roorda et al., 2011).

TSRs can be assessed by teachers' and/or students' perceptions of positive and negative relational aspects such as closeness and conflict (Koomen & Jellesma, 2015). Considering the student perspective can offer a more nuanced comprehension of classroom relationship dynamics and their impact on StudWB, especially when both TSRs and student–student relationships are considered (Endedijk et al., 2021; Roza et al., 2021). In a dyadic TSR, closeness refers to the sense of warmth and security, including the ease with which students seek support from teachers. Conflict, on the other hand, measures the degree of negativity, resistance, and lack of rapport. Thus, a high-quality TSR is characterized by both increased closeness and minimal conflict (Koomen & Jellesma, 2015; Verschueren & Koomen, 2012) and is closely associated with students' positive development and well-being (Hoferichter & Raufelder, 2022; Mainhard et al., 2018; Sabol & Pianta, 2012; Zhou et al., 2020). In addition, recent meta-analyses have shown that high-quality TSRs are associated with StudWB, alongside learning engagement and academic achievement (Lei et al., 2018; Roorda et al., 2011, 2017; Quin, 2017). A few longitudinal studies have reported positive, reciprocal relations between the quality of TSRs and StudWB (Bakadorova & Raufelder, 2018; Siedlecki et al., 2014). TSRs and StudWB may form a reciprocal negative cycle (Miller-Lewis et al., 2014), in which students with low well-being have difficulty forming positive relationships with their teachers and experience more conflict, which, in turn, lowers their well-being (Doumen et al., 2008; Zhang & Sun, 2011).

1.3. Student–Student Relationships

Student–student relationships (SSRs) are presumed to fulfill students' need for belongingness (Baumeister & Leary, 1995; Kiefer et al., 2015) and need for relatedness (Ryan & Deci, 2000), both of which are considered fundamental and inherent desires essential for human development and well-being.

Unlike relationships with parents and teachers, SSRs tend to be more reciprocal, less hierarchical, and thus serve as a foundation for students' emotional development (W. M. Bukowski et al., 2018; De Wit et al., 2011). During adolescence, gaining independence from parents and other adults represents a developmental task, engendering students to increasingly value their peers' opinions, feedback, and support (Erikson, 1968; Rubin et al., 2006). This time is marked by a heightened concern over obtaining peer acceptance and fostering a sense of belonging (Brown & Larson, 2009; Ragelienė, 2016; Sullivan, 1953). Moreover, in secondary education, SSRs could even surpass the significance of TSRs, given students' increased independence and exposure to multiple teachers, in contrast to the primary school level, where the focus on one teacher predominates (Buhrmester & Furman, 1987; Hargreaves, 2000; Lynch & Chicchetti, 1997).

SSRs can be defined by the reported cohesion among students (Santos et al., 2014). According to Schiefer and van der Noll (2017), social cohesion, as a multidimensional construct, refers to the quality of collective togetherness within a group, with social relations as the predominant aspect. Thus, classroom cohesion embodies the overall sense of belonging, collaboration, and supportive connections among classmates (Osterman, 2000; Schiefer & van der Noll, 2017).

In addition to theoretical assumptions (Baumeister & Leary, 1995; Ryan & Deci, 2000), empirical evidence suggests that positive classroom interactions are associated with positive attitudes toward school, school satisfaction, enjoyment (Thapa et al., 2013; Zullig et al., 2011), and StudWB (Graham et al., 2016; Schmidt et al., 2019), whereas feelings of rejection and exclusion decrease StudWB (Patalay & Fitzsimons, 2016) and increase negative emotions and depression (Kornienko & Santos, 2014; Östberg, 2003; Weber et al., 2010), even in the context of e-learning (Abuhassna et al., 2022).

However, the associations may differ across dimensions of StudWB, as some studies have found SSRs to be related to positive aspects of StudWB, but not to negative aspects (Martin & Huebner, 2007; Véronneau et al., 2005). Longitudinal studies suggest that peer acceptance may not only have short-term effects on StudWB but may also predict future peer adjustment difficulties (Klima & Repetti, 2008) and, thus, lower StudWB (King, 2015). Equally, StudWB appears to be beneficial for positive SSRs because it fosters students' social competence (Holopainen et al., 2012) and may elicit positive reactions from peers, thereby positively influencing the quality of their relationships (Kiuru et al., 2020; Konu et al., 2002). However, empirical evidence also suggests that academic engagement and a positive academic self-concept may be negatively associated with a student's standing among peers, because other students may view it as an opportunity to create a boundary between themselves and adult authority figures (Ishiyama & Chabassol, 1985; Preckel et al., 2013). Although there are a few longitudinal studies examining the relations between SSRs and StudWB, they mostly focus on negative social experiences such as victimization and bullying (e.g., Morrow et al., 2014; Nishina & Juvonen, 2005; Nishina, 2012), or do not apply a multidimensional approach to StudWB (Lehman & Repetti, 2007).

1.4. Linking Teacher–Student Relationships and Student–Student Relationships

At the microlevel, teachers and students interact in a variety of ways, leading to a complexity of social interactions in the classroom that requires linking these relationships. Drawing from attachment theory (Bowlby, 1969), the TSR may influence the quality of a student's peer relationships through the student's expectations and beliefs about relationships. A high-quality TSR offers security and confidence in the ability to build meaningful connections with other students in the classroom (Hamre & Pianta, 2001; Troop-Gordon & Kuntz, 2013; Verschueren & Koomen, 2012). If the TSR lacks closeness or is characterized by conflict, students are less likely to seek support from their teacher. As students may not be able to solve problems on their own, they run the risk of encountering more social problems in the classroom (Pianta et al., 2003). Teachers can also serve as a learning environment where students develop behavioral repertoires to apply in their interactions with peers (Bandura, 1971). Specifically, students who have difficulty forming peer relationships may benefit from learning improved social skills from their teachers, who can serve as role models for appropriate interactive behavior (Whitby et al., 2012). However, a low-quality TSR can result in students paying less attention to their teachers' behavior and not seeing them as role models for other forms of relationships (Bandura, 1971).

A few existing studies considering both TSRs and SSRs (J. Chen et al., 2020; Hughes & Im, 2016; Liu et al., 2016; C. Wang et al., 2016) suggest that closeness in TSRs can be associated with students' social competencies, peer acceptance (Pianta et al., 2003), prosocial behavior (Wu & Zhang, 2022), and peer support (J. Chen et al., 2020). Students who have close relationships with their teachers may receive more emotional support, which can contribute to their social development, whereas conflict may contribute to peer dislike and dissocial behavior (Hamre & Pianta, 2001; Hughes & Im, 2016). Conflict in TSRs could be even more strongly associated with SSRs, as negative TSRs may stand out more in the classroom than positive ones (Hendrickx et al., 2017b; Huber et al., 2018; McAuliffe

et al., 2009), thus casting a more negative light on a student (Hendrickx et al., 2017a). Additional empirical findings indicate that the relation between TSRs and SSRs may also be reversed (Mercer & DeRosier, 2008). More precisely, positive SSRs can result in increased engagement and cooperative participation in class (Ladd et al., 1999; Zimmer-Gembeck et al., 2006), as well as improved academic self-concept (Bush, 2005; Flook et al., 2005), which may, in turn, nourish positive TSRs (Hughes & Chen, 2011).

To the best of our knowledge, our study is the first to attempt to reflect this complexity in the interplay between the TSR, SSR, and different dimensions of StudWB over time. By examining the various dimensions of StudWB in combination with TSRs and SSRs over time, the present study contributes to a more comprehensive understanding of the interrelationship between these constructs. Additionally, it provides practical implications by identifying which dimensions of StudWB could be fostered by teachers to enhance students' positive emotions and cognitions within the school setting.

