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The effect of teacher, parental, and peer support on later grade point average: The mediating roles of self-beliefs

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Abstract

The present study investigates how perceived support from peers, parents, and teachers influences later academic performance and if academic self-efficacy and entity intelligence beliefs mediate this association in a sample of early secondary school students. Data were collected from 750 Norwegian students in lower secondary school at two-time points (8th and 10th grade). All support variables were positively associated with academic self-efficacy but not entity intelligence beliefs. Academic self-efficacy was positively associated with GPA in 10th grade, while entity intelligence beliefs were negatively associated. The only mediation effect observed was between teacher support and GPA through academic self-efficacy. The study offers knowledge about mechanisms of support and later GPA, emphasizing the vital role of teachers in promoting academic self-efficacy and, in turn, improving academic performance for young adolescents. Entity intelligence beliefs hamper GPA, but more research is needed to ascertain its effect on academic performance.

KEYWORDS

academic self-efficacy, entity intelligence beliefs, GPA, social support

The raw data used in this study can be obtained from the Norwegian Center for Research data https://www.nsd.no/en after reasonable request to the corresponding author.

1 | INTRODUCTION

Much research has investigated how self-beliefs influence academic performance throughout education. This research has identified academic self-efficacy (ASE), that is, an individual's belief that they can successfully perform the behaviors necessary to produce a certain outcome (Bandura, 1997) as a particularly important factor in academic functioning (e.g., Multon et al., 1991). In addition, investigating the academic impact of how students perceive their own intelligence as being either malleable or fixed is given increasing attention (e.g., Costa & Faria, 2018). Even though self-beliefs have been extensively examined in an educational setting, less is known about how perceived parental, teacher, and peer support influences these self-beliefs and the subsequent academic performances. The present longitudinal study fills that knowledge gap. Specifically, we investigate (1) how perceived support influences later academic performance and (2) if self-beliefs mediate this association in a sample of early secondary school students. This knowledge might benefit future implementation research and school practitioners.

1.1 | Perceived parental, teacher, and peer support and academic performance

Learning does not take place in a vacuum. Parents, teachers, and peers influence how students think and feel in school and at home (Bronfenbrenner, 1986; Eccles et al., 1993; Song et al., 2015). Social support is frequently construed as a multidimensional construct consisting of dimensions such as emotional, instrumental, informational and appraisal support—with varying effects on different outcomes (Tardy, 1985). For the present study, we decided to narrow our use of social support to specific dimensions that have shown associations with adolescent academic outcomes, that is, autonomy support from teachers, academic support from parents and emotional support from peers.

According to self-determination theory (SDT) (Deci & Ryan, 1985, 2002; Ryan & Deci, 2017), environments can satisfy (or, in contrast, thwart or frustrate) individuals' three basic psychological needs for autonomy, competence, and relatedness. SDT (Ryan & Deci, 2017) suggests that satisfying the three basic needs brings about several positive educational effects. The theory argues that if a learning environment, such as parents, teachers, and peers, satisfies a student's basic needs, the student will become motivated and engaged, which, in turn, will lead to greater performances in the same setting (e.g., Furrer et al., 2014; Mitchell & DellaMattera, 2011; Skinner et al., 2008). Previous research supports these theoretical assumptions (e.g., see Bureau et al., 2022; Buzzai et al., 2021; Ryan & Deci, 2017).

In an educational context, the positive impact of having an autonomy-supportive teacher (as opposed to a controlling teacher) has been widely studied. Findings generally indicate that teacher autonomy support is positively related to several beneficial educational outcomes for students (for overviews, see Hooper, 2018; Núñez & León, 2015; Okada, 2021; Stroet et al., 2013). Examples of how a teacher can be autonomy supportive are allowing students to choose tasks they find interesting and important and encouraging the students to be critical and self-determined thinkers (Assor & Kaplan, 2001). Because teachers organize a large portion of students' everyday life and spend a lot of time with them, the perceived support students experience from their teachers could potentially be the most important social influence in students' lives (Chen, 2005; Lempers & Clark-Lempers, 1992).

