



# Does social well-being predict academic resilience and achievement? Analysis of Swedish PISA 2018 data

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## Abstract

In recent years, Sweden has been struggling with issues of educational inequity as the influence of students' socioeconomic status on their academic achievements has amplified. Nonetheless, academically resilient students who demonstrate high achievement despite socioeconomic disadvantages offer hope for a more equitable future. Previous research has primarily focused on the relationship between well-being and academic achievement, with less emphasis on the connection between academic resilience and well-being. Thus, this study investigates the extent to which students' well-being predicts their academic achievement and resilience, with a special focus on the social well-being of socioeconomically disadvantaged students. Using the Swedish PISA 2018 dataset and structural equation modeling technique, the measurement properties of social well-being were first tested, and its dimensions were then related to students' academic resilience and achievement. The findings reveal that student-reported teacher support positively predicts their academic resilience and achievement, whereas exposure to bullying is detrimental to their academic achievement.

**Keywords** Academic Resilience · Social Well-Being · Socioeconomic Status · Student Achievement · PISA

## Introduction

Sweden faces challenges with educational inequity as disparities in school outcomes and the influence of students' socioeconomic background on achievement have increased in recent decades (Siebecke & Jarl, 2022; Yang Hansen & Gustafsson, 2019). Despite the persistent and troubling association between student achievement and socioeconomic background (see Sirin, 2005 for a meta-analytic review), some students beat the odds and achieve high despite disadvantages in their socioeconomic background that can place them at risk for low achievement. These students are often referred to as academically resilient and yield hope for a more equitable future. In general terms, resilience is grounded in the recognition

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of individuals' divergent responses to adversities (Rutter, 2012). While some struggle and fail in the face of adversity, others seem to adjust just fine. Those who demonstrate positive adaptation are usually considered resilient (e.g., Masten & Obradovic, 2006). Even though the definitions differ to some extent, the duality of the construct, namely adversity and adaptation, seems pivotal (e.g., Luthar & Cicchetti, 2000; Martin & Marsh, 2009; Masten et al., 1990). Adversity typically refers to chronic or severe negative life circumstances that "are known to be statistically associated with adjustment difficulties", while positive adaptation refers to the successful adjustment and fulfillment of important "stage-salient developmental tasks" (Luthar & Cicchetti, 2000, p. 858). Therefore, in this study, students are considered academically resilient if they beat the odds academically and achieve relatively high at school despite their adverse socioeconomic background.

Although academic resilience was initially viewed as an innate, unchanging personal trait, recent research has shifted towards understanding resilience as a dynamic process or outcome of the interactions between an individual and their environment, family, and community (Kolar, 2011). Therefore, environmental and individual protective factors play an important role in the study of resilience. To discover crucial factors contributing to the high achievement and thus positive adaptation of academically resilient students, the present study focuses on the social well-being of resilient students and their peers.

In an educational context, student well-being is assumed to be a school-based outcome (Noble & McGrath, 2013; Opdenakker & Van Damme, 2000) and has been defined as the result of the interaction between students and their immediate environments. Well-being is a multidimensional construct encompassing social, physical, and mental/psychological dimensions, each comprising several subdimensions (Borgonovi, 2020; Borgonovi & Pál, 2016; Colombo, 1984; Pollard & Lee, 2003). These dimensions and subdimensions have been found to be related to academic achievement but the relationship is not straightforward. Recent meta-analyses revealed a small positive relationship between well-being and achievement (Bücker et al., 2018; Kaya & Erdem, 2021). However, some studies identified a negative relationship between at least one dimension of well-being and achievement (e.g., Klapp et al., 2023), and an ongoing debate persists regarding a potential trade-off between academic achievement and well-being (Clarke, 2020). Inconsistencies in prior research may suggest that different dimensions of well-being affect student outcomes differently. Therefore, a separate analysis of well-being dimensions seems appropriate.

The present study focuses on the social dimension of well-being that, according to Pollard & Lee (2003), can be measured by assessing "family and peer relationships, the availability of emotional and practical support" (p. 68). When asking 14- and 15- year-olds what well-being meant to them, some key topics were identified, including family (e.g., being loved and supported), friends (e.g., friends as a source of support, bullying), and school (e.g., school-related stress, relationships with teachers) (Pople et al., 2015). Similarly, focus groups and individual interviews with students, teachers, and principals highlighted the importance of relationships with friends and teachers, as well as a sense of school connectedness for students' well-being (Graham et al., 2016). As students highlight the importance of social relationships, this study solely focuses on the social dimension of well-being, the interrelationship between subdimensions, and the relationship with academic achievement and resilience. To capture its complexity, a multi-faceted conceptualization of well-being is needed to assess which aspects are particularly important for achievement (Clarke, 2020).

The OECD (2019a) explored the well-being of academically resilient students and found that resilient students tend to have more positive well-being outcomes in some countries. The report concluded that some students, despite their relative socioeconomic disadvantage, "are capable of attaining academic excellence by national standards, and exhibiting

strong social and emotional adjustment” (OECD, 2019a, p. 77). However, the results differed across countries, highlighting the need for more country-specific research. Moreover, the study was subject to certain limitations, as student well-being was measured solely through indicators such as the student’s sense of belonging at school, life satisfaction, and resilience in the risk of failure. Given the multifaceted nature of well-being, a more comprehensive and nuanced approach to measurement is needed.

According to Borgonovi and Pál (2016) and Borgonovi (2020), students’ social well-being comprises various indicators, including their relationship with peers, parents, and teachers as well as their sense of belonging at school. These indicators, which can also be referred to as subdimensions of social well-being, have been found to be related to (academic) resilience. Both qualitative and quantitative studies have demonstrated that external factors such as a supportive academic environment and supportive relationships with peers and adults can promote students’ resilience. For instance, Hersi (2012) explored factors contributing to the academic resilience of Ethiopian Immigrant high school students and found family support and the connection between family and community to be important factors. Howard and Johnson (2000) conducted interviews with children and teachers in disadvantaged areas in South Australia, inquiring about the factors that distinguish resilient from nonresilient students. The respondents highlighted the importance of social and emotional support and caring relationships. These supportive relationships, analyzed across multiple studies, encompass the connections with teachers, parents, caregivers, or other adults in the community, as well as peer relationships. The famous Kauai Longitudinal Study, which followed the development of hundreds of children born on the Hawaiian island of Kauai, identified supportive adults, close bonds with caregivers, and emotional support outside the family as protective factors that facilitate the positive adaptation of high-risk children and youth (Werner, 1997). Similarly, Noble and McGrath (2012) discuss the significance of positive teacher-student interactions, peer relationships, and parent-child bonds as important protective factors that contribute to resilience and well-being.

In addition to this possible association between social well-being and student outcomes, it is important to recognize that subdimensions of social well-being may also be interrelated. For instance, Zumbrunn et al. (2014) highlighted in their mixed method study the importance of supportive classroom environments in influencing student outcomes, where student belonging played a mediating role in the relationship between supportive classroom environments and motivation and achievement. Similarly, other studies have indicated that a student’s sense of belonging strongly mediates the relationship between teacher support and science literacy (Saroughi & Cheema, 2023). Further, it has been discussed how social support from peers and teachers may buffer the effect of bullying (Flaspohler et al., 2009). Consequently, this present study examines not only the relationship to student outcomes but also the interrelationship between subdimensions.