1.5. The Present Study

The purpose of the study was to obtain a greater understanding of the reciprocal relationship between StudWB, TSRs, and SSRs over two measurement points on the basis of students' perceptions. The following research questions were investigated:

(1) How do StudWB, closeness and conflict in TSRs, and cohesion in SSRs interact with each other over time?

Based on the literature examining the cross-sectional as well as the longitudinal associations between StudWB, TSRs, and SSRs, we expect the positive dimensions of StudWB (i.e., positive attitudes toward school, enjoyment in school, and positive academic self-concept) to positively predict the closeness in TSRs and cohesion in SSRs (Hypothesis 1.1). We assume that the negative dimensions of StudWB (i.e., worries in school, physical complaints in school, and social problems in school) have opposite relations to closeness in TSRs and cohesion in SSRs (Hypothesis 1.2). We expect closeness in TSRs and cohesion in SSRs to positively predict the positive dimensions (Hypothesis 1.3) and negatively predict the negative dimensions (Hypothesis 1.4) of StudWB. We posit that the positive dimensions of StudWB will negatively predict conflict in TSRs (Hypothesis 1.5) and assume that the negative dimensions of StudWB positively predict conflict in TSRs (Hypothesis 1.6). Conflict in TSRs is supposed to negatively predict the positive dimensions (Hypothesis 1.7), and positively predict the negative dimensions (Hypothesis 1.8) of StudWB.

(2) How are closeness and conflict in TSRs and cohesion in SSRs related over time?

Building on theoretical frameworks and previous research, we expect TSRs and SSRs to be correlated over time. In more detail, we assume closeness in TSRs to positively predict cohesion in SSRs (Hypothesis 2.1). We also expect conflict with teachers and cohesion in SSRs to be negatively related (Hypothesis 2.2).

2. Materials and Methods

The sample included participants of a longitudinal project "XXX" (2021–2025) conducted in three German-speaking cantons in Switzerland (Aargau, Bern, Solothurn). All schools that provided contact information on their websites were contacted and informed about the project. School principals shared this information with teachers, who independently decided whether or not to participate in the project. A total of 133 schools were contacted, of which 17 schools (13%) and 44 teachers with their classes participated in the study. The level of teacher/class participation varied considerably across schools, with some schools having all teachers/classes engaged (n = 2), while in other schools, only one teacher/class participated (n = 2). In the majority of the schools, two to four teach-

ers/classes were involved. Ethical approval was granted by the ethics committee at the University of Bern prior to data collection (Ethics Application Nr. 2021-08-00005, August 2021). Participation was entirely voluntary; informed consent forms were obtained from the students' parents (except for 9% of the original sample). Participants were assured that their responses would remain confidential.

The present study focused on two measurement points in lower secondary school, that is, Grades 7 and 8. Measurement point 1 (t_1) data were collected from winter to spring of 2022 in Grade 7 and measurement point 2 (t_2) data were collected from winter to spring of 2023 in Grade 8. Students filled in an online self-reported questionnaire, during regular school hours with one trained tester present in the classroom. Due to the length of the questionnaire, students completed two distinct parts of the survey, separated by a minimum of one hour and a maximum of one week. StudWB was included in part one, and TSR, as well as SSR, were included in part two of the survey. The participants were N = 757 students (47.8% female; Mage = 13.12, SDage = 0.60) in Grade 7 (t_1) and N = 720 students (47.6% female; Mage = 13.92, SDage = 0.81) in Grade 8 (t_2). From t_1 to t_2, N = 123 students left the classes while N = 50 new students joined. There were no changes in classroom teachers from t_1 to t_2.

Missing data on the study variables during t_1 ranged from N = 122 (13.9%) for survey part one to N = 172 (19.6%) for survey part two and during t_2 from N = 158 (18.0%) for survey part one to N = 225 (25.6%) for survey part two. Participants who did not complete the questionnaire parts regarding the study variables at both measurement points were excluded from the final analytical sample. R. J. A. Little's (1988) Missing Completely at Random (MCAR) test, obtained using the missing value analysis, was found to be nonsignificant [t_1: $\chi^2(56) = 63.17$, $p = 0.238$; t_2: $\chi^2(43) = 45.47$, $p = 0.370$], indicating that the missing data at each measurement point were MCAR. Therefore, we applied Full Information Maximum Likelihood (FIML) estimation to utilize all available data for individual measurement points (Enders, 2010; R. J. A. Little & Rubin, 2014).

2.1. Measures

2.1.1. Student Well-Being

StudWB was assessed through the Student Well-being Questionnaire (Hascher, 2007), encompassing six dimensions of StudWB including (1) positive attitudes toward school (e.g., "I like to go to school."); (2) enjoyment in school (e.g., "Have you experienced joy because of teachers' friendliness in the past few weeks?"); (3) positive academic self-concept (e.g., "I don't have problems mastering school tasks."); (4) worries in school (e.g., "Have you been worried about your school grades in the past few weeks?"); (5) physical complaints in school (e.g., "Have you had a severe headache in school in the past few weeks?"); and (6) social problems in school (e.g., "Have you had problems with your classmates in the past few weeks?"). Each dimension was composed of 3 items, except for the dimension of physical complaints in school, which included 4 items. Students rated the items on a 6-point Likert scale ranging from 1 (never) to 6 (very often) for positive attitudes toward school, enjoyment in school, worries in school, physical complaints in school, and social problems in school and from 1 (disagree) to 6 (disagree) for positive academic self-concept. Negatively worded items were reverse-coded to align with the positively phrased items, ensuring consistency in construct measurement and interpretability of the scale. Internal consistency reliability (McDonald's Omega (ω)) of the different StudWB dimensions ranged from 0.71 to 0.83 (t_1) and from 0.80 to 0.85 (t_2) (see Table 1). The factor structure was tested by performing a Confirmatory Factor Analysis (CFA) comparing three models: (1) six dimensions of StudWB; (2) two dimensions (positive vs. negative components); and (3) one dimension (see Table 2).

Table 1. Descriptive statistics, internal consistency reliability, and inter-correlation between study variables.