Previous research indicates that young people with parents who are involved and engaged in their lives, regardless of income or background, have an increased likelihood of performing better academically, enrolling in higher-level programs, having good school attendance, being well adapted in school, graduate, and go on to postsecondary education (Driessen et al., 2005; Henderson & Mapp, 2002). One meta-analysis found that experiencing autonomy support from parents was associated with greater academic performance, autonomous motivation, perceived competence, engagement, and positive school attitudes, among other outcomes (Vasquez et al., 2016). Moreover, one longitudinal study found that parental support was the most beneficial, compared to

teacher and peer support, and predicted stronger mastery goals and higher academic achievement (Song et al., 2015). It should also be noted that earlier studies have indicated a strong correlation between types of support from parents (Patrick et al., 2007; Wentzel, 1997, 1998), but these seem to potentially predict academic outcomes differently (Song et al., 2015). When differentiating between emotional and academic parental support, Song et al. (2015) found parental emotional support to be consistently associated with positive academic outcomes, whereas parental academic support was found both to be associated with master and performance goals and test anxiety, and only indirectly with academic achievement. Mackinnon (2012) also found that general social support (including general parental support) did not predict academic achievement, which could be a result of not differentiating between types of support. So, even if a substantial number of studies indicate that parental support is beneficial for academic achievement, the findings are inconsistent, pointing to the relevance of studying specific types of social support and potential mechanisms at play in the relationship with academic achievement.

During adolescence, peers also become increasingly important (Larson & Richards, 1991), and studies imply that they influence a wide range of domains (Giletta et al., 2021; Song et al., 2015). One recent cross-sectional study found support for the positive effect of social connectedness with peers across developmental domains and confirmed that relationships with peers are of particular importance during adolescence (Bradley et al., 2021). Bradley et al. (2021) established that peer support was positively associated with academic achievement while negatively related to engagement. In contrast, findings imply that victimized adolescents perform worse academically than others (Thijs & Verkuyten, 2008).

1.2 | Academic self-efficacy and Entity intelligence beliefs

Self-efficacy theory argues that the core belief of self-efficacy can be regarded as the basis of all human aspirations, motivation, and accomplishments (Bandura, 1997, 2018). In the educational domain, it has been found that students with high levels of ASE tend to put more effort into schoolwork, participate in academic activities more readily, show greater interest in learning, and feel tranquil and ready in the face of difficult academic challenges (Bandura, 1986, 1997; Schunk, 2012). ASE tends to influence self-regulated learning behaviors related to performance, such as task choice, effort, persistence, ambitious goal setting, persisting in the face of adversity, use of effective learning strategies and exhibiting resourceful and thoughtful planning to undertake and achieve the desired outcome (Pajares, 2008; Richardson et al., 2012; Schunk & Pajares, 2009; Zimmerman, 2000; Zimmerman & Cleary, 2009). Previous research indicates that the association between ASE and academic performance is positive and moderate in effect size (for overviews, see Honicke & Broadbent, 2016; Richardson et al., 2012; Schunk & DiBenedetto, 2016).

ASE is an evaluative element of one's capabilities, but it does not give an indication of how stable or unstable students perceive their abilities to be (i.e., is it possible to improve?). Students' implicit theories of intelligence consider this aspect of self-belief. A previous cross-sectional study with data from all the 8th graders in the present study revealed that entity intelligence beliefs (EIB) were statistically significant and negatively associated with grade point average (GPA), whereas incremental beliefs had no significant association with GPA (Diseth et al., 2014). Therefore, the present study included only EIB as an implicit theory of intelligence.

Intelligence beliefs concern individuals' mindsets of how they perceive their own intelligence as either fixed (a quality one is born with) or malleable (something that can be altered over time) (Dweck & Leggett, 1988). The Implicit theory of intelligence assumes that individuals with EIB are likely to perceive their abilities and competencies as relatively stable or fixed (Dweck, 1999). Central to this way of thinking is that although it is possible to learn new things, the underlying intelligence remains the same (Dweck et al., 1995). This perception promotes an understanding of performances as a direct consequence of the stability of their intelligence (Hong et al., 1999). Students with this outlook on intelligence are increasingly likely to embrace performance goals that will demonstrate their abilities and result in positive assessments from others (Dweck, 1999; Pepi et al., 2015). They are

also more likely to prioritize assessment over learning and assume helpless strategies than individuals with malleable intelligence beliefs (Elliott & Dweck, 1988; Robins & Pals, 2002). These forms of assessment prioritizing and helpless strategies tend to result in poorer academic performances (Blackwell et al., 2007).