Previous research on resilience, conducted across diverse countries and contexts, has shown considerable variation in the conceptualization and operationalization of resilience. More country-specific research on academic resilience is needed to understand the reason behind this positive adjustment despite adversity and help explain why some students are more successful than others despite similar prerequisites. Understanding the factors and processes involved in positively impacting the lives of socioeconomically disadvantaged students is the first step that may, in the long run, contribute to narrowing the performance gap and achieving a higher level of equity in education. Hence, the main objective of the present study is to investigate the extent to which students’ social well-being predicts their academic resilience and achievement in Sweden. Sweden is an especially interesting country to investigate as it generally performs well on many indicators of well-being (OECD, 2016). However, the

Swedish education system currently faces issues of decreasing educational equity and overall declining educational performance. The deteriorating school performance and widespread school pressures have been hypothesized to have contributed to an increase in (mental) health complaints among children and adolescents in Sweden (Public Health Agency of Sweden, 2018). Similarly, a decline in students' sense of belonging at school, as one important indicator of their social well-being, has been reported in recent decades. This decline was found to be disproportionately large for low-achieving students and students from disadvantaged social backgrounds (Högberg et al., 2021). Thus, research on student well-being and its relation to academic achievement and resilience is highly topical, especially in the Swedish context.

## Theoretical framework

As “individuals cannot be understood in isolation from their broader environment” (Ng & Fisher, 2013, p. 314), it can be argued that students themselves, their environments (e.g., the family, the school, and society), as well as the interrelationship of the two, are crucial for the understanding of the complexity of well-being and resilience. Therefore, this study is theoretically framed by Bronfenbrenner's (1979, 2005) ecological system theory, according to which the individual is centered in an environmental context structured in different systems, namely the Micro-, Meso-, Exo-, Macro-, and Chronosystem. As students interact with their environment, they learn and develop different skills, such as making use of resources and finding appropriate responses to stress. They may also encounter barriers and facilitators that, altogether, can shape a child's development and well-being (Ben-Arieh, 2010). In this way, students' experiences and outcomes are shaped by these systems directly, as well as by their interplay.

A student's interaction with the microsystem, that is their immediate environment, including peers, teachers, and parents, can influence their well-being, achievement, and resilience. For instance, the support students receive from their closest environment, such as their parents and teachers, can strengthen their skills to cope with difficulties at school. The mesosystem describes the connection and relationship between microsystems, such as the parent-teacher relationship. The exosystem contextualizes the student's development in relation to political and economic conditions, whereas the macrosystem provides its larger cultural and societal context and practices. The chronosystem describes the historical context and development over time. In this study, Bronfenbrenner's (1979) theory is used to underline the importance of the complex interplay of individuals and their different environments. Resilience is seen as the result of the interaction of the individual with their environment. Consequently, students cannot solely be held accountable for their resilience or lack thereof. Instead, this study shifts the focus toward the significance of relationships and social support, examining their potential impact on student outcomes. Moreover, the chosen theory frames the study within the larger societal and cultural context, recognizing its impact on shaping a student's ability to thrive.

## Hypothesized models

Drawing on the review of previous literature and the underlying theoretical framework, two hypothesized models (Fig. 1) were developed to guide the analysis. The triangles in the models represent a comprehensive view of social well-being, where all subdimensions are hypothesized to directly affect academic achievement (Model 1) and resilience

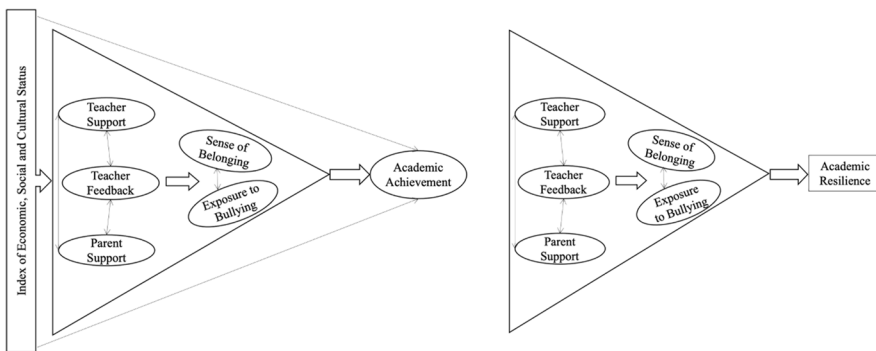
(Model 2). Additionally, the complexity of social well-being is captured by the inter-relationship between subdimensions. That is, the three social well-being subdimensions on the left-hand side of the triangle, namely the student-perceived teacher feedback, teacher support, and parental support, are hypothesized to indirectly impact academic outcomes through their influence on the student’s sense of belonging and exposure to bullying. The role of the student’s sense of belonging at school, as one important aspect of social well-being, has been especially highlighted in previous research. Relationships are considered “integral to well-being at school, [...] help facilitate a felt sense of connectedness when positive” (Graham et al., 2016, referring to Patton et al., 2000; Rowe et al., 2007; Soutter, 2011). A positive sense of belonging, in turn, is associated with higher achievement scores in many countries (OECD, 2019b). Further, students’ exposure to bullying is hypothesized to be closely linked with their sense of belonging at school. Thus, the present study places a special focus on the student’s sense of belonging at school and exposure to bullying in hypothesizing a mediating relationship between support factors and student outcomes. As mentioned previously, such mediation effects have been found in previous research (Saroughi & Cheema, 2023; Zumbunn et al., 2014). As shown in Fig. 1, the index of economic, social, and cultural status (ESCS) is used as a control variable in the first model, implying that the estimated relationship between social well-being and academic achievement is conditioned on ESCS. Model 1 is applied to the overall Swedish sample, whereas Model 2 focuses on the group of socioeconomically disadvantaged students and their probability of becoming resilient. By doing this, it becomes possible to identify significant connections between various subdimensions of social well-being and academic success in general, as well as with a specific focus on the accomplishments of students who demonstrate resilience.

With these hypothesized models, the following research questions will be examined:

RQ1: What is the relationship between different subdimensions of social well-being and a student’s academic achievement and resilience?

**Model 1. Social Well-Being and Academic Achievement**

**Model 2. Social Well-Being and Academic Resilience**



**Fig. 1** Hypothetical models linking social well-being to academic resilience and achievement. *Note.* Unidirectional arrows represent a relationship in terms of regression while the bidirectional arrows symbolize correlations. Academic resilience and achievement are regressed on all subdimensions of well-being, whereas the sense of belonging and exposure to bullying are regressed on teacher support, teacher feedback, and parent support

RQ2: To what extent do the students' sense of belonging at school and exposure to bullying mediate the relationship between other subdimensions of well-being and academic achievement and resilience?