Variable	M	SD	ω	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. PAS t_1	4.28	1.04	0.80	–																	
2. EIS t_1	4.33	1.01	0.71	0.61 **	–																
3. PASC t_1	4.31	1.02	0.77	0.34 **	0.25 **	–															
4. WIS t_1	3.29	1.42	0.81	−0.14 **	−0.09 *	−0.33 **	–														
5. PCS t_1	2.15	1.25	0.83	−0.15 **	−0.09 **	−0.26 **	0.53 **	–													
6. SPS t_1	1.67	0.97	0.78	−0.21 **	−0.13 **	−0.14 **	0.27 **	0.38 **	–												
7. CLOS t_1	3.28	0.90	0.90	0.38 **	0.42 **	0.18 **	−0.12 **	−0.15 **	−0.14 **	–											
8. CONF t_1	1.95	0.94	0.94	−0.26 **	−0.20 **	−0.13 **	0.20 **	0.26 **	0.19 **	−0.06	–										
9. COH t_1	3.06	0.56	0.83	0.31 **	0.27 **	0.22 **	−0.16 **	−0.21 **	−0.40 **	0.39 **	−0.15 **	–									
10. PAS t_2	4.06	1.10	0.82	0.53 **	0.40 **	0.25 **	−0.07	−0.12 **	−0.13 **	0.25 **	−0.23 **	0.26 **	–								
11. EIS t_2	3.97	1.14	0.80	0.44 **	0.48 **	0.17 **	−0.04	−0.07	−0.12 **	0.28 **	−0.21 **	0.18 **	0.66 **	–							
12. PASC t_2	4.36	1.03	0.85	0.23 **	0.18 **	0.50 **	−0.20 **	−0.22 **	−0.09 *	0.11 **	−0.16 **	0.18 **	0.34 **	0.30 **	–						
13. WIS t_2	3.45	1.46	0.82	−0.11 **	−0.12 **	−0.16 **	0.49 **	0.42 **	0.22 **	−0.12 **	0.14 **	−0.04	−0.09 *	−0.06	−0.23 **	–					
14. PCS t_2	2.28	1.34	0.81	−0.09 *	−0.11 **	−0.16 **	0.35 **	0.60 **	0.25 **	−0.11 *	0.24 **	−0.09 *	−0.25 **	−0.16 **	−0.19 **	0.59 **	–				
15. SPS t_2	1.81	1.08	0.82	−0.14 **	−0.07	−0.13 **	0.21 **	0.30 **	0.39 **	−0.06	0.28 **	-0.15 **	−0.20 **	−0.11 **	−0.13 **	0.30 **	0.48 **	–			
16. CLOS t_2	3.31	0.89	0.91	0.25 **	0.28 **	0.15 **	−0.07	−0.11 **	−0.11 **	0.49 **	−0.10 *	0.28 **	0.38 **	0.37 **	0.20 **	−0.14 **	−0.14 **	−0.06	–		
17. CONF t_2	1.95	0.86	0.92	−0.24 **	−0.17 **	−0.18 **	0.16 **	0.17 **	0.13 **	−0.13 **	0.54 **	−0.17 **	−0.28 **	−0.25 **	−0.18 **	0.09 *	0.21 **	0.19 **	−0.24 **	–	
18. COH t_2	3.01	0.55	0.84	0.23 **	0.19 **	0.15 **	−0.14 **	−0.19 **	−0.26 **	0.17 **	−0.18 **	0.40 **	0.33 **	0.23 **	0.28 **	−0.19 **	−0.19 **	−0.31 **	0.35 **	−0.15 **	–

Note. N = 757 (t_1) and N = 720 (t_2). PAS = positive attitudes to school; EIS = enjoyment in school; PASC = positive academic self-concept; WIS = worries in school; PCS = physical complaints in school; SPS = social problems in school; CLOS = closeness; CONF = conflict; COH = cohesion; t_1 = measurement point 1; t_2 = measurement point 2; M = mean; SD = standard deviation; ω = McDonald's Omega. Answer options: PAS, EIS, WIS, PCS, SPS: 1 = never–6 = very often. PASC: 1 = disagree–6 = agree. CLOS and CONF: 1 = no, that is not true; 2 = that is usually not true; 3 = sometimes; 4 = that is usually true; 5 = yes, that is true. COH: 1 = not at all true; 2 = not rather true; 3 = rather true; 4 = true. ** $p < 0.01$, * $p < 0.05$.

Table 2. Model fit statistics of the CFAs testing competing models in terms of the factor structure of StudWB, TSR, and SSR.

	$\chi^2(df)$	CFI	TLI	SRMR	RMSEA
CFA Models StudWB					
Six-factor model	296 (137)	0.970	0.963	0.039	0.039
Two-factor model	1781 (151)	0.697	0.656	0.097	0.120
One-factor model	3092 (152)	0.453	0.384	0.141	0.160
CFA Models TSR					
Two-factor model	897 (134)	0.915	0.902	0.090	0.090
One-factor model	3624 (135)	0.609	0.557	0.215	0.191
CFA Models SSR					
One-factor model	50 (9)	0.971	0.952	0.031	0.080

Notes. χ^2 = Chi-Square; *df* = degrees of freedom; CFI = comparative fit index; TLI = Tucker–Lewis Index; SRMR = standardized root mean square residual; RMSEA = root mean squared error of approximation.

2.1.2. Teacher–Student Relationships

The measurement of TSRs included 18 items from the Teacher–Student Relationship Scale (Koomen & Jellesma, 2015), covering students' perceptions of the level of closeness (8 items) and conflict (10 items) in their relationship with their teacher. Students were directed to refer to their classroom teacher or the teacher with whom they had the most classes. Closeness in TSRs comprised items such as "When I feel uncomfortable, I go to my teacher for help and comfort"; "I feel relaxed with my teacher"; and "I think I have a good relationship with my teacher." Conflict in TSR contained items such as "My teacher treats me unfairly"; "I feel my teacher doesn't trust me"; and "I can be very angry with my teacher". Ratings assessed by students ranged from 1 (no, that is not true) to 5 (yes, that is true). Internal consistency reliability (McDonald's Omega (ω)) of the Teacher–Student Relationship Scale was 0.90 (t_1) to 0.91 (t_2) for closeness and 0.94 (t_1) to 0.92 (t_2) for conflict (see Table 1). The factor structure was examined using a Confirmatory Factor Analysis (CFA), comparing two models: (1) two-factor model of TSRs with closeness and conflict as separate factors and (2) a one-factor model (see Table 2).

2.1.3. Student–Student Relationships

The Student–Student Relationship Scale based on the Hessian Reference Framework for School Quality (Hessischer Referenzrahmen Schulqualität (HRS), 2012). Cohesion of SSRs was measured with 6 items, including "In my class, most of the students get along very well with each other"; "In my class we make sure that nobody is left alone with their problems"; and "In my class I have several good friends". Students responded on a 4-point Likert-scale, ranging from 1 (not at all true) to 4 (very true). The reliability (McDonald's Omega (ω)) of the Student–Student Relationship Scale was 0.83 (t_1) and 0.84 (t_2) (see Table 1). The factor structure was assessed using a Confirmatory Factor Analysis (CFA) for a one-dimensional model (see Table 2).

2.2. Statistical Analysis

We applied a path analysis using a structural equation model (SEM) approach to explore the relationship between the dimensions of StudWB, closeness and conflict in TSRs, and cohesion in SSRs. The SEM approach proved to be particularly suitable for our study, as it allows for the simultaneous estimation of multiple relationships between observed and latent variables, thereby facilitating a comprehensive understanding of the complex interactions among these constructs (Kline, 2016). This method is advantageous for longitudinal designs as it accounts for measurement error, ensures more precise parameter estimates, and allows for the examination of direct and indirect effects. Due to the factor structure

and complexity, we estimated six models to explore the relationship between StudWB, TSRs, and SSRs, with each model consisting of one dimension of StudWB, TSRs, and SSRs. In addition, we evaluated a model which included only TSRs and SSRs. This approach ensured a systematic examination of the distinctive contributions of each dimension of StudWB, while also facilitating insights into the interrelationships between TSRs and SSRs. The models included autoregressive paths to account for the stability of each measure over time, allowing for the examination of both within-time and cross-lagged effects among the variables. This approach is consistent with the study's objective of gaining insight into both short-term and longitudinal dynamics within the classroom context. Moreover, the use of SEM enabled the separation of the effects of stability from the cross-lagged associations, thereby facilitating a more nuanced understanding of the interplay between StudWB, TSRs, and SSRs. The decision to employ path analysis within the SEM framework was driven by its suitability for evaluating complex theoretical models involving latent constructs and its ability to handle longitudinal data effectively.

Preliminary statistical analyses (i.e., descriptive statistics, bivariate correlations, multivariate normality testing, and multicollinearity) were conducted using SPSS version 28 and advanced analyses (Confirmatory Factor Analysis, intraclass correlation coefficients, measurement invariance, model fit, SEM) using MPlus version 8.9 (Muthén & Muthén, 2017).