1.3 | The association between perceived social support and self-beliefs

Parents, teachers, and peers influence students' self-beliefs (Song et al., 2015). First, parents who encourage children in their scholarly pursuits also foster their psychological resources, help them perform better on tests and strengthen their ASE (Grijalva-Quiñonez et al., 2020; Holloway et al., 2016; Pino-Pasternak & Whitebread, 2010; Sha et al., 2016). Second, several studies have established that teacher autonomy support predicts students' ASE (Alivernini & Lucidi, 2011; Baten et al., 2020; Gutiérrez & Tomás, 2019; Nolen, 2003; Reeve et al., 2004). Third, Nelson and DeBacker (2008) found that students who perceived they were valued and respected by their classroom peers reported higher self-efficacy concurrently. In addition, students' self-beliefs may suffer from a lack of peer support. This is particularly true in secondary school, as adolescents spend a great deal of time thinking about their position among peers and remain more susceptible to peer influence than children and adults (Ciranka & van den Bos, 2019; Thijs & Verkuyten, 2008). Lastly, a handful of studies also suggest adverse effects on ASE when adolescents are rejected or experience victimization (Austin & Joseph, 1996; Flook et al., 2005; Verkuyten & Thijs, 2002).

How perceived social support from parents, peers and teachers might be associated with implicit intelligence beliefs is less clear. One study found that adolescents' intelligence beliefs were associated with the level of support or control they experienced from their parents (Roskam & Nils, 2007). For example, young people with controlling parents were increasingly likely to report that they believed their intelligence was fixed or unchangeable, compared to individuals with more supportive parents. Similarly, another study using cross-sectional data from a secondary school sample found that parental and teacher support was negatively associated with EIB (King et al., 2012). In addition, some findings indicate that students who hold EIB are more likely to experience negative emotions, which could be explained by differences in social support (King et al., 2012; Robins & Pals, 2002).

1.4 | The present study

ASE and EIB constitute distinct but complementary elements of students' self-beliefs relevant to academic performance. Theory and empirical findings imply that perceived social support impacts motivation-related cognitions, such as self-beliefs (Ryan & Deci, 2017). Some studies have considered social support from parents, teachers and peers as a whole concerning self-beliefs and academic performance (e.g., Song et al., 2015). However, very few studies have examined the individual effect of different types of perceived social support sources on self-beliefs and GPA. Moreover, the potential mediating effect of self-beliefs in the association between perceived social support and later GPA remains largely unexplored.

We sought to investigate the effect of perceived parental, teacher, and peer support on GPA directly and indirectly through EIB and ASE. This study is guided by theoretical rationales in self-efficacy theory, implicit theory of intelligence, and SDT and shortcomings in earlier studies (e.g., cross-sectional design). We employed a longitudinal design from 8th to 10th grade while controlling for gender, socioeconomic status (SES), and earlier academic performances. We proposed the following hypotheses:

1. Perceived peer support, parental academic support, and teacher autonomy support in 8th grade are positively related to ASE and negatively related to EIB.

2. Perceived peer support, parental academic support, and teacher autonomy support in 8th grade are positively related to GPA in 10th grade.
3. ASE in 8th grade is positively related to GPA in 10th grade, and EIB in 8th grade is negatively related to GPA in 10th grade.
4. ASE and EIB in 8th grade partially mediate the relationships between perceived peer support, parental school support, and teacher autonomy support in 8th grade and GPA in 10th grade.

2 | METHODS

2.1 | Participants and procedure

Data were collected at two-time points (T1–T2) at an interval of 2 years. In 2011, students in 8th grade responded. Two years later, in 2013, the same students responded in 10th grade. Teachers distributed self-report questionnaires during class hours and students were assured that participation was voluntary. Confidentiality was safeguarded with closed envelopes that students delivered at the end of the class hour. The students were given sufficient time to respond to the survey during a class hour, and this procedure was repeated at T2. The survey was administered late in the fall term (November/December) at both time points, which is considered a stable period in the semester. Seven hundred and fifty students (49% boys and 51% girls) responded on both measurement occasions.

2.2 | Ethics

The study was approved by the Norwegian regional committee for ethics in medical research, approval number "2011/510 REK vest." Participation was confidential and voluntary. Informed written consent was obtained from the parents and students.

2.3 | Survey instruments

2.3.1 | GPA

GPA was calculated based on the mean score of teacher assessments in three subjects: mathematics, Norwegian and English. Grades range from 1 (fail) to 6 (excellent).

2.3.2 | EIB

Students were assessed on their entity or fixed mindset on intelligence using a 4-item scale adapted from a measure of implicit theory of intelligence (Dweck et al., 1995). This scale included three original items as well as one additional item added to increase reliability. The 4-item scale has been validated in previous research (Diseth et al., 2014). An item example is: "You have a certain amount of intelligence, and you really can't do much to change it." The participants rated how much they agreed with the statements on a 5-point scale ranging from 1 (completely disagree) to 5 (completely agree). The scale produced good omega reliability ($\omega = 0.89$).