## Methods

### Data source and sampling

Data were retrieved from the Swedish 2018 cross-sectional data set of the *Programme for International Student Assessment* (PISA), initiated by the *Organisation for Economic Co-operation and Development* (OECD). To closely mirror the population of students, a two-stage stratified sample design was used for PISA 2018. In the first stage, schools were sampled that had been pre-identified as PISA-eligible schools and categorized into different groups based on school characteristics. The second stage of sampling consisted of the random selection of 15-year-old students within these schools (OECD, 2017). The Swedish sample consists of 5504 students in 223 schools. The analysis of this study is twofold – one part focuses on the relationship between social well-being and academic achievement using the entire Swedish sample, and the other part focuses on the relationship between social well-being and academic resilience. As a measure of adversity is needed for the definition of resilient and nonresilient students, the second part of the analysis utilizes a subsample of 1337 socioeconomically disadvantaged students from 201 schools (later referred to as the low SES sample). These students fall within the bottom 25 percentile of the Swedish distribution of the Index of Economic, Social, and Cultural Status (ESCS).

### Measures

PISA's multifaceted survey and test program are distributed every three years, alternately focusing on the three competencies of reading, mathematics, and natural science, in addition to teacher, parent, and student surveys. The present study makes use of data from the student survey as well as achievement data. Table 1 presents information on all variables involved in the current analysis.

**Student's social well-being** The measure of social well-being is based on a well-being framework proposed by Borgonovi & Pál (2016) and adapted to the newer measures in PISA 2018 (for an overview, see Borgonovi, 2020). According to this framework, the social dimension of well-being can be measured using students' self-reported data on the sense of belonging at school, exposure to bullying, teacher support, teacher feedback, and parental emotional support. Each of these indicators was treated as a latent variable and measured by three to six items (see Table 1).

**Index of Economic, Social, and Cultural Status (ESCS)** The ESCS index comprises a range of indicators designed to assess the socioeconomic status of the student's family of origin. These include information on the parental occupational and educational status and family wealth, measured by an index of home possessions. This study employs the ESCS as a control variable in the first model and in the operationalization of academic resilience in the second model.

**Table 1** Descriptive variable information

Factor	Items	Entire Swedish Sample		Low SES Sample		Scale
		N	% Missing	N	% Missing	
Sense of Belonging at School	B1: I feel like an outsider (or left out of things) at school.	4963	9.83	1181	11.67	4-scaled variables, ranging from 1 = strongly agree to 4 = strongly disagree
	B2: I make friends easily at school.	4968	9.74	1192	10.85	
	B3: I feel like I belong to school.	4960	9.88	1186	11.29	
	B4: I feel awkward and out of place in my school.	4941	10.23	1176	12.04	
	B5: Other students seem to like me.	4939	10.27	1174	12.19	
	B6: I feel lonely at school.	4960	9.88	1189	11.07	
<i>Cronbach's Alpha:</i> Teacher Support	T1: The teacher shows an interest in every student's learning.	5377	2.31	1320	1.27	4-scaled variables, ranging from 1 = never or hardly ever to 4 = every lesson
	T2: The teacher gives extra help when students need it.	5372	2.40	1317	1.50	
	T3: The teacher helps students with their learning.	5367	2.49	1314	1.72	
	T4: The teacher continues teaching until the students understand.	5367	2.49	1315	1.65	
<i>Cronbach's Alpha:</i> Perceived Feedback	F1: The teacher gives me feedback on my strengths in this subject.	5329	3.18	1297	2.99	4-scaled variables, ranging from 1 = never or almost never to 4 = every lesson or almost every lesson
	F2: The teacher tells me in which areas I can still improve.	5327	3.22	1296	3.07	
	F3: The teacher tells me how I can improve my performance.	5324	3.27	1295	3.14	
<i>Cronbach's Alpha:</i>			.891		.881	

Table 1 (continued)

Factor	Items	Entire Swedish Sample		Low SES Sample		Scale
		N	% Missing	N	% Missing	
Exposure to Bullying	E1: Other students left me out of things on purpose.	4821	12.41	1143	14.51	4-scaled variables, ranging from 1 = never or almost never to 4 = once a week or more
	E2: Other students made fun of me.	4811	12.59	1139	14.81	
	E3: I was threatened by other students.	4802	12.75	1134	15.18	
	E4: Other students took away or destroyed things that belong to me	4815	12.52	1145	14.36	
	E5: I got hit or pushed around by other students.	4805	12.70	1141	14.66	
	E6: Other students spread nasty rumors about me.	4804	12.72	1139	14.81	
Parental Support	P1: My parents support my educational efforts and achievements.	4955	9.97	1180	11.74	4-scaled variables, ranging from 1 = strongly disagree to 4 = strongly agree
	P2: My parents support me when I am facing difficulties at school.	4945	10.16	1179	11.82	
	P3: My parents encourage me to be confident.	4943	10.19	1178	11.89	
ESCS	Index of Economic, Social, and Cultural Status	5348	2.83	1337	0	
	Mean (SD):	.361 (.89)		-.863 (.61)		



**Table 1** (continued)

Factor	Items	Entire Swedish Sample		Low SES Sample		
		N	% Missing	N	% Missing	Scale
Achievement	Mathematics	5504	0	1337	0	
	<i>Mean (SD):</i>		504.67 (89.99)		459.58 (86.12)	
	Reading	5504	0	1337	0	
	<i>Mean (SD):</i>		508.84 (106.05)		459.80 (99.72)	
Science	Science	5504	0	1337	0	
	<i>Mean (SD):</i>		501.80 (97.25)		452.56 (93.47)	

*Note.* If applicable, variables were recoded so that higher values indicate higher belonging/support. To measure achievement, multiple imputations were used to include all ten plausible values of each subject domain (mathematics, reading, and science) when using the entire Swedish sample. Thus, these values differ slightly from the ones reported in international reports. Plausible value 1 was used for the low SES sample

**Student's academic achievement** In PISA, student performance is reported as a set of ten plausible values for each student and domain (OECD, 2009b). Using multiple imputations, this study measures student achievement (the outcome of Model 1) as a latent variable combining all plausible values of the three domains mathematics, reading, and science.

**Academic resilience** A dichotomous variable with 1 = resilient and 0 = nonresilient is used. The classification of students into resilient and nonresilient categories is based on the cutoff values suggested by Agasisti et al. (2018). Students who achieve at or above level 3 proficiency in all three subjects and fall among the bottom 25% of the country's distribution of the PISA Index of Economic, Social, and Cultural Status (ESCS) are considered resilient. The threshold of level 3 was chosen as it reflects the median proficiency level, i.e., the highest level achieved on average by at least 50% of students across OECD countries, and is said to equip students "for success later in life" (Agasisti et al., 2018, p. 8). First, the plausible values of student achievement were translated into proficiency levels. The lower boundary for proficiency level 3 is 484.14 in Science, 482.38 in Mathematics, and 480.18 in Reading (OECD, 2002, 2005, 2009a). In Sweden, the average performance in PISA 2018 was around the 500-point mark (Avvisati et al., 2019). Thus, proficiency level 3 reflects performance just below the country's average. Then, students in the bottom 25% of the ESCS distribution with achievement at or above level 3 were identified. In this way, 358 students were defined as academically resilient, and the remaining 979 students from low socioeconomic backgrounds who did not meet said proficiency requirement (i.e., achievement below Level 3 in at least one subject) were defined as nonresilient. Please note that the findings presented in Model 2 resulted from analyses using the first of ten plausible values for each achievement domain. This approach is in accordance with other authors in the field (e.g., Agasisti et al., 2018; Radišić & Pettersen, 2020). Additional analyses with the remaining nine plausible values were conducted and led to comparable results (available in Appendix Table 6).