We performed normality statistics to assess the assumption of normality for the variables of interest by using the Kolmogorov–Smirnov Test (Durot, 2003; Massey, 1951). To measure the level of multicollinearity, we tested the Variance Inflation Factor (VIF). High levels of multicollinearity can increase the variance of coefficient estimates, resulting in unreliable and unstable results. If there is no correlation among these factors, the VIFs will be equal to 1 (Hair et al., 2010; O'Brien, 2007).

We estimated a range of fit indices including the Chi-Square statistics for the degrees of freedom (χ^2/df), the comparative fit index (CFI), the Tucker–Lewis Index (TLI), root mean square residual (SRMR), and the root mean square error of approximation (RMSEA). A nonsignificant Chi-Square value at a 0.05 threshold and $\chi^2/df < 2$ indicated a good model fit (T. D. Little, 2013). In addition, a CFI and TLI close to 0.95 and an SRMR and RMSEA close to 0.05 also indicated a good fit of the model (Hu & Bentler, 1999; Steiger, 2007). To account for potential clustering in the data, we applied the "TYPE = COMPLEX" command in conjunction with the "CLUSTER = class_w1" command, specifying the clusters as the classes at measurement point 1. To examine the amount of within-person and between-person variance, we calculated the intraclass correlation coefficients (ICCs) for the study variables. ICC (2,1) (two-way random effects, absolute agreement, single rater/measurement) is used if raters were randomly selected from a larger population of raters with similar characteristics (Bartko, 1966; McGraw & Wong, 1996; Shrout & Fleiss, 1979). ICC values less than 0.5 indicate poor reliability (Portney & Watkins, 2000). Furthermore, we tested measurement invariance across time to ensure that the indicators measured the same underlying latent construct across both measurement points and across all participants. First, we tested configural invariance to determine whether the same underlying variable structure exists over time. Second, we utilized constraints on factor loadings to examine metric (or weak) invariance, determining whether the significance of items assessing the study variables varies temporally (Newsom, 2015). Finally, we applied constraints on item intercepts to assess scalar (or strong) invariance, verifying the longitudinal consistency of item intercepts across corresponding factors (Meredith & Teresi, 2006). We assessed changes in model fit using the Satorra–Bentler scaled Chi-Square difference test (Satorra & Bentler, 2001), ΔCFI, and ΔRMSEA values (Chen, 2007; Cheung & Rensvold, 2002). The measurement models can be compared based on F. F. Chen's (2007) suggestion that a change in the CFI of 0.01 or less and a change in the RMSEA of 0.015 or less indicates that the assumption of

invariance is robust. To assess the model fit of the different SEMs, we used fit indices such as χ^2/df, CFI, RMSEA, and SRMR (Hu & Bentler, 1999; T. D. Little, 2013), alongside the Bayesian information criterion (BIC) and the Akaike information criterion (AIC) for model comparison (Akaike, 1973; Schwarz, 1978). A nonsignificant result for the Chi-Square value at a 0.05 threshold and $\chi^2/df < 2$ indicated a good model fit (T. D. Little, 2013). A CFI close to 0.95, RMSEA close to 0.05 (Hu & Bentler, 1999), and SRMR values less than 0.05 indicate well-fitting models (Byrne, 1998; Steiger, 2007).

3. Results

3.1. Descriptive Statistics, Bivariate Correlations, Multivariate Normality Testing, and Multicollinearity

The descriptive statistics (mean, standard deviation, sample size, and McDonald's Omega (ω)) and correlation matrix of the variables of interest are presented in Table 1. In order to avoid redundancy, only the lower triangular part of the matrix is displayed. The mean values provide insight into the students' general perceptions, with higher values denoting higher values on the positive and negative StudWB dimensions, as well as higher values of closeness and conflict in TSRs and cohesion in SSRs.

The multivariate normality statistics showed nonsignificant results for all of the study variables at both measurement time points, indicating that the data were not normally distributed. To account for non-normality, all further models were calculated using MLR estimator (Maximum Likelihood estimation with robust standard errors), a Chi-Square test statistic that is robust to non-normality, and FIML (Muthén & Muthén, 2017; Yuan & Bentler, 2008).

The VIF values to test for multicollinearity among the study variables ranged from 1.14 to 1.87, which is below the typical threshold of 5 or 10, indicating that multicollinearity is not a significant issue in our model and the regression coefficients can be interpreted as stable and reliable (Hair et al., 2010; O'Brien, 2007).

3.2. Confirmatory Factor Analysis

The results of the CFA supported the six-factor conceptualization of StudWB as demonstrated by a good model fit, in contrast to the suboptimal fit statistics presented by the alternative structure models. Therefore, the data support the use of the six-dimensional structure of a model for evaluating StudWB (see Table 2).

3.3. Intraclass Correlation

The ICCs for the StudWB dimensions ranged from 0.04 to 0.14 (t_1) and from 0.05 to 0.11 (t_2). For the closeness of the TSRs, the ICCs were 0.10 (t_1) and 0.14 (t_2), and for conflict, 0.14 (t_1) and 0.08 (t_2). The ICCs of the cohesion in the SSRs were 0.16 (t_1) and 0.18 (t_2). The ICC values of less than 0.5 for all of the study variables among all of the measurement points indicate that there were no substantial differences between the school classes (Portney & Watkins, 2000).

3.4. Measurement Invariance

All of the models provided a good fit to the data (see Table 3; Model 1), indicating that a similar measurement model is plausible across both measurement points. The models did not differ significantly from the unconstrained models when constraining factor loadings to equality, providing support for longitudinal metric invariance (see Table 3; Models 2). Despite the rather large change in the RMSEA of 0.048 regarding the StudWB dimension enjoyment in school, the change in the CFI of 0.007 and the nonsignificant difference with the configural model indicate metric invariance (Chen, 2007; Rutkowski & Svetina, 2014). Finally, the scalar invariance models for the StudWB dimensions positive academic

self-concept, physical complaints in school, and social problems in school supported longitudinal scalar invariance (see Table 3; Model 3). The metric to scalar factorial invariance for all of the study variables indicate that the scores can be meaningfully compared across time.

Table 3. Model fit statistics for the test of longitudinal measurement invariance of the StudWB, TSR, and SSR dimensions.