2.3.3 | ASE

ASE was measured using three questions related to perceived school-related tasks, skills, and performance. The short scale has shown good validity and reliability in previous research (Diseth et al., 2008, 2014). An example indicator is: "I believe that I will achieve good results in school." The students responded on a five-point scale, ranging from 1 (completely disagree) to 5 (completely agree). Omega testing indicated good reliability of the instrument ($\omega = 0.80$).

2.3.4 | Teacher autonomy support

We applied a six-item version of the Learning Climate Questionnaire (LCQ; Black & Deci, 2000) to measure the students' perception of teachers' autonomy support. The same measure was used in an earlier study in the same context as the present study (Diseth et al., 2018). The scale pertains to the original theoretical framework in SDT, which utilized a narrow conceptualization of motivating style with a focus only on autonomy support (Deci et al., 1981). It is previously validated and widely used to assess teacher autonomy support (Yu et al., 2018). One indicator example is: "I feel that my teachers provide me with choices and options." The questions were assessed on a scale ranging from 1 (completely disagree) to 5 (completely agree). The instrument produced good omega reliability ($\omega = 0.93$).

2.3.5 | Peer support

We applied three questions from the Classmate Support Scale (Torsheim et al., 2000), which measures general social support from peers. An example item is: "The students in my class enjoy being together." The questions were answered on a 5-level scale ranging from 1 (never) to 5 (always). The instrument produced acceptable omega reliability ($\omega = 0.75$).

2.3.6 | Parental academic support

We applied the five items from the Parental School Support scale from the Health Behavior in School Children (HBSC)-studies (https://www.hbsc.org/). An example indicator is: "If I have problems at school, my parents are ready to help." The questions were assessed on a 5-point scale ranging from 1 (never) to 5 (always). The scale achieved good omega reliability ($\omega = 0.88$).

2.3.7 | Control variables

Socioeconomic position was measured with one question regarding family finances. The students were asked how well off they considered their family to be economically. The answer alternatives ranged from "not very well off at all" to "very well off" on a five-point scale. Boys were coded as 1, and girls were coded as 2.

2.4 | Statistical analyses

Analyses were performed in SPSS Statistics 27 and R using the lavaan package (Rosseel, 2012). Descriptive statistics and zero-order correlation coefficients were obtained for all main study variables. Internal consistency for

all latent variables (peer support, parental support, teacher autonomy support, ASE, and EIB) was assessed using the omega coefficient (ω). Confirmatory factor analyses (CFA) were conducted to assess the construct validity of the latent variables. After establishing the measurement model, we tested a full structural equation model (SEM) with path analyses for the relationship between support variables in 8th grade and GPA in 10th grade mediated through ASE and EIB in 8th grade. Maximum likelihood with robust standard errors (MLR) was used for estimation, and 95% bias-corrected bootstrap was used to assess the significance of the mediation effect. Full information maximum likelihood (FIML) was used to handle potential construct-level data missingness. Model goodness of fit was assessed using recommended cut-off criteria, where CFI > 0.95, RMSEA < 0.05, and SRMR < 0.05 is considered good model fit, and CFI > 0.90, RMSEA < 0.08, and SRMR < 0.08 is considered acceptable model fit (Hu & Bentler, 1999). To assess statistical significance, a *p*-value level of <0.05 was set. The final SEM adjusted for gender, self-perceived SES, and GPA at T1.

3 | RESULTS

3.1 | Descriptive statistics

Descriptive statistics and relationships between study variables are presented in Tables 1 and 2, respectively. Statistically significant and positive correlation coefficients with moderate to large effect sizes (Cohen, 1988) were observed among support variables and ASE, with teacher autonomy support and ASE recording the strongest relationship. Although significant, ASE had a negative and negligible association with EIB. Parental support was positively related to GPA in 10th grade—however, the effect size was negligible. ASE in 8th grade was positively and moderately associated with GPA in 10th grade. EIB in 8th grade was negatively associated with GPA in 10th grade, showing a moderate effect size.