To further validate the study's findings, an alternative operationalization of resilience was tested, and the model results were compared. The alternative approach defines resilient students as those who fall in both the bottom third of Sweden's ESCS distribution and the top third of Sweden's reading performance distribution (OECD, 2011, p. 25).

## Analytical method

Data analyses were carried out using SPSS 29 and Mplus 8. Confirmatory factor analysis (CFA; Brown, 2015) was used to test the measurement property for the five social well-being subdimensions. Based on the proposed relations in the hypothesized models, the measurement models of the social well-being subdimensions were tested and linked together to affect academic resilience and achievement in structural equation models. Despite the nested structure in PISA data (i.e., the clustering of individual data in schools), only the student level was modeled due to small intraclass correlations and design effects (see Appendix Table 5.). Standard error biases of the parameter estimates due to the clustered data structure were corrected by using the TYPE = COMPLEX command in Mplus. Additionally, student weights were included, which are readily available in the PISA dataset and are utilized to adjust for variations in the likelihood of students being selected considering the specific sampling structure that is applied in PISA (OECD, 2019b).

Model 1 uses the entire Swedish sample of students and applies a robust maximum likelihood estimator to link the latent well-being subdimensions with the latent achievement outcome. Since ten plausible values per performance domain are available, multiple imputations are used to combine them. Model 2 only uses a subsample of socioeconomically disadvantaged students. As the outcome variable resilience is dichotomous, a probit regression analysis and the robust WLSMV (weighted least squares mean and variance adjusted) estimator are utilized. To evaluate model fit, both local and global fit indices were consulted. For this, the chi-square goodness-of-fit test, the root mean squared error of approximation (RMSEA), the comparative fit index (CFI), and the standardized root mean squared residual (SRMR) were used. Values below .06 for RMSEA, below .08 for SRMR and a CFI close to .95 indicate good model fit, whereas a CFI above .90 indicates acceptable model fit (Hu & Bentler, 1999).

## Results

### Testing measurement property of subdimensions of social well-being

Confirmatory factor analyses (CFA) were run separately for the entire Swedish sample and the low SES sample (see Table 2). Both CFAs resulted in a good model fit, with RMSEA of 0.031, CFIs at 0.974 (low SES sample) and 0.975 (entire sample), and an SRMR of 0.038 (low SES sample) and 0.033 (entire sample). As Chi-Square is sensitive to sample size, small differences appeared significant. Therefore, the indices RMSEA, CFI, and SRMR provide a better indication of model fit. Based on modification indices proposed in Mplus, residual correlations between items B2, B3, and B5 were introduced in the measurement model of sense of belonging at school. As these items were reverse coded, residual correlations seem appropriate.

Factor loadings presented in Table 2 of each latent construct are estimated for the socioeconomically disadvantaged subsample, as well as for the entire Swedish sample. A great majority of the factor loadings range from .70 to .90, indicating high construct validity of each latent variable in the analysis. Relatively low factor loading can also be observed; however, no factor loadings are below .47.

### Estimating the relationship between social well-being and achievement

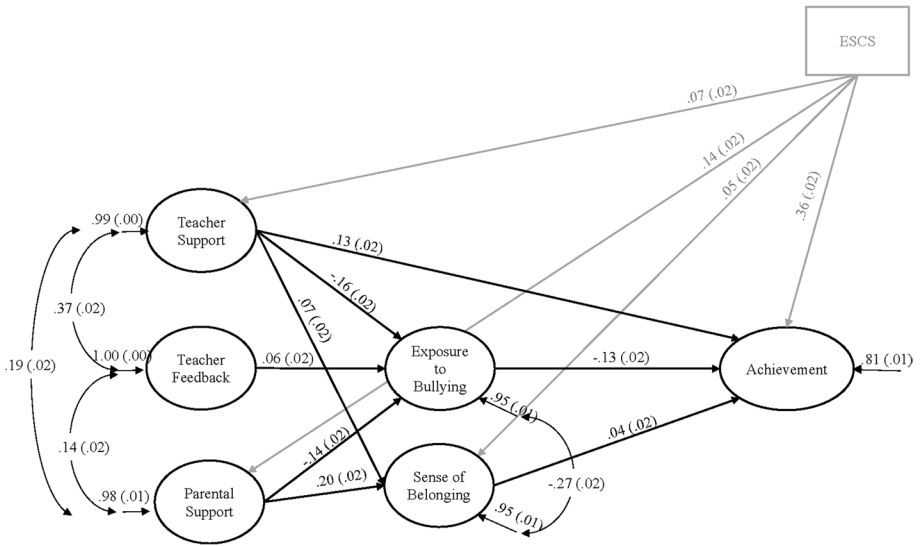
The hypothesized relationship between social well-being and academic resilience and achievement was tested in two separate models. Standardized results from the first structural equation model, linking academic achievement with social well-being, are displayed in Fig. 2. However, to increase readability, only significant relationships are displayed. Additionally, measurement models are not displayed but the factor loadings can be found in Table 2. Coefficients for direct and indirect relationships can be derived from Table 3. The model showed an overall good model fit with MLR  $\chi^2(276) = 1711.188$ , RMSEA = .031, CFI = 0.974, and SRMR = .032.

As can be derived from Fig. 2, the effects of different aspects of social well-being on student achievement vary. The perceived teacher support ( $\beta = .13$ ,  $p < .001$ ), sense of belonging at school ( $\beta = .04$ ,  $p = .05$ , thus only borderline significant), and exposure to bullying ( $\beta = -.13$ ,  $p < .001$ ) significantly predict students' achievement. Nevertheless, the socioeconomic background remains the strongest predictor ( $\beta = .36$ ,  $p < .001$ ). The