Models	Overall Fit Indices					Model Comparison	Comparative Fit Indices			
	χ^2	*df*	CFI	RMSEA	SRMR		$\Delta\chi^2$	Δdf	ΔCFI	ΔRMSEA
Positive attitudes toward school										
1. Configural invariance	0.00	0	1.00	0.000	0.000	–	–	–	–	–
2. Metric invariance	0.81	2	1.00	0.000	0.013	2 vs. 1	0.81 (ns)	2	<0.001	<0.001
3. Scalar invariance	8.03	4	0.99	0.039	0.026	3 vs. 2	7.26 *	2	0.003	0.039
Enjoyment in school										
1. Configural invariance	0.00	0	1.00	0.000	0.000	–	–	–	–	–
2. Metric invariance	5.17	2	0.993	0.048	0.032	2 vs. 1	5.17 (ns)	2	0.007	0.048
3. Scalar invariance	33.36	4	0.936	0.104	0.059	3 vs. 2	34.63 ***	2	0.057	0.056
Positive academic self-concept										
1. Configural invariance	0.00	0	1.00	0.000	0.000	–	–	–	–	–
2. Metric invariance	0.21	2	1.00	0.000	0.010	2 vs. 1	0.33 (ns)	2	<0.001	<0.001
3. Scalar invariance	3.64	4	1.00	0.000	0.006	3 vs. 2	4.16 (ns)	2	<0.001	<0.001
Worries in school										
1.Configural invariance	0.00	0	1.00	0.000	0.000	–	–	–	–	–
2. Metric invariance	1.39	2	1.00	0.000	0.013	2 vs. 1	1.39 (ns)	2	<0.001	<0.001
3. Scalar invariance	21.70	4	0.983	0.081	0.034	3 vs. 2	24.23 ***	2	0.017	0.081
Physical complaints in school										
1.Configural invariance	12.92	4	0.994	0.057	0.017	–	–	–	–	–
2. Metric invariance	16.52	7	0.993	0.043	0.020	2 vs. 1	1.16 (ns)	3	0.001	0.014
3. Scalar invariance	20.60	10	0.992	0.040	0.023	3 vs. 2	1.91 (ns)	3	0.001	0.003
Social problems in school										
1.Configural invariance	0.00	0	1.00	0.000	0.000	–	–	–	–	–
2. Metric invariance	0.72	2	1.00	0.000	0.011	2 vs. 1	0.72 (ns)	2	<0.001	<0.001
3. Scalar invariance	1.00	4	1.00	0.000	0.011	3 vs. 2	0.02 (ns)	2	<0.001	<0.001
Closeness										
1. Configural invariance	217.46	34	0.961	0.092	0.041	–	–	–	–	–
2. Metric invariance	239.65	41	0.958	0.088	0.048	2 vs. 1	11.85 (ns)	7	0.003	0.004
3. Scalar invariance	266.44	48	0.954	0.085	0.053	3 vs. 2	24.56 ***	7	0.004	0.003
Conflict										
1. Configural invariance	204.74	70	0.975	0.055	0.025	–	–	–	–	–
2. Metric invariance	218.62	79	0.975	0.053	0.027	2 vs. 1	3.70 (ns)	9	<0.001	0.002
3. Scalar invariance	242.69	88	0.972	0.053	0.029	3 vs. 2	23.53 **	9	0.003	<0.001
Cohesion										
1. Configural invariance	54.00	18	0.983	0.056	0.029	–	–	–	–	–
2. Metric invariance	57.28	23	0.983	0.049	0.035	2 vs. 1	2.20 (ns)	5	<0.001	0.007
3. Scalar invariance	70.77	28	0.979	0.049	0.039	3 vs. 2	13.91 *	5	0.004	<0.001

Notes. CFI = comparative fit index; RMSEA = root mean squared error of approximation; SRMR = standardized root mean square residual; $\Delta\chi^2$ = Satorra–Bentler scaled Chi-Square difference between the nonrestricted and restricted models; Δdf = changes in degrees of freedom between the nonrestricted and restricted models; ns = nonsignificant. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

3.5. Structural Equation Models

The results of all of the hypothesized models are presented in Figure 1. For simplicity, we removed the nonsignificant paths, and displayed only the significant longitudinal beta coefficients. The different models are discussed in more detail below.

The model fit indices for the models, including the dimensions of StudWB, closeness and conflict in TSRs, and cohesion in SSRs, revealed a good fit to the data (Byrne, 1998; T. D. Little, 2013) and are presented in Table 4.

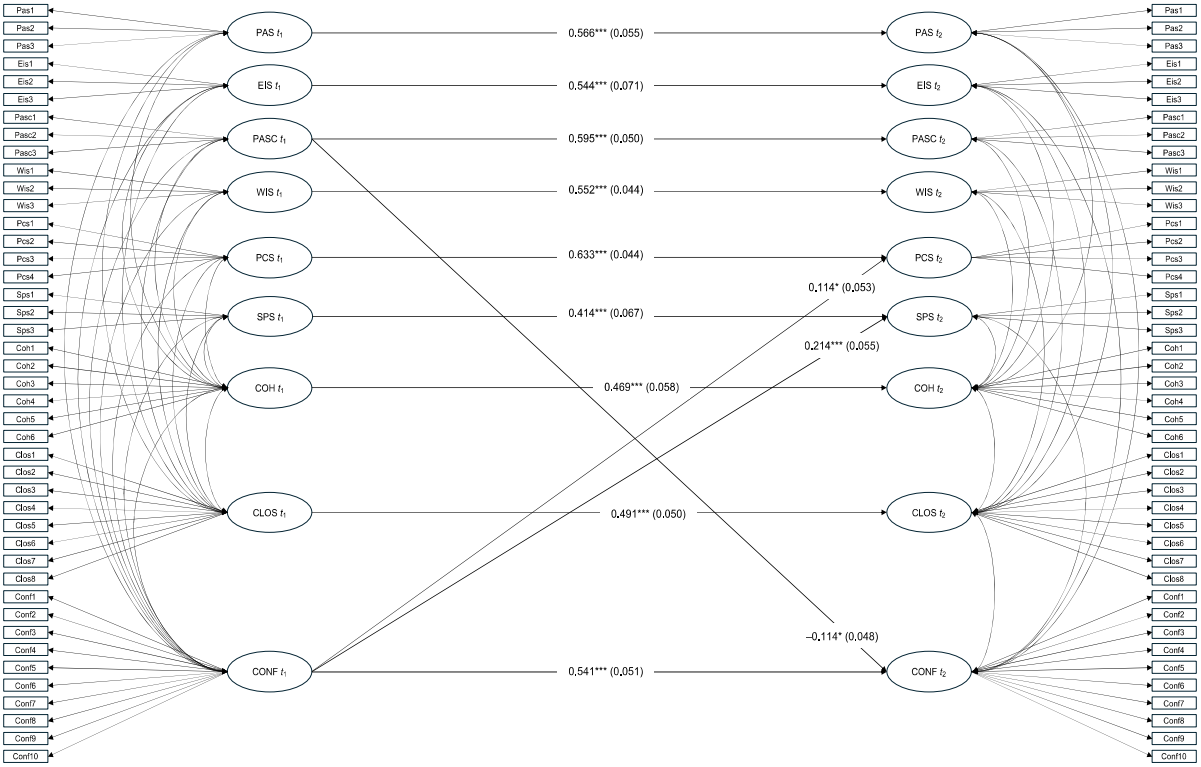

Figure 1. Significant standardized regression coefficients and standard error of the hypothesized theoretical models. PAS = positive attitudes toward school; EIS = enjoyment in school; PASC = positive academic self-concept; WIS = worries in school, PCS = physical complaints in school; SPS = social problems in school; COH = cohesion; CLOS = closeness; CONF = conflict; t_1 = measurement point 1; t_2 = measurement point 2; *** $p < 0.001$; * $p < 0.05$.

Table 4. Model fit statistics of the SEMs.

	$\chi^2(df)$	AIC	BIC	RMSEA	CFI	RMR
SEMs						
1 PAS–CLOS–CONF–COH	2604.39 (1316)	88,133.14	89,198.56	0.033	0.933	0.063
2 EIS–CLOS–CONF–COH	2608.13 (1316)	89,103.39	90,168.80	0.033	0.931	0.062
3 PASC–CLOS–CONF–COH	2495.38 (1316)	88,299.21	89,364.62	0.032	0.937	0.061
4 WIS–CLOS–CONF–COH	2525.31 (1316)	91,050.30	92,115.72	0.032	0.936	0.061
5 PCS–CLOS–CONF–COH	2734.63 (1422)	94,712.68	95,811.54	0.032	0.934	0.062
6 SPS–CLOS–CONF–COH	2536.55 (1316)	88,135.21	89,200.62	0.033	0.934	0.062
7 CLOS–CONF–COH	2156.91 (1035)	5586.05	76,480.66	0.036	0.934	0.066

Notes. PAS = positive attitudes toward school; EIS = enjoyment in school; PASC = positive academic self-concept; WIS = worries in school; PCS = physical complaints in school; SPS = social problems in school; CLOS = closeness; CONF = conflict; COH = cohesion; χ^2 = Chi-Square; *df* = degrees of freedom; AIC = Akaike information criterion; BIC = Bayesian information criterion; RMSEA = root mean squared error of approximation; CFI = comparative fit index; SRMR = standardized root mean square residual.