3.2 | CFA

Results from the CFAs indicated that the latent variables of peer support and ASE achieved good model fit (<0.05 RMSEA, <0.06 SRMR, >0.950 CFI). Because of shared method variance or silent, unobserved dimensions

TABLE 1 Descriptive statistics of study variables

	N	ω	*M*	SD	Min	Max
Peer support T1	735	0.75	4.13	0.62	1	5
Parent support T1	722	0.88	4.57	0.60	1	5
Teacher autonomy support T1	708	0.93	3.88	0.65	1	5
Academic self-efficacy T1	692	0.80	4.00	0.62	1.33	5
Entity intelligence beliefs T1	696	0.89	2.95	0.83	1	5
Grade point average T1	650	–	4.21	0.72	1	6
Grade point average T2	706	–	4.17	0.78	1.33	6
Socioeconomic position	732	–	2.15	0.66	1	5
			Male *n* (%)	Female *n* (%)		
Gender	750	–	370 (49.33)	380 (50.67)		

TABLE 2 Correlations between the study variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Peer support T1	1.000								
2. Parental support T1	0.409***	1.000							
3. Teacher autonomy support T1	0.368***	0.361***	1.000						
4. Academic self-efficacy T1	0.384***	0.415***	0.539***	1.000					
5. Entity intelligence beliefs T1	−0.034	−0.087	−0.070	−0.176**	1.000				
6. Grade point average T1	0.150**	0.201***	0.116*	0.429***	−0.260***	1.000			
7. Grade point average T2	0.069	0.168**	0.070	0.373***	−0.303***	0.666***	1.000		
8. Socioeconomic position	0.208***	0.203***	0.184***	0.217***	−0.004	0.112**	0.046	1.000	
9. Gender	−0.031	−0.004	−0.087*	−0.055	0.030	0.066	0.108**	−0.027	1.000

*$p \leq 0.05$; **$p \leq 0.010$; ***$p \leq 0.001$.

(Brown, 2015), some residual variances were correlated for the parental support scale, the teacher autonomy support scale, and the entity intelligence scale. Based on modification indices, we added one error covariance in the parental support scale and the EIB scale and two error covariances in the teacher autonomy support scale. Satorra-Bentler scaled chi-square difference tests indicated significant improvements in model fit for each construct.

3.3 | Structural model

Results from the fully adjusted SEM with parental, teacher, and peer support, and two mediators (ASE and EIB) as GPA predictors demonstrated acceptable fit ($\chi^2 = 428.170$, $df = 216$, $p < .001$, RMSEA (95% CI) = 0.036 (0.031, 0.041), CFI = 0.971, and SRMR = 0.036). The results are presented in Figure 1, and the direct and indirect standardized regression coefficients are presented in Table 3.

In partial support of hypothesis 1, peer, parental, and teacher support variables were positively and statistically significantly associated with ASE in 8th grade. However, no statistically significant relationships were found between the support variables and EIB. Hypothesis 2 was not supported; none of the support variables in 8th grade was statistically significantly associated with GPA in 10th grade. The results supported hypothesis 3 – ASE and EIB in 8th grade had a positive and negative, respectively, association with GPA in 10th grade.

Tests of indirect effects (Table 4) showed one statistically significant mediation effect, namely that the relationship between teacher autonomy support in 8th grade and GPA in 10th grade was mediated through ASE in 8th grade.