**Table 2** Confirmatory factor analyses with standardized factor loadings

Factor	Items	Entire Sample: Factor loading	Low SES Sample: Factor Loadings
Sense of Belonging at School	B1: I feel like an outsider (or left out of things) at school.	0.765	0.760
	B2: I make friends easily at school.	0.584	0.561
	B3: I feel like I belong to school.	0.511	0.477
	B4: I feel awkward and out of place in my school.	0.807	0.761
	B5: Other students seem to like me.	0.579	0.538
	B6: I feel lonely at school.	0.819	0.822
Teacher Support	T1: The teacher shows an interest in every student's learning.	0.763	0.770
	T2: The teacher gives extra help when students need it.	0.868	0.887
	T3: The teacher helps students with their learning.	0.888	0.897
	T4: The teacher continues teaching until the students understand.	0.815	0.819
Perceived Feedback	F1: The teacher gives me feedback on my strengths in this subject.	0.810	0.773
	F2: The teacher tells me in which areas I can still improve.	0.911	0.908
	F3: The teacher tells me how I can improve my performance.	0.853	0.844
Exposure to Bullying	E1: Other students left me out of things on purpose.	0.607	0.643
	E2: Other students made fun of me.	0.686	0.659
	E3: I was threatened by other students.	0.775	0.781
	E4: Other students took away or destroyed things that belong to me	0.725	0.762
	E5: I got hit or pushed around by other students.	0.718	0.710
Parental Support	E6: Other students spread nasty rumors about me.	0.715	0.706
	P1: My parents support my educational efforts and achievements.	0.840	0.843
	P2: My parents support me when I am facing difficulties at school.	0.915	0.911
Achievement	P3: My parents encourage me to be confident.	0.886	0.883
	A1: Plausible Values 1-10 Mathematics (multiple imputation)	0.908	
	A2: Plausible Values 1-10 Reading (multiple imputation)	0.898	
	A3: Plausible Values 1-10 Science (multiple imputation)	0.951	

*Note.* If applicable, variables were recoded so that higher values indicated higher belonging/support. Model fit, entire sample:  $\chi^2(257) = 1643.241$ , RMSEA = 0.031, CFI = 0.975, SRMR = 0.033; Model fit, low SES sample:  $\chi^2(257) = 577.703$ ,  $p < 0.001$ , RMSEA = 0.031 [90% CI 0.027, 0.034], CFI = 0.974, SRMR = 0.038



**Fig. 2** Structural equation model with standardized parameter estimates. Note. For better readability, the measurement part of the model and nonsignificant relationships are not displayed. Relationships with the ESCS control variable are indicated in grey, whereas all other relationships are indicated in black

perceived parental support and teacher feedback do not act as significant direct predictors of academic achievement, however, weakly place their effect indirectly through the students’ exposure to bullying ( $\beta = .02, p < .001$  and  $\beta = -.01, p = .009$  respectively). That is, perceived parental support weakens the student’s exposure to bullying and thus, indirectly places a positive effect on achievement. However, the negative indirect effect of teacher feedback is counterintuitive and small in size. Additionally, teacher support placed its effect indirectly through the exposure to bullying on achievement ( $\beta = .02, p < .001$ )

The students’ sense of belonging at school was highlighted as an important aspect of well-being and a predictor of academic resilience and achievement in previous research, however, was not found to be a strong predictor of student outcomes in the present study ( $\beta = .04, p = .05$ ). Yet, the results do indicate that different indicators of social well-being are interrelated and the student’s sense of belonging at school is significantly correlated with their exposure to bullying ( $\beta = -.27, p < .001$ ). Further, the perceived parental support significantly predicted students’ sense of belonging at school ( $\beta = .20, p < .001$ ) and exposure to bullying ( $\beta = -.14, p < .001$ ). The perceived support by the teacher similarly predicted the students’ exposure to bullying ( $\beta = -.16, p < .001$ ) and sense of belonging at school ( $\beta = .07, p = .001$ ).

### Estimating the relationship between social well-being and academic resilience

The hypothesized relationship between social well-being and academic resilience was then tested with a similar model structure but using a probit regression due to the dichotomous resilience outcome. The model fit statistics were as follows:  $\chi^2(213) = 468.797, p < 0.001, RMSEA = 0.030$  [90% CI 0.026, 0.034], CFI = 0.929, SRMR = 0.035, thus indicating acceptable model fit. Model results (Table 4) showed that only

**Table 3** STDYX results of structural equation model. Dependent variable: Achievement

<i>Factor</i>	<i>Coefficient</i>	<i>Standard Error</i>	<i>p-value</i>
Sense of Belonging (direct effect)	<b>0.038</b>	<b>0.020</b>	<b>0.050</b>
Exposure to Bullying (direct effect)	<b>-0.127</b>	<b>0.020</b>	<b>0.000</b>
Perceived Feedback			
- total effect	-0.033	0.018	0.060
- direct effect	-0.026	0.018	0.145
- indirect through Belong	0.000	0.001	0.997
- indirect through Bullying	<b>-0.008</b>	<b>0.003</b>	<b>0.009</b>
Teacher Support			
- total effect	<b>0.156</b>	<b>0.020</b>	<b>0.000</b>
- direct effect	<b>0.133</b>	<b>0.021</b>	<b>0.000</b>
- indirect through Belong	0.003	0.001	0.080
- indirect through Bullying	<b>0.021</b>	<b>0.004</b>	<b>0.000</b>
Parental Support			
- total effect	<b>0.049</b>	<b>0.018</b>	<b>0.005</b>
- direct effect	0.024	0.018	0.177
- indirect through Belong	0.007	0.004	0.053
- indirect through Bullying	<b>0.017</b>	<b>0.004</b>	<b>0.000</b>
ESCS			
- total effect	<b>0.379</b>	<b>0.017</b>	<b>0.000</b>
- direct effect	<b>0.363</b>	<b>0.017</b>	<b>0.000</b>
- indirect through Belong	0.002	0.001	0.146
- indirect through Bullying	-0.004	0.003	0.102
- indirect through Feedback	0.000	0.000	0.917
- indirect through Parental Support	0.003	0.003	0.184
- indirect through Teacher Support	<b>0.010</b>	<b>0.003</b>	<b>0.001</b>
- indirect through Belong and Feedback	0.000	0.000	0.997
- indirect through Belong and Parental Support	0.001	0.001	0.057
- indirect through Belong and Teacher Support	0.000	0.000	0.104
- indirect through Bully and Feedback	0.000	0.000	0.915
- indirect through Bully and Parental Support	<b>0.002</b>	<b>0.001</b>	<b>0.000</b>
- indirect through Bully and Teacher Support	<b>0.002</b>	<b>0.001</b>	<b>0.003</b>

Note. Model fit:  $\chi^2(276) = 1711.188$ , RMSEA = 0.031, CFI = 0.974, SRMR = 0.032; Significant results at  $p < 0.05$  are indicated in bold

the perceived teacher support was found to significantly predict the student's likelihood of being resilient and no indirect effects were found to be statistically significant. Therefore, an additional analysis of a model without the mediation structure was performed with resilience as the dependent variable and teacher support, feedback, parental support, exposure to bullying, and sense of belonging as correlated independent variables. Of the five latent variables entered into the probit regression model, only student-perceived teacher support significantly contributed to predicting the likelihood of academic resilience, with a probit regression coefficient of 0.113 ( $p = 0.032$ ). In other words, one