3.5.1. Positive StudWB Dimensions, TSR, and SSR

The path analysis using SEM including the positive StudWB dimensions (positive attitudes toward school, enjoyment in school, and positive academic self-concept) revealed significant autoregressive effects for all of the positive StudWB dimensions (see Table 5). Regarding the cross-lagged effects, positive academic self-concept at t_1 had a significant negative effect on the conflict in TSRs at t_2 ($\beta = -0.11$, $p < 0.05$). However, the effect over time of the conflict in TSRs on positive attitudes toward school was not significant ($\beta = -0.08$, $p > 0.05$) (see Table 5).

Table 5. Autoregressive effects and cross-lagged effects for the positive StudWB dimensions, TSRs, and SSRs.

	Estimate	SE	CR
Models			
Autoregressive effects			
PAS t_1 → PAS t_2	0.57 ***	0.06	10.23
EIS t_1 → EIS t_2	0.54 ***	0.07	7.67
PASC t_1 → PASC t_2	0.60 ***	0.05	11.87
Cross-lagged effects			
PAS t_1 → CLOS t_2	0.07	0.06	1.21
PAS t_1 → CONF t_2	−0.06	0.05	−1.33
PAS t_1 → COH t_2	0.11	0.06	1.75
CLOS t_1 → PAS t_2	0.00	0.05	0.08
CONF t_1 → PAS t_2	−0.08	0.05	−1.45
COH t_1 → PAS t_2	0.10	0.06	1.75
EIS t_1 → CLOS t_2	0.09	0.06	1.39
EIS t_1 → CONF t_2	−0.02	0.06	−0.35
EIS t_1 → COH t_2	0.10	0.07	1.45
CLOS t_1 → EIS t_2	0.04	0.07	0.59
CONF t_1 → EIS t_2	−0.10	0.06	−1.80
COH t_1 → EIS t_2	−0.01	0.06	−0.12
PASC t_1 → CLOS t_2	0.01	0.05	0.28
PASC t_1 → CONF t_2	−0.11 *	0.05	−2.37
PASC t_1 → COH t_2	0.06	0.05	1.11
CLOS t_1 → PASC t_2	−0.05	0.06	−0.95
CONF t_1 → PASC t_2	−0.08	0.05	−1.70
COH t_1 → PASC t_2	0.09	0.06	1.46

Notes. All estimate values are standardized betas. PAS = positive attitudes toward school; EIS = enjoyment in school; PASC = positive academic self-concept; CLOS = closeness; CONF = conflict; COH = cohesion; SE = standard error; CR = critical ratio. *** $p < 0.001$, * $p < 0.05$.

3.5.2. Negative StudWB Dimensions, TSR, and SSR

The path analysis using SEM revealed significant autoregressive effects for all negative StudWB dimensions, including worries in school, physical complaints in school, and social problems in school (see Table 6).

Table 6. Autoregressive effects and cross-lagged effects for the negative StudWB dimensions, TSRs, and SSRs.

	Estimate	SE	CR
Models			
Autoregressive effects			
WIS t_1 → WIS t_2	0.55 ***	0.04	12.44
PCS t_1 → PCS t_2	0.63 ***	0.04	14.45
SPS t_1 → SPS t_2	0.41 ***	0.07	6.16
Cross-lagged effects			
WIS t_1 → CLOS t_2	0.07	0.05	1.44
WIS t_1 → CONF t_2	0.04	0.04	0.83
WIS t_1 → COH t_2	−0.05	0.05	−0.93
CLOS t_1 → WIS t_2	−0.07	0.05	−1.29
CONF t_1 → WIS t_2	0.05	0.05	1.00
COH t_1 → WIS t_2	0.09	0.06	1.63
PCS t_1 → CLOS t_2	−0.01	0.05	−0.09
PCS t_1 → CONF t_2	0.02	0.05	0.35
PCS t_1 → COH t_2	−0.09	0.05	−1.68
CLOS t_1 → PCS t_2	−0.02	0.05	−0.53
CONF t_1 → PCS t_2	0.11 *	0.05	2.15
COH t_1 → PCS t_2	0.09	0.05	1.87
SPS t_1 → CLOS t_2	−0.01	0.06	−0.23
SPS t_1 → CONF t_2	−0.03	0.05	−0.51
SPS t_1 → COH t_2	0.09	0.07	−1.22
CLOS t_1 → SPS t_2	−0.01	0.05	−0.28
CONF t_1 → SPS t_2	0.21 ***	0.06	3.90
COH t_1 → SPS t_2	0.09	0.06	1.39

Notes. All estimate values are standardized betas. WIS = worries in school; PCS = physical complaints in school; SPS = social problems in school; CLOS = closeness; CONF = conflict; COH = cohesion; SE = standard error; CR = critical ratio. *** $p < 0.001$, * $p < 0.05$.

Conflict with teachers at t_1 had a significant positive effect on physical complaints in school ($\beta = 0.11$, $p < 0.05$) and social problems in school ($\beta = 0.21$, $p < 0.001$) at t_2. Neither negative dimension of StudWB at t_1 predicted conflict or closeness with teachers or cohesion with peers at t_2 (see Table 6).

3.5.3. TSRs and SSRs

All of the autoregressive effects in the path analysis using the SEM for closeness and conflict in TSRs and cohesion in SSRs were significant. However, there were no significant cross-lagged effects between TSRs and SSRs over time (see Table 7).

Table 7. Autoregressive effects and cross-lagged effects for TSRs and SSRs.

	Estimate	SE	CR
Model			
Autoregressive effects			
CLOS $t_1 \rightarrow$ CLOS t_2	0.49 ***	0.05	9.85
CONF $t_1 \rightarrow$ CONF t_2	0.54 ***	0.05	10.57
COH $t_1 \rightarrow$ COH t_2	0.47 ***	0.06	8.06
Cross-lagged effects			
CLOS $t_1 \rightarrow$ CONF t_2	−0.07	0.05	−1.28
CLOS $t_1 \rightarrow$ COH t_2	−0.02	0.06	−0.43
CONF $t_1 \rightarrow$ CLOS t_2	−0.07	0.05	−1.37
CONF $t_1 \rightarrow$ COH t_2	−0.10	0.06	−1.73
COH $t_1 \rightarrow$ CLOS t_2	0.09	0.06	1.69
COH $t_1 \rightarrow$ CONF t_2	−0.08	0.05	−1.54

Notes. All estimate values are standardized betas. CLOS = closeness; CONF = conflict; COH = cohesion; SE = standard error; CR = critical ratio. *** $p < 0.001$.

4. Discussion

The present study sought to enhance our understanding of the complex interplay between different StudWB dimensions and relationships in the classroom among lower secondary school students in German-speaking Switzerland using a path analytic SEM approach. The current research on StudWB still predominantly focus on a unidimensional perspective, overlooking the multifaceted nature of the construct and the importance of measuring well-being with constructs specifically developed for the school context (Hascher, 2007; Raccanello et al., 2020). Although classroom relationships have been identified as critical determinants of StudWB in cross-sectional research, longitudinal investigations that examine their interrelations and cross-lagged effects remain remarkably limited (Endedijk et al., 2021; Hughes & Chen, 2011; Roza et al., 2021). Moreover, most studies tend to focus solely on either TSRs or SSRs, disregarding the complex interplay between both forms of relationships and StudWB at the microlevel of the classroom. This oversight extends to the reciprocal relations between TSRs and SSRs.