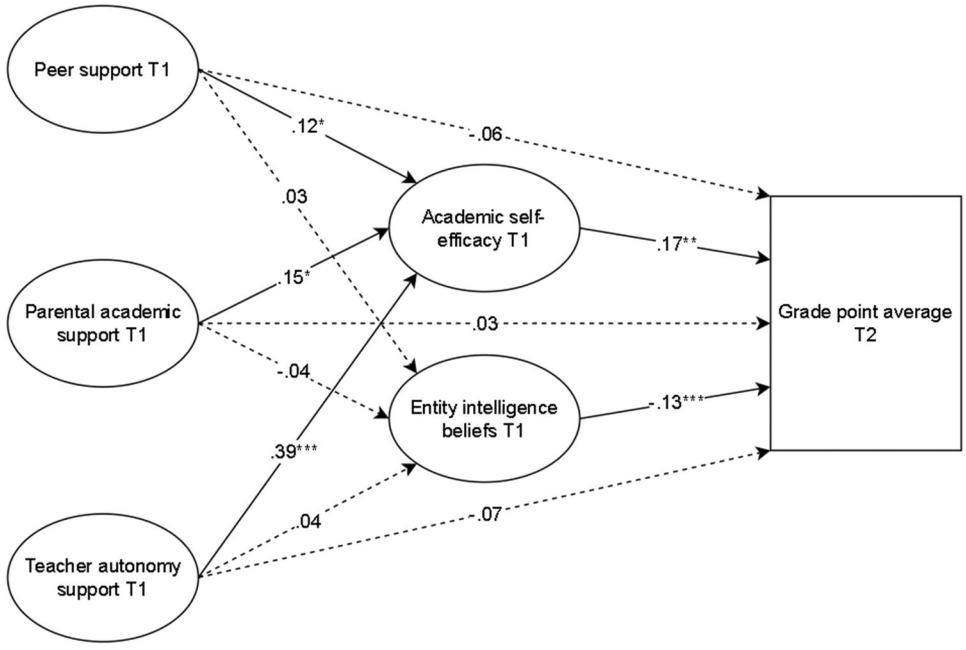

FIGURE 1 Structural mediation model adjusted for gender, socioeconomic status, and GPA at T1. *$p \leq .05$, **$p \leq .01$, ***$p \leq .001$. Standardized estimates presented in figure. Dotted lines represent nonsignificant regression coefficients.

4 | DISCUSSION

The present study aimed to investigate whether perceived social support from peers, parents and teachers influences GPA directly or indirectly through adolescent students' EIB and ASE. Using structural equation modelling, we modelled the effects of social support types at age 13–14 (8th grade) on ASE and EIB at the same time point and GPA at age 15–16 (10th grade) while controlling for gender, socioeconomic position, and GPA obtained in 8th grade. We found that ASE mediated the association between teacher autonomy support and GPA and that EIB had a negative effect on later GPA.

4.1 | The impact of perceived social support on self-beliefs and grade point average

Concerning hypothesis 1, the study revealed that all support variables—parental academic support, teacher autonomy support, and peer support—positively predicted ASE but not EIB. The positive relationships between social support and ASE are in line with previous research (Grijalva-Quiñonez et al., 2020; Holloway et al., 2016; Pino-Pasternak & Whitebread, 2010; Sha et al., 2016) and with central theoretical assumptions of SDT postulating that a supportive learning environment can contribute to higher academic motivation and engagement. The lack of associations between support variables and EIB could be related to how individuals' intelligence beliefs are shaped and upheld implicitly. Some research has found that different types of intelligence may be perceived as easily changeable, such as language or reading, compared to musical or creative intelligence, which is perceived as more or less fixed (Furnham, 2014). In other words, it could be that some of our social support measures affect EIB but that the effects cancel out when not considering subject-specific academic outcomes. Alternatively, it could be that if individuals have an overall rigid belief about the malleability of their intelligence, it is harder for this belief to be

TABLE 3 Standardized coefficients from the fully adjusted mediation model

	Mediators						Dependent		
	Academic self-efficacy			Entity intelligence beliefs			GPA T2		
Variables	*β*	SE	95% CI	*β*	SE	95% CI	β	SE	95% CI
ASE							0.165**	0.080	0.073, 0.397
EIB							−0.132***	0.048	−0.267, −0.069
PS	0.118*	0.068	0.016, 0.286	0.030	0.083	−0.114, 0.213	−0.060	0.063	−0.221, 0.027
PaS	0.148*	0.092	0.047, 0.395	−0.040	0.084	−0.203, 0.117	0.031	0.080	−0.107, 0.210
TAS	0.390***	0.077	0.298, 0.594	0.039	0.077	−0.203, 0.094	−0.070	0.075	−0.259, 0.028
Gender[a]	−0.037	0.039	−0.123, 0.033	0.045	0.051	−0.047, 0.157	0.074*	0.045	0.020, 0.202
SEP	0.041	0.034	-0.026, 0.109	0.034	0.041	−0.047, 0.114	−0.036	0.034	−0.103, 0.031
GPA T1	0.333***	0.038	0.192, 0.342	−0.259***	0.047	−0.309, −0.131	0.570***	0.050	0.515, 0.709

Abbreviations: *β*, standardized regression coefficient; ASE, academic self-efficacy; CI, confidence interval; EIB, entity intelligence beliefs; GPA, grade point average; PaS, parental support; PS, peer support; SE, standard error; SEP, socioeconomic position; TAS, teacher autonomy support.

[a]Male = 1, female = 2.

*$p \leq .05$; **$p \leq .010$; ***$p \leq .001$.