**Table 4** unstandardized results for probit regression analysis. Dependent variable: Academic Resilience

<i>Factor</i>	<i>Coefficient</i>	<i>Standard Error</i>	<i>p-value</i>
Sense of Belonging (direct effect)	0.019	0.095	0.841
Exposure to Bullying (direct effect)	-0.159	0.099	0.108
Perceived Feedback			
- total effect	-0.060	0.061	0.330
- direct effect	-0.055	0.062	0.369
- indirect through Belong	0.000	0.002	0.846
- indirect through Bullying	-0.004	0.006	0.419
- total effect	<b>0.128</b>	<b>0.052</b>	<b>0.014</b>
- direct effect	<b>0.113</b>	<b>0.053</b>	<b>0.032</b>
- indirect through Belong	0.001	0.005	0.843
- indirect through Bullying	0.014	0.009	0.136
Parental Support			
- total effect	0.008	0.065	0.908
- direct effect	-0.013	0.067	0.841
- indirect through Belong	0.004	0.019	0.840
- indirect through Bullying	0.017	0.011	0.107

Note. Model fit:  $\chi^2(213) = 468.797$ ,  $p < 0.001$ , RMSEA = 0.030 [90% CI 0.026, 0.034], CFI = 0.929, SRMR = 0.035; Significant results at  $p < 0.05$  are indicated in bold

unit change in teacher support is associated with a 0.113 increase in the standard score (z-score) of resilience (for all results, see Appendix Table 6).

### Validation using different operationalizations and plausible values

To validate the results, additional analyses using the remaining nine plausible values for each subject domain, as well as an alternative operationalization of academic resilience were tested. All results can be found in Appendix Tables 6 and 7. The additional analyses using the remaining nine plausible values for each subject domain also led to comparable results. In all but one analyses, teacher support was found to significantly predict academic resilience. In addition, analyses with two out of ten plausible values found the student's exposure to bullying to negatively predict resilience.

For the alternative operationalization, students within the bottom third of Sweden's ESCS distribution with achievement in the top third of the reading achievement distribution were considered resilient (OECD, 2011). This alternative operationalization resulted in a number of 1783 socioeconomically disadvantaged students, 351 of whom are considered resilient using plausible value 1. Again, the analysis was performed ten times, that is, once for each plausible value. Results using this alternative operationalization also underline the importance of teacher support as a positive predictor of academic resilience in all analyses. In addition, students' exposure to bullying was found to be a significant negative predictor of resilience in all but one analyses. Surprisingly, the student-reported teacher feedback was also found to negatively predict academic resilience in two out of ten analyses.

Overall, these additional analyses suggest that the results presented in this paper are fairly robust. They could even be considered modest, as the relationship between social well-being and academic resilience may have been underestimated.

## Discussion

The aim of the study was to explore whether a student's social well-being, as an important dimension of their general well-being, can be used to predict the academic achievement and resilience of students in Sweden. Further, it was tested whether a student's sense of belonging at school and exposure to bullying mediated the relationship between the other subdimensions (that is teacher feedback, teacher support, and parental support) and students' academic achievement and resilience. Modeling the Swedish PISA 2018 data with a structural equation modeling technique, the results revealed a complex interplay among the subdimensions of social well-being. For instance, the student-reported teacher and parent support factors were significantly related to students' sense of belonging at school and exposure to bully. Even though the indicators of social well-being seem to be closely related to each other, the hypothesized mediating role of a student's sense of belonging at school and their exposure to bullying was only partly confirmed, and indirect effects on student outcomes were rather weak. However, negative effects of student-perceived support by parents and teachers on the student's exposure to bullying do indicate that social support may have a buffering effect. This indicates that adults at school and home play a crucial role in safeguarding students from bullying and promoting their sense of belonging at school. Students who perceive more support from their close environment (i.e., the microsystem; Bronfenbrenner, 1979) may build more internal resources and skills that help them react and cope when facing threats to their well-being.

With regard to the relationship between social well-being and academic outcomes, it should be noted that only student-reported teacher support was found to be a significant predictor of both students' academic resilience and achievement. This underscores the crucial value of supportive teachers, aligning with prior research findings and emphasizing the significance of fostering supportive teacher-student relationships to enhance student outcomes. Further, exposure to bullying was found to negatively predict academic achievement, highlighting its detrimental effect on student outcomes in addition to the negative influence on well-being. Even though teacher feedback was not found to directly predict achievement or resilience, it did exhibit a small significant indirect effect on achievement through its association with bullying. This rather unexpected positive relationship between feedback and bullying may appear counterintuitive, suggesting that students who perceive higher levels of feedback are also exposed to more frequent bullying. These results could indicate that students struggling academically may receive increased teacher attention and feedback on areas that require improvement. However, these students may also be the ones more susceptible to bullying, hence the negative relationship between exposure to bullying and achievement. Further research is needed. However, the findings do indicate the need to invest in strategies to reduce bullying in educational settings and strengthen the support students receive from their immediate environment.

It is interesting to note that, contrary to the expectations based on prior research, the student's sense of belonging at school may not be as influential in determining student outcomes. The current study did not find a significant relationship between a student's sense of belonging and their academic resilience and only found a weak relationship to academic achievement. This discrepancy with previous research raises questions about the complex interplay of influencing factors and requires further investigation. Overall, the value of promoting social well-being in general, and social support in particular, needs to be acknowledged and further scrutinized. However, it is important to highlight that fostering student well-being and ensuring that all students are equipped with the necessary skills, support,



and care should be a priority in and of itself. Still, the present study additionally highlighted the importance of investing in the development of social well-being in light of the potential to foster academic achievement and resilience. Placing the results into the broader societal context (i.e., the macrosystem; Bronfenbrenner, 1979), programs to promote students' social well-being could not only have positive effects on students' lives but also their academic development. In the long run, this could lead to productivity gains and bring positive implications for the growth of the nation and economy, as well as the overall well-being of the nation.

Yet, the results indicate that social well-being, as measured by social relationships and perceived support and feedback, is not sufficient to explain academic resilience in Sweden. Social well-being, and especially the perceived support from the teacher, was found to predict the likelihood of being academically resilient but future research is needed. It can be assumed that the positive adaptation of resilient students in Sweden may be influenced by the classroom composition, peer effects, or school culture. The need for a better school climate with fewer disciplinary problems (OECD, 2016) and the lack of compensatory allocation of teaching resources (Hansson & Gustafsson, 2016) could intensify the risk of some students and may thus, explain different responses to adversity.

As the present study mostly concerned students' immediate environment, as measured by their relationship to teachers, peers, and parents, and their interrelation (i.e., the micro- and mesosystem; Bronfenbrenner, 1979), future studies should place a stronger emphasis on the students' wider environment. Academic resilience is not seen as an individual trait but rather an interplay of different environmental systems and individual characteristics. Acknowledging the responsibility of the student's environment is an important step to not credit or blame an individual student for their academic achievement and resilience. Rather, considering larger sociocultural factors allows us to identify external resources that can be utilized to enhance academic resilience and support the student's development. Similarly, other researchers have argued that "the study of resilience should involve context first and the child second" (Ungar, 2011). Thus, more research on the function of the meso-, exo-, and macrosystem is needed to stronger contextualize resilience. Additionally, studies focusing on other dimensions of well-being are needed. A recent study on the relationship between student well-being and academic achievement in Swedish compulsory schools indicated a negative relationship between psychological well-being and academic achievement (Klapp et al., 2023). This highlights the complexity of the relationship between well-being and achievement and further research, especially on academic resilience and well-being is needed.

