



Associations of social and emotional competencies, academic efficacy beliefs, and emotional distress among students in lower secondary school

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Abstract

This cross-sectional study aimed to investigate how perceived social-emotional competencies (SECs), relationship skills, emotional regulation, and the ability to structure schoolwork at school and at home were associated with academic efficacy belief (AEB) and emotional distress among 1142 Norwegian eighth-grade students. The students answered an Internet-based questionnaire during school hours. Structural equation modeling was used to assess the paths of associations. In the structural model, AEB was treated as an intermediate variable predicted by the other SECs and as a predictor of emotional distress. Perceived relationship skills, emotional regulation, and the ability to structure schoolwork showed moderate to strong associations with AEB. AEB showed a strong association with emotional distress, whereas relationship skills and emotional regulation showed a moderately strong association with emotional distress. The results suggest that all SECs play a role in AEB, whereas high AEB, good perceived ability for emotional regulation, and relationship skills are linked to less emotional distress. Good perceived relationship skills, emotional regulation, and structuring of schoolwork were more strongly related to less emotional distress among females. Moreover, emotional regulation and structuring of schoolwork were more strongly associated with AEB for females. These findings may indicate that these SECs may be more essential to emotional well-being among female adolescent students.

Keywords Relationship skills · Emotional regulation · Planning schoolwork · Structuring homework · Academic efficacy beliefs · Emotional distress

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1 Introduction

Research suggests that enhanced social-emotional competencies (SECs) in general reduce emotional distress (ED) and stimulate academic efficacy belief (AEB) among young adolescents (Durlak et al., 2011; Taylor et al., 2017). However, knowledge about how specific SECs are linked to AEB and ED in early adolescence is scarce (Jagers et al., 2015). The aim of this cross-sectional study, therefore, is to investigate how SECs (relationship skills, emotional regulation, and the ability to plan schoolwork and structure homework) are associated with AEB and ED among a sample of Norwegian eighth-grade students. AEB will be treated as an intermediate variable predicted by the other SECs and as a predictor of ED.

1.1 Emotional distress

Adolescents frequently encounter various stressors that pose potential threats to their healthy development. Stress among the young is increasing and an issue of concern (Eriksen et al., 2017). In Norway and other Western countries, a large proportion of adolescents report high levels of ED (Östberg et al., 2015). Reports of stress have increased over time, and school is among the main sources of stressors (Bakken et al., n.d.). ED denotes unpleasant emotional reactions that may influence students' level of functioning. A high level of ED is an indicator of possible mental health problems (Strand et al., 2003). As such, it is important to investigate how social and emotional competencies relate to ED. An earlier meta-analysis by Durlak et al., (2011) indicated that interventions aimed at increasing students' SECs reduced their ED. However, relatively few studies have investigated SECs in early adolescence (Jagers et al., 2015). Insight into the links between specific SECs and ED could help to inform future interventions aimed at enhancing SECs among adolescent students.

SECs can help adolescents cope adequately with the demands and stressors of daily life and thereby reduce the risk of ED (Durlak et al., 2011; Sande et al., 2019). SECs may also increase the likelihood that individuals' basic needs—such as the needs for competence and relatedness will be met, further minimizing the likelihood of ED (Deci and Ryan, 2008; Ryan and Deci, 2001). Ability to plan schoolwork and structure homework and one's optimism about one's ability to master schoolwork are likely linked to individuals' perceptions of their academic competence. Relationship skills are likely to be central in satisfying the need for relatedness (Deci and Ryan, 2008). Moreover, the ability to emotionally self-regulate could help to reduce conflict in relationships and thus help maintain supportive relations (Gross, 2002; Lopes et al., 2005). Further discussion of the possible links between ED and various SECs will be presented in the chapters that follow.

1.2 Academic efficacy beliefs

AEB is an aspect of self-awareness or, more specifically, academic optimism (Durlak et al., 2011). In this respect, AEB is considered a SEC. Moreover, in the present

study, the analytic model is based on the assumption that other SECs, such as relationship skills, emotional regulation, and the ability to plan school and structure homework, influence AEB, which, in turn, is believed to influence ED. AEB is therefore treated as an intermediate variable. AEB is defined in this study as one's belief in their ability to accomplish challenging tasks and that their ability can grow with effort (Gaumer Erickson et al., 2016). This definition is inspired by social cognitive theory (Bandura, 1997) and Dweck's (1999) growth mindset approach, both of which concern students' beliefs regarding their ability to master academic tasks.

According to social cognitive theory, academic self-efficacy is students' confidence in their personal ability to engage in the behaviors required to produce a desired academic outcome (Bandura, 1997; Maddux, 2016). Efficacy beliefs may concern specific school subjects but may also be generalized through "transformed experiences" into a broader domain, such as the school curriculum as a whole (Klepang and Hagquist, 2016). Students' transformed experiences can be linked to a growth mindset in that it concerns students' beliefs that ability is developed through effort and perseverance and that attributes such as personality and intelligence are malleable (Dweck, 1999). This is likely to engender optimism and enhanced confidence in their capacity for academic success (Dweck, 1999; Yeager and Dweck, 2012). This is supported by previous studies in which efficacy beliefs as well as a growth mindset are positively associated with academic performance and achievement in school (Honicke and Broadbent, 2016; Claro et al., 2016).

Research suggests that the connection between perceived academic challenges and ED has intensified among adolescent students (Bakken, 2019; Scrimin et al., 2018). Considering that the students included in this study are at an early stage of lower secondary school, it is particularly appropriate to assess the association between AEB and ED. Eriksen et al., (2017) claim that school-related stress is a key factor in ED among young people. Therefore, belief in one's ability to master academic challenges is likely to reduce perceived school-related stress. Higher AEB is therefore assumed to be related to reduced ED.