4.1. Autoregressive Effects

In our study, all dimensions of StudWB, closeness and conflict in TSRs, and cohesion in SSRs significantly predicted themselves over time. The only positive StudWB dimension that increased from Grade 7 to 8 was positive academic self-concept, while all other positive dimensions decreased, and negative dimensions increased. Consistent with previous research (e.g., Gunnell et al., 2013; Pietarinen et al., 2014), it appears that StudWB generally decreases across time. In the context of Switzerland, the progression from Grade 7 to Grade 8 represents a pivotal juncture in the educational trajectory of students (EDK, 2023). During this stage, students are introduced to a new school environment in Grade 7 and face heightened scholastic expectations, which culminate in pivotal postsecondary or vocational

decisions by the end of Grade 8. Furthermore, students residing in two (of the three) cantons that participated in this study are afforded the opportunity to transition to a more academically oriented track after the completion of Grade 7, contingent upon meeting specific academic criteria (BKD, 2022; DBK, 2015). This introduces additional performance pressure that may negatively impact StudWB (e.g., Kuusi et al., 2024; Widlund et al., 2024). Conversely, students who successfully fulfill the requisite academic standards and have a clear vision of their future career paths may exhibit an enhanced positive academic self-concept (Gogol et al., 2017; Köller et al., 2006; Marsh et al., 2017). In addition, students are required to engage in career exploration activities, which can lead to the realization of one's own abilities outside of the school context and potentially challenge preconceived notions of their academic self-concept within school. This is particularly salient in the context of Switzerland, where a dual education system is implemented at the higher secondary school level, involving a division of time spent attending vocational schools and working on the job. In light of this, the potential for enhancing this dual approach to education, integrating theoretical knowledge and practical skill development already at the secondary school level, is a noteworthy consideration. The dynamic changes and challenges at this educational stage underscore the necessity for supportive and exploratory opportunities to facilitate positive self-conceptualization among students (Garn & Shen, 2015; Parker et al., 2015; Simonsmeier et al., 2020).

Regarding the dimensions of closeness and conflict within TSRs, our study revealed increased closeness, while the conflict levels remained constant across the two measurement points. The observed enhancement in closeness may be attributable to the students' prolonged exposure to and familiarity with their classroom teacher.

Interestingly, the cohesion within SSRs showed a decline from Grade 7 to Grade 8. This may be attributed to the change in class composition, including the transition of some students to a more academically focused track and absences from school due to vocational exploration activities (EDK, 2023). Moreover, the more familiar students become with each other, the more likely they are to express their opinions and disagreements openly, which can lead to more frequent conflicts and, consequently, a reduction in cohesion (e.g., Amodio & Showers, 2005; Kohne et al., 2019).

4.2. Cross-Lagged Effects Between StudWB, Closeness (TSR), and Cohesion (SSR)

Contrary to the study hypotheses and previous empirical findings, our findings revealed no significant relations between the positive dimensions (Hypothesis 1.1.) or the negative dimensions (Hypothesis 1.2) of StudWB and closeness with teachers or cohesion with peers. Furthermore, neither closeness nor cohesion were found to be significantly related to either the positive (Hypothesis 1.3) or negative dimensions of StudWB (Hypothesis 1.4). This absence underscores the complexity of classroom interactions and suggests that the dynamics of StudWB, closeness, and cohesion may be influenced by additional, unexamined factors or are less stable over the school years (García-Moya, 2020; Roorda et al., 2011). Prior research has underscored the context-dependent nature of teacher–student and student–student relationships (Pianta et al., 2012). For example, the quality of these relationships can be influenced by the individual characteristics of students and teachers, the classroom climate, and the broader school culture, which may moderate the expected relationships between StudWB and interpersonal connections (Cornelius-White, 2007; Hughes & Chen, 2011).

4.3. Cross-Lagged Effects Between StudWB and Conflict (TSR)

In alignment with the study hypotheses, we found that positive academic self-concept (StudWB) was significantly negative related to conflict over time (Hypothesis 1.5). Nev-

ertheless, our findings did not support the hypothesis that negative StudWB dimensions were associated with conflict (Hypothesis 1.6). The StudWB dimension positive academic self-concept negatively predicted conflict in TSRs over time, but not vice versa (e.g., Goetz et al., 2013; Gutiérrez et al., 2017; Westphal et al., 2018). If students feel that they do not have problems coping with the demands of school and are able to achieve things at school as well as others, it could potentially obviate the need for disputes with teachers regarding grades. This also raises the question of why students seek to establish relationships with their teachers. The foundation upon which students and teachers construct their relationship goals may diverge significantly. Adolescent students might prioritize goals oriented toward performance, viewing teachers as arbiters of their academic grades; thus, in instances of satisfactory performance, the impetus for conflict diminishes (Ames, 1992; Bandura, 1993). Conversely, teachers may base their expectations more on mastery-oriented goals, emphasizing the development of skills pertinent to students' future endeavors, which may not directly align with immediate academic requirements. This discrepancy in goal orientation between students and teachers could explain why the associations were not reciprocal.

Contrary to our initial hypotheses, conflict did not significantly negatively predict the positive dimensions (Hypothesis 1.7). However, as anticipated, conflict significantly positively predicted two of the negative StudWB dimensions (Hypothesis 1.8). Conflict with teachers in Grade 7 was positively related to the physical aspects of StudWB in Grade 8. Although the overall mean of conflict with teachers was relatively low, conflict with teachers may be considered a source of stress for students (Lazarus & Folkman, 1984). Stress may contribute to or exacerbate the development of somatic symptoms, such as headaches, stomach aches, and fatigue (McEwen, 1998; Murberg & Bru, 2004). These symptoms are often reported as physical complaints in school settings and may be the result of a perceived mismatch between environmental demands (in this case, conflict in TSRs) and the individual's ability to cope with these demands. It not only increases students' physical complaints, but threatens their sense of belonging, leading to more social problems in school, lower competence, and autonomy (Ryan & Deci, 2000). Therefore, when students perceive and process conflict in TSRs, they may experience physical symptoms in response to this cognitive processing of teacher stimuli. Moreover, the negative relation between conflict with teachers in Grade 7 and social problems in school, as a dimension of StudWB in Grade 8, highlights the complex interplay between StudWB and relationship dynamics at the individual student level. Over time, relationships high in conflict may be associated with a decline in children's prosocial behavior and an increase in peer-perceived aggressive behavior (Birch & Ladd, 1997; Pianta et al., 1995). The existence of conflict in TSRs does not necessarily undermine classroom cohesion but may increase students' awareness of social issues within the classroom, which can reduce their sense of well-being. Additionally, this finding could be attributed to the contrasting effect of conflict in the classroom. Conflict with teachers may be more noticeable than experiences of closeness (e.g., Hendrickx et al., 2017a, 2017b; Huber et al., 2018; McAuliffe et al., 2009). This, in turn, could increase the feeling of social problems in the classroom and lower well-being (e.g., László et al., 2019; Miller-Lewis et al., 2014; M. Wang et al., 2013). Overall, negative relationship characteristics may have a greater impact on students' psychosocial development than positive ones (Baumeister et al., 2001; Rook, 1984) but may not necessarily negatively affect all dimensions of StudWB.