## Limitations

There are some limitations to the study that should be addressed. First and foremost, due to the cross-sectional design of this study, no strong causal claims can be made. This study hypothesizes an influence of social well-being on academic achievement and resilience. However, academic achievement and resilience could have a causal effect on students' social well-being, or both well-being and achievement could be influenced by a third common variable.

The issue that there is no clear consensus on the terminology and methodology used in research on resilience (Wustmann, 2005) additionally limits the present study. After weighing the advantages and disadvantages of different approaches, a definition-driven approach was applied, which is said to reflect academic resilience “in its most literal sense: academic achievement despite adversity” (Rudd et al., 2021, p. 5). Yet, the use of binary labels can miscategorize students close to the chosen thresholds. Therefore, an alternative operationalization was tested to validate the findings. Even though the results were fairly robust, some smaller differences were found. The statistically significant relationships presented in this study were confirmed by these additional analyses. However, further significant relationships (such as the predicting role of bullying on resilience) were found when applying the alternative operationalization. Hence, the results presented in this study are rather conservative and might underestimate the relationship between social well-being and academic resilience.

As this study makes use of secondary data, it is closely dependent on and constrained by the data and variable availability. Due to this, the study is limited to a definition of academic resilience that only takes the student’s socioeconomic background into account and is unable to include other possible adversities that could justifiably lead to classifying students as academically resilient, nor can it claim that students themselves perceive their background as challenging. Further, students may be considered resilient in other areas of life. Nonetheless, the chosen approach of operationalizing academic resilience using measures of achievement and socioeconomic background is well established and the context specificity can be seen as an advantage.

## Conclusion

The present study highlights the importance of a supportive environment, and especially a supportive teacher, to promote academic achievement and resilience. Furthermore, the study underscores the detrimental impact of bullying on both well-being and academic performance, highlighting the need for comprehensive strategies to address the issue. However, the relationship between social well-being and academic resilience and achievement is complex and needs to be further scrutinized. Subdimensions of social well-being only partly explained the variation in student outcomes. Thus, further research is needed to investigate other possible predictors for academic resilience, while placing them in the larger context of sociocultural issues.

At this early stage of research on the relationship between academic resilience and well-being, policy implications cannot be voiced without caution. Based on the study’s findings, interventions aimed at enhancing academic resilience and achievement should focus on strengthening the student’s social support system, especially the support received by the teacher. In any case, the importance of student well-being needs to be acknowledged in and of itself, as well as its interrelation with academic resilience and achievement. Nevertheless, the results suggest that the student’s level of adversity still is the strongest predictor of academic achievement. Thus, the elimination of the risks involved with having a disadvantaged background should be of utmost priority.

## Appendix 1

Table 5 Intraclass correlations (ICC) and design effect (DEFF) for items measuring social well-being

Factor	Items	Entire Sample		Low SES sample	
		ICC	DEFF	ICC	DEFF
Sense of Belonging at School	B1: I feel like an outsider (or left out of things) at school.	0.011	1.26	0.004	1.02
	B2: I make friends easily at school.	0.012	1.28	0.004	1.02
	B3: I feel like I belong to school.	0.032	1.75	0.025	1.14
	B4: I feel awkward and out of place in my school.	0.015	1.35	0.009	1.05
	B5: Other students seem to like me.	0.016	1.37	0.005	1.03
	B6: I feel lonely at school.	0.027	1.63	0.017	1.10
Teacher Support	T1: The teacher shows an interest in every student's learning.	0.027	1.63	0.022	1.12
	T2: The teacher gives extra help when students need it.	0.053	2.24	0.047	1.26
	T3: The teacher helps students with their learning.	0.053	2.24	0.048	1.27
	T4: The teacher continues teaching until the students understand.	0.053	2.24	0.048	1.27
Perceived Feedback	F1: The teacher gives me feedback on my strengths in this subject.	0.044	2.03	0.033	1.19
	F2: The teacher tells me in which areas I can still improve.	0.041	1.96	0.030	1.17
	F3: The teacher tells me how I can improve my performance.	0.037	1.87	0.027	1.15
Exposure to Bullying	E1: Other students left me out of things on purpose.	0.012	1.28	0.008	1.04
	E2: Other students made fun of me.	0.036	1.84	0.026	1.15
	E3: I was threatened by other students.	0.027	1.63	0.020	1.11
	E4: Other students took away or destroyed things that belong to me	0.053	2.24	0.042	1.24
	E5: I got hit or pushed around by other students.	0.025	1.58	0.025	1.14
	E6: Other students spread nasty rumors about me.	0.026	1.61	0.022	1.12
Parental Support	P1: My parents support my educational efforts and achievements.	0.023	1.54	0.015	1.08
	P2: My parents support me when I am facing difficulties at school.	0.037	1.87	0.032	1.18
	P3: My parents encourage me to be confident.	0.033	1.77	0.026	1.15

Note. DEFF (design effect) =  $1 + \delta(n - 1)$ , with  $\delta$  = Intraclass Correlation (ICC) and  $n$  = average cluster size

## Appendix 2

Table 6 Probit regression analysis with ten plausible values. Dependent variable: Academic Resilience