TABLE 4 Test of indirect paths

		Via academic self-efficacy				Via entity intelligence beliefs			
Independent	Dependent	*β*	SE	95% CI	*z*	*β*	SE	95% CI	*z*
PS	GPA T2	0.019	0.020	0.002, 0.077	1.580	−0.004	0.014	−0.034, 0.021	−0.450
PaS	GPA T2	0.024	0.047	0.006, 0.115	1.636	0.005	0.015	−0.021, 0.039	0.693
TAS	GPA T2	0.064*	0.041	0.030, 0.192	2.364	0.005	0.013	−0.015, 0.036	0.580

Abbreviations: *β*, standardized regression coefficient; CI, confidence interval; GPA, grade point average; PaS, parental support; PS, peer support; TAS, teacher autonomy support; SE, standard error.

*$p \leq .05$.

affected by different environmental influences (regardless of the type of social support). Furthermore, even personality differences could account for our findings to some extent. For instance, one study found that introverts are more likely to have a fixed mindset (Storek & Furnham, 2013), which could partly explain our null findings of how social support is related to EIB.

In contradiction to our hypothesis 2, we found that neither parental, teacher, nor peer support were statistically significant direct predictors of GPA. The commonly held assumption about the importance of perceived social support on academic performance might be overestimated, particularly peer support (Chen, 2008). For example, the previously mentioned study by Mackinnon (2012) found that high perceived social support neither predicted later academic achievement nor protected against declining changes in academic achievement as time progressed. Our results of no parental and peer support effects on later GPA align with these findings. Further, our results of no relationship between parental academic support and GPA partly align with the findings of Song et al. (2015), who found that parental academic support did not directly predict academic achievement but only indirectly through mastery achievement goals. As such, different types of perceived support might have an impact on later academic performance, but the effects are likely dependent both on the type of perceived support and on mediation effects. Because ASE mediated the association between teacher autonomy support and GPA in our study, future research should further untangle the association between emotional and academic parental and peer support and academic performance by including other relevant mediating factors, such as school engagement (Ansong et al., 2017). The fully adjusted mediation model revealed that GPA and EIB at T1 were strongly and negatively associated. Therefore, we should bear in mind that confirming associations in cross-sectional designed studies (Chen, 2008) cannot be translated to results from longitudinal studies (MacKinnon, 2012). The time lag between the measurement of predictors and outcomes will also impact the chance of revealing the predictive power of relevant variables.

4.2 | Self-beliefs and GPA

In support of hypothesis 3 and previous findings, our results implied that ASE is a positive predictor of later academic performance. This effect aligns with similar literature on ASE, confirming a moderate association between ASE and academic performance (Honicke & Broadbent, 2016; Richardson et al., 2012). According to self-efficacy theory, this association implies that students with a stronger belief in their academic abilities are more likely to perform well academically. In addition, students with high levels of ASE seem to be more persistent and adaptive in their learning strategies and actively choose challenging academic tasks (Mega et al., 2014). Importantly, our results indicate that the effect of ASE is significant 2 academic years later. The students with favorable ASE may still perform the self-regulated learning behaviors accompanying high ASE 2 years later, which could improve overall grades.

In further support of hypothesis 3, our findings indicate that EIB negatively impacted later academic performance. As mentioned in Section 1.2, the association between EIB and academic performance is complex and varies across educational levels and cultures (Costa & Faria, 2018). In contradiction to theoretical assumptions and most research, one study found positive effects of EIB on achievement (Stocker & Faria, 2011). Educational systems emphasizing competition and attainments might foster performance goals and outcomes, resulting in academic success. It seems that EIB could represent a double-edged sword regarding learning behavior—having a fixed mindset might increase performance-related behavior to prove one's intelligence or inhibit self-regulated learning behaviors because their intelligence is never going to change, no matter the efforts exerted.

Because Norwegian students begin receiving grades in lower secondary school (8th grade through 10th grade), the Norwegian school system might be less assessment focused than other Western countries. For instance, the United States and United Kingdom start grading students in 6th grade and 2nd grade, respectively. Moreover, the final GPA students achieve in lower secondary school does not have a major impact on whether a student can begin an upper secondary school education or not—97.2% who apply to an upper secondary education are accepted to their first, second, or third choice of educational program (SSB, 2020). The late introduction of assessments and an increasingly relaxed approach to achieving good grades in lower secondary school may promote a culture that is not overly preoccupied with demonstrating personal abilities. More research on how intelligence beliefs are related to important academic factors, such as motivation, engagement, and self-regulated learning behaviors, is necessary to unravel the educational impact of this self-belief further.