4.4. Cross-Lagged Effects Between Conflict (TSR) and Cohesion (SSR)

Regarding the reciprocal relations between TSRs and SSRs, our study found no significant results, even when the StudWB dimensions were not considered in the model (Hypothesis 2.1, 2.2). Perhaps the quality of students' dyadic relationships with teachers and classmates is

influenced more by adolescents' personal and behavioral characteristics, such as agreeableness and prosocial behavior (e.g., Hughes & Chen, 2011; Wu & Zhang, 2022).

Overall, our findings highlight the importance of a multidimensional approach to StudWB and the need to take different relationships into account to understand the complex interplay between the constructs. Interestingly, students seem to be able to maintain positive attitudes toward school, enjoyment in school, and a positive academic self-concept even when they have a conflictual relationship with their teachers. Conflict may be indicative of a form of detachment from the teachers, and therefore not impact the positive StudWB dimensions (Bandura, 1971; Bowlby, 1969). On the other hand, conflict seems to amplify the negative aspects of StudWB, and if these negative aspects outweigh the positive ones, it can lead to an overall decrease in StudWB (Hascher, 2004, 2007). Therefore, supporting teachers with strategies to nurture their relationship with students is still critical. By providing constructive feedback, showing respect, spending one-on-one time with students, and developing personal relationships (Kincade et al., 2020), teachers can not only directly promote StudWB, but also help cultivate a positive academic self-concept, which, in turn, may protect students from conflict in TSRs over time and further enhance their StudWB.

4.5. Strengths, Limitations, and Future Research

The present study deepens the understanding of StudWB by adopting a multidimensional perspective and acknowledging the importance of measuring well-being with constructs specifically developed for the school context. The investigation was conducted during a pivotal phase, wherein age-related transformations encountered the challenges associated with integration into a novel school environment. Including both the TSR and SSR enhances the understanding of the association with different dimensions of StudWB and acknowledges the complex nature of classroom relationships. The longitudinal design of the study with two measurement points enabled an examination of the reciprocal relations between the dimensions of StudWB and classroom relationships, as well as between TSRs and SSRs. In doing so, the study provides the first findings on the longitudinal and reciprocal associations between multiple dimensions of StudWB, TSRs, and SSRs.

However, in addition to these strengths, several limitations associated with the study findings should be considered.

First, although collecting student data annually for two years allows us to observe developmental trends and changes over time, it might be that the 1-year time lag could be appropriate for revealing the effects of certain StudWB dimensions on closeness and conflict in TSRs and cohesion in SSRs and vice versa, but might be either too short or too long for the detection of effects in regard to other associations between the constructs. Annual data points may miss more subtle, within-year changes or fluctuations in student behavior and experiences. Furthermore, the development and subsequent evaluation of relationships may require an extended period of time. Given that the second measurement was conducted approximately six months into the seventh grade, it is plausible that students were still in the process of adapting to their new classroom environment and teacher. This adjustment period might have contributed to the absence of significant reciprocal effects in our findings. Future research might benefit from time-intensive longitudinal designs and follow-up measurements. Second, the analysis employed a single-level model, thus overlooking the potential for student clustering within classrooms. Nevertheless, the results regarding the ICC revealed a small proportion of variance, indicating that the associations between predictor and outcome variables remained relatively stable across different classrooms. Future studies might contemplate the adoption of multilevel modeling, particularly when the investigation encompasses a larger number of classes per school. Third, it should be noted that the results were not differentiated based on individual student characteristics,

such as gender, migration, or socio-economic background. To further investigate the underlying mechanisms of StudWB, TSRs, and SSRs for different students, it is advisable to enrich the findings by applying a person-centered approach (e.g., latent profile or latent class analysis), as there might be student groups that experience different effects of relationships on their well-being and vice versa. Furthermore, a whole-school approach could prove advantageous in providing additional insight into contextual factors and their potential correlations with StudWB, TSRs, and SSRs.

Fourth, the incorporation of qualitative data could provide valuable insights into the nuances of students' as well as teachers' experiences and perceptions of well-being, TSRs, and SSRs. For example, qualitative interviews or focus groups could elicit students' subjective perspectives on how they perceive and assess these relationships and how these dynamics impact their sense of well-being in ways that quantitative data might fail to capture. Furthermore, such data could provide insight into the contextual and cultural factors that shape these constructs, thereby offering a more comprehensive understanding of the mechanisms underlying the observed relationships.

Fifth, while the students were asked to respond to questions concerning their relationship with the classroom teacher or the teacher with whom they had the most classes, there was no verification to ensure adherence to these instructions. Future research could distinguish between relationships with different teachers or consider the extent of interaction, measured by the number of hours a teacher spends with the class. Additionally, it is important to consider that the relationship with the teacher may vary depending on the subject.

Sixth, the study relies on student self-reports. Self-reported data are inherently subjective, and outcomes may be influenced by social desirability bias, whereby students may provide responses that they perceive as favorable or acceptable rather than those that accurately reflect their true feelings or behaviors. Moreover, reliance on a single informant's perspective may lead to an underestimation of the complexity of the classroom environment. Incorporating perspectives from multiple informants could offer a more comprehensive understanding of relationships and further serve to evaluate the robustness and validity of the study findings.

5. Conclusions

In recent years, there has been a growing interest in research on StudWB driven by the recognition of its significance as a vital skill in addressing 21st century challenges. Thus, investigating the interplay of StudWB, TSRs, and SSRs holds importance in understanding StudWB and classroom processes. To our knowledge, this is the first study that has examined the longitudinal relations among the three constructs by using a multidimensional approach to StudWB as well as considering TSRs, SSRs, and StudWB in one model applying a path analytical SEM approach. In conclusion, the current study contributes to the field by highlighting that associations between StudWB, TSRs, and SSRs vary regarding different StudWB dimensions. Specifically, the findings illustrate the important association between conflict with teachers, positive academic self-concept, and physical complaints and social problems in school. The main conclusions of the present study are outlined in Table 8.

(1.) Fostering a positive academic self-concept could serve as a buffer for conflict in TSRs, leading to enhanced StudWB. Integrating targeted activities into classroom practice may contribute to addressing conflict and promoting positive interactions. For instance, structured sessions, such as daily or weekly exchanges of compliments among students, are suggested to foster a positive classroom climate and potentially reduce conflict (Tomba et al., 2010). (2. and 3.) The implementation of conflict resolution training and social–emotional learning programs could equip students with skills for managing interpersonal

conflicts. Teachers might also benefit from professional development focused on effective communication, empathy-building, and proactive conflict management, as they serve as role models for the establishment of meaningful relationships. These interventions are designed to address conflict and enhance closeness in TSRs, which may contribute to a more harmonious classroom environment and support StudWB (Harks & Hannover, 2017; Kochenderfer-Ladd & Pelletier, 2008).

Table 8. Main study conclusions.

	Estimate	SE	CR
1. Positive academic self-concept (StudWB) t_1 → Conflict (TSR) t_1	−0.11 *	0.05	−2.37
2. Conflict (TSR) t_1→ Physical complaints (StudWB) t_2	0.11 *	0.05	2.15
3. Conflict (TSR) t_1→ Social problems in school (StudWB) t_2	0.21 ***	0.06	3.90

Note. All estimate values are standardized betas. StudWB = student well-being; TSR = teacher–student relationship; t_1 = measurement point 1; t_2 = measurement point. *** $p < 0.001$, * $p < 0.05$.

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Abbreviations

The following abbreviations are used in this manuscript:

StudWB	Student well-being
TSR	Teacher–student relationship
SSR	Student–student relationship

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