Factor	PV1	PV2	PV3	PV4	PV5	PV6	PV7	PV8	PV9	PV10
	Coefficient (Standard Error)	Coefficient (Standard Error)	Coefficient (Standard Error)	Coefficient (Standard Error)	Coefficient (Standard Error)	Coefficient (Standard Error)	Coefficient (Standard Error)	Coefficient (Standard Error)	Coefficient (Standard Error)	Coefficient (Standard Error)
<b>Sense of Belonging</b>										
unstandardized	0.019 (0.095)	-0.012 (0.097)	0.008 (0.090)	0.049 (0.091)	-0.030 (0.089)	0.078 (0.093)	-0.043 (0.090)	0.082 (0.087)	0.099 (0.092)	0.103 (0.094)
STDYX	0.013 (0.065)	-0.008 (0.067)	0.006 (0.062)	0.034 (0.063)	-0.021 (0.061)	0.054 (0.064)	-0.030 (0.062)	0.056 (0.060)	0.068 (0.063)	0.071 (0.065)
<b>Exposure to Bullying</b>										
unstandardized	-0.159 (0.099)	-0.130 (0.094)	-0.161 (0.094)	-0.109 (0.095)	<b>-0.265 (0.101)</b>	-0.146 (0.097)	<b>-0.300 (0.092)</b>	-0.066 (0.097)	-0.166 (0.096)	-0.159 (0.096)
STDYX	-0.084 (0.052)	-0.069 (0.049)	-0.085 (0.049)	-0.057 (0.050)	<b>-0.140 (0.052)</b>	-0.077 (0.050)	<b>-0.158 (0.047)</b>	-0.035 (0.051)	-0.088 (0.050)	-0.084 (0.050)
<b>Perceived Feedback</b>										
unstandardized	-0.055 (0.062)	-0.104 (0.059)	-0.080 (0.059)	-0.043 (0.062)	-0.039 (0.052)	-0.109 (0.061)	-0.058 (0.060)	-0.038 (0.060)	-0.056 (0.059)	-0.083 (0.063)
STDYX	-0.042 (0.046)	-0.078 (0.043)	-0.060 (0.044)	-0.032 (0.046)	-0.029 (0.043)	-0.082 (0.045)	-0.043 (0.045)	-0.028 (0.045)	-0.042 (0.044)	-0.062 (0.047)
<b>Teacher Support</b>										
unstandardized	<b>0.113 (0.053)</b>	<b>0.131 (0.050)</b>	<b>0.170 (0.052)</b>	<b>0.116 (0.051)</b>	<b>0.134 (0.052)</b>	<b>0.143 (0.050)</b>	<b>0.142 (0.052)</b>	<b>0.128 (0.053)</b>	0.083 (0.052)	<b>0.115 (0.052)</b>
STDYX	<b>0.095 (0.044)</b>	<b>0.110 (0.041)</b>	<b>0.143 (0.045)</b>	<b>0.097 (0.042)</b>	<b>0.112 (0.043)</b>	<b>0.120 (0.042)</b>	<b>0.119 (0.044)</b>	<b>0.108 (0.044)</b>	0.069 (0.044)	<b>0.096 (0.043)</b>
<b>Parental Support</b>										
unstandardized	-0.013 (0.067)	-0.014 (0.063)	0.007 (0.069)	0.049 (0.066)	-0.048 (0.067)	0.014 (0.065)	0.022 (0.066)	0.003 (0.065)	-0.012 (0.064)	-0.015 (0.062)
STDYX	-0.009 (0.046)	-0.010 (0.043)	0.005 (0.047)	0.034 (0.063)	-0.033 (0.061)	0.010 (0.044)	0.015 (0.045)	0.002 (0.044)	-0.008 (0.044)	-0.010 (0.065)

Note. Academic resilience is a dichotomous variable with 1 = resilient and 0 = nonresilient. Students in the bottom 25% of Sweden's ESCS distribution who achieve at or above Level 3 in mathematics, reading, and science are defined as resilient. Low SES students who do not reach Level 3 in at least one domain are defined as nonresilient. The analyses are based on a sample of 1337 students. Significant results at  $p < 0.05$  are indicated in bold

**Table 7** Probit regression analysis with ten plausible values. Dependent variable: Academic Resilience (alternative operationalization)

Factor	PV1	PV2	PV3	PV4	PV5	PV6	PV7	PV8	PV9	PV10
	Coefficient (Standard Error)	Coefficient (Standard Error)	Coefficient (Standard Error)	Coefficient (Standard Error)	Coefficient (Standard Error)	Coefficient (Standard Error)	Coefficient (Standard Error)	Coefficient (Standard Error)	Coefficient (Standard Error)	Coefficient (Standard Error)
<b>Sense of Belonging</b>										
unstandardized	-0.023 (0.072)	0.015 (0.074)	-0.052 (0.070)	0.042 (0.079)	0.056 (0.076)	0.027 (0.076)	-0.046 (0.074)	-0.004 (0.074)	-0.048 (0.078)	0.017 (0.084)
STDYX	-0.016 (0.049)	0.010 (0.051)	-0.036 (0.047)	0.029 (0.054)	0.038 (0.052)	0.018 (0.051)	-0.031 (0.050)	-0.003 (0.050)	-0.032 (0.053)	0.012 (0.057)
<b>Exposure to Bullying</b>										
unstandardized	<b>-0.287 (0.089)</b>	<b>-0.230 (0.085)</b>	<b>-0.218 (0.088)</b>	<b>-0.232 (0.085)</b>	-0.166 (0.092)	<b>-0.217 (0.084)</b>	<b>-0.227 (0.086)</b>	<b>-0.208 (0.082)</b>	<b>-0.301 (0.087)</b>	<b>-0.260 (0.085)</b>
STDYX	<b>-0.153 (0.047)</b>	<b>-0.123 (0.045)</b>	<b>-0.117 (0.046)</b>	<b>-0.124 (0.044)</b>	-0.089 (0.049)	<b>-0.116 (0.044)</b>	<b>-0.112 (0.046)</b>	<b>-0.112 (0.044)</b>	<b>-0.162 (0.046)</b>	<b>-0.139 (0.045)</b>
<b>Perceived Feedback</b>										
unstandardized	-0.012 (0.056)	-0.047 (0.052)	-0.066 (0.052)	-0.048 (0.052)	-0.023 (0.053)	-0.025 (0.050)	<b>-0.118 (0.054)</b>	-0.015 (0.053)	<b>-0.101 (0.051)</b>	-0.028 (0.054)
STDYX	-0.009 (0.044)	-0.036 (0.040)	-0.051 (0.040)	-0.037 (0.041)	-0.018 (0.041)	-0.019 (0.039)	<b>-0.092 (0.042)</b>	-0.012 (0.041)	<b>-0.078 (0.039)</b>	-0.021 (0.042)
<b>Teacher Support</b>										
unstandardized	<b>0.178 (0.056)</b>	<b>0.179 (0.053)</b>	<b>0.175 (0.053)</b>	<b>0.137 (0.051)</b>	<b>0.196 (0.052)</b>	<b>0.166 (0.053)</b>	<b>0.163 (0.052)</b>	<b>0.180 (0.052)</b>	<b>0.186 (0.046)</b>	<b>0.192 (0.055)</b>
STDYX	<b>0.149 (0.047)</b>	<b>0.150 (0.045)</b>	<b>0.147 (0.044)</b>	<b>0.115 (0.042)</b>	<b>0.164 (0.044)</b>	<b>0.140 (0.044)</b>	<b>0.137 (0.044)</b>	<b>0.151 (0.043)</b>	<b>0.156 (0.039)</b>	<b>0.161 (0.046)</b>
<b>Parental Support</b>										
unstandardized	0.124 (0.054)	0.009 (0.061)	0.035 (0.064)	0.052 (0.065)	0.050 (0.076)	0.042 (0.054)	0.056 (0.058)	0.077 (0.060)	0.093 (0.059)	0.026 (0.060)
STDYX	0.085 (0.038)	0.006 (0.042)	0.025 (0.044)	0.036 (0.054)	0.034 (0.041)	0.029 (0.037)	0.038 (0.041)	0.053 (0.042)	0.064 (0.041)	0.018 (0.042)

*Note.* Academic resilience is a dichotomous variable with 1 = resilient and 0 = nonresilient. Students in the bottom third of Sweden's ESCS distribution and the top third of Sweden's reading performance distribution are defined as resilient. Low SES students who do not reach the top third in reading performance are defined as nonresilient. The analyses are based on a sample of 1783 students. Significant results at  $p < 0.05$  are indicated in bold

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**Data availability** The dataset used in this article is openly accessible and can be downloaded as public use file from the OECD's website: <https://www.oecd.org/pisa/data/>.

## Declarations

**Competing interests** The author declares no competing interests.

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