4.3 | The mediating effects of self-beliefs

In support of hypothesis 4, ASE mediated the effect of teacher autonomy support on later academic performance. It has been suggested that social support might buffer against stressors and increase feelings of competence, thus, allowing students to engage more fully with academic tasks (DeBerard et al., 2004; Li et al., 2018; Yang, 2004). In particular, autonomy support has been posited by SDT as an important determinant in fulfilling individual needs of autonomy, competence, and relatedness to others, and by implication, improved academic performance (Amholt et al., 2020). Our findings are consistent with a positive effect of teacher autonomy support and imply that the extent to which teachers satisfy students' basic psychological needs has a strong impact on motivation and learning. Indeed, teachers seem to be in a unique position to support students academically, considering that they organize the students' education, administer homework, decide on teaching methods, and have many interactions with students daily.

Parental and peer support did not influence GPA indirectly through ASE or EIB in the current sample. Our findings differ to some extent from earlier research which has shown strong associations between parental support and students' academic performance (Boonk et al., 2018; Gordon & Cui, 2012; Roksa & Potter, 2011). One reason for the null effect of parental support on GPA through self-beliefs might be related to the type of support measured. For example, parental autonomy support, in particular, could have even greater importance regarding academic adjustment and functioning (Vasquez et al., 2016) than other support types. During adolescence, young people's need to develop and feel autonomous is strong because they strive to establish their own identities and become more self-determined. Thus, we suspect the existence of a stronger effect on GPA when directly measuring autonomy support, as opposed to a more general type of social or school support (Soenens et al., 2007; Wentzel & Battle, 2001). The nonsignificant indirect effects of peer support on academic performance may be due to similar conceptualizations as parental support. Because findings support a link between basic need satisfaction and higher ASE (Raven & Pels, 2021; Zhen et al., 2017), future research might benefit from using measurements of social support that more specifically assess students' perception of autonomy, competence, or relatedness support from peers and parents.

4.4 | Limitations and strengths

The study has some limitations that should be considered when interpreting the results. First, the study has only two time points, limiting the possibility of making causal inferences. Nevertheless, our study still contributes important knowledge due to the longitudinal nature of our design, which enables us to draw more conclusive inferences about the direction of effects between the study's variables. Further, we controlled for relevant confounders and included GPA at baseline to reduce possible interfering, third-variable effects on the mediation model.

Second, all data were self-reported, which may introduce a common method bias in the data (Podsakoff et al., 2003). However, the perceptions of one's self-efficacy and intelligence beliefs and how supportive an environment is, are arguably most accurately measured by self-reporting due to the subjective nature of the constructs.

Lastly, the participants that the study was based on were drawn from one single county in Norway, which may limit the external validity of the results to the wider adolescent population in Norway or beyond. However, previous studies from the same region demonstrated that adolescent health and health behavior are similar to national and even international findings (Meland et al., 2010; Reiter et al., 2013; Thuen et al., 2021), suggesting that generalization at least cannot be precluded.

Despite these limitations, the study holds important strengths. First, the longitudinal design enables a stronger basis for understanding mechanisms in the relationship between support, self-beliefs and academic performance. Adjusting for GPA in 8th grade, we obtained a robust model for longitudinal effects. The regression coefficients reveal how predictors impact GPA in 10th grade for students with similar achievement levels in the 8th grade. The span of 2 years between measurements further strengthens the trustworthiness of positive findings but may increase the risk of type two errors. The inclusion of several support variables and self-belief variables provides for a broad and extensive analysis of the determinants of GPA.

4.5 | Conclusion

The findings of this study support the role of teachers as important figures in influencing students' GPA through autonomy support. This effect aligns with SDT which highlights autonomy as a primary psychological need enabling self-determined regulations in academic settings. Further, our findings also point to the centrality of teacher support in promoting ASE, which perhaps is not too surprising. However, viewed in light of the emerging influence of peers through adolescence and the continuing role of parents as primary caregivers as influences of students' self-beliefs in a wide range of domains, our study speaks to the seminal role of teachers in adolescents' academic development. On a related note, we did not find a mediating effect from parental and peer support which could indicate that autonomy support constitutes a particularly important social element in constituting academic self-beliefs and performance outcomes during secondary school education. This finding has implications for future studies and practical interventions designed to improve academic self-beliefs and performances in lower secondary schools.

Another aim of this study was to investigate the role of EIB as a possible mediator of the effects of social support on GPA. Interestingly, our study found a negative effect of EIB on GPA, but EIB did not function as a mediator between teacher, peer, or parental support and later GPA. In alignment with earlier research, this suggests an important role of EIB in academic performance. However, more research on predictors or moderators of EIB and their relationship to GPA is needed to investigate the effects on academic outcomes further.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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