1.3 Social and emotional competencies

In this study, SEC is broadly defined as the ability to understand, manage, and express the social and emotional aspects of one's life (Dias et al., 1996, p. 2). This definition links to the framework of the Collaborative for Academic, Social, and Emotional Learning (CASEL n.d.), which presents SEC as encompassing five dimensions: relationship skills, self-management, self-awareness, social awareness, and responsible decision-making. This study will investigate competencies pertaining to relationship skills, self-management, and self-awareness. Relationship skills will be represented by students' perceived ability to establish relationships with peers, while perceived ability of emotional regulation and two indicators of perceived ability to structure schoolwork (planning of schoolwork and structuring of homework) will represent self-management. Finally, AEB will represent self-awareness.

1.3.1 Perceived ability to establish relationships with peers

The ability to establish relationships is an essential aspect of relationship skills that leads to positive social outcomes (Greenberg et al., 2017). Students' perceived relationship skills relate to positive beliefs about coping in a social context (Eckerdode, 2013). Relationship skills may be particularly relevant today because a higher percentage of young people experience difficulties establishing social relationships (Eriksen et al., 2017). Positive relationships contribute to fulfilling the central human need of relatedness, and supportive relationships with others are crucial for the well-being of human beings (Niemiec and Ryan, 2009; Ryan and Deci, 2017). Adolescents with good relationship skills exhibit fewer adjustment problems and report lower levels of ED (Malecki and Elliot, 2002). This may be attributed to the ability to establish social relations with peers, which provides social support when needed (Thoits, 2011). However, the stress-buffering effects of support from adolescent peers are somewhat inconsistent (Murberg and Bru, 2009; Rueger et al., 2016). This may indicate that early adolescents vary in their ability to gain appropriate support from peers.

Previous research has found that students with good relationship skills tend to exhibit greater school engagement and exert greater academic effort (Kwon et al., 2014). However, peer influences on AEB are likely to vary depending on the peer group to which the student belongs. If a student's peer group exhibits low AEB and swiftly abandons academic challenges, the student may model these beliefs and behaviors, and the influence on their AEB will be negative (Yang et al., 2018). However, belonging to a peer group who believe themselves capable of managing academic challenges may boost the student's AEB (Lynch et al., 2013; Rubin et al., 2008). Competence in establishing supportive relationships with peers at school may make it easier for students to integrate with peer groups who have positive academic aspirations and AEB. It is therefore expected that perceived ability to establish relationships with peers at school will be positively associated with AEB.

1.3.2 Emotional regulation

Reappraisal is a cognitive aspect of emotional regulation, a controllable process that directs and refines the perception of a situation to create a more positive perspective (Gross, 2015; Gross and Thompson, 2007). This is an aspect of self-management (Durlak et al., 2011; Taylor et al., 2017). The ability to reappraise situations more beneficially has been shown to contribute to the regulation of unpleasant emotions (Gross, 2013; Webb et al., 2012). Moreover, emotions are strongly related to students' motivational beliefs in an academic context (Pekrun and Linnenbrink-Garcia, 2012; Pekrun et al., 2002). Positive academic emotions reflect students' anticipations of enjoyment, hope, pride, and joy related to learning situations, whereas negative emotions arouse emotions such as anxiety, distress, and hopelessness (Pekrun, 1992). Thus, students' ability to regulate emotions more positively in an academic context may be crucial for their AEB (Boekaerts et al., 2015; Pekrun and Linnenbrink-Garcia, 2012). Given the increased independence and new demands associated with adolescence, adolescents, in particular, may need to regulate their emotions in

response to various stressors. Hence, we expect that the perceived ability to emotionally regulate will be associated with ED. It is also expected that the ability to regulate emotions will be associated with AEB.

1.3.3 Structuring of schoolwork

Academic demands and challenges increase in lower secondary school and require students to become more self-directed in their academic work (Yeager, 2017). The ability to structure schoolwork requires individuals to self-manage their time and behavior to optimize learning possibilities (Domitrovich et al., 2017; Weissberg et al., 2015). In this study, the structuring of schoolwork includes two aspects: the perceived ability to plan schoolwork and the perceived ability to structure homework.

Self-management strategies, such as planning, which create a perception of control, are found to reduce ED (Doron et al., 2009; Östberg et al., 2015). Studies have also indicated a positive link between academic self-management strategies and AEB (Dinsmore et al., 2008; Diseth et al., 2014).

In addition to planning academic work in the school setting, this study focuses on the structuring of homework, which is typically less structured by others than in-class studying. Support for the structuring of homework is likely to vary more between students, depending on how the home environment facilitates homework (Hong et al., 2009). Homework, therefore, places greater demands on students' self-management skills (Dent and Koenka, 2016; Gebauer et al., 2019). Students who are successful in structuring their homework are found to have higher AEB (Putwain et al., 2013). Studies have also indicated that adequate time and behavioral management in relation to homework influence optimistic beliefs about future academic mastery (Valle et al., 2016).

Based on earlier findings, students' perceived ability to plan schoolwork and structure homework is expected to be associated with higher AEB and lower ED either directly or indirectly via AEB.

1.4 Gender differences

More adolescent females than males report having experienced ED (Eriksen et al., 2017; Moksnes and Lazarewicz, 2019). Furthermore, they appear to experience higher levels of negative emotion (Chaplin and Aldao, 2013). Evidence also suggests that females are more easily emotionally activated and display a greater variety of emotions (Neumann et al., 2010). Females also seem to have higher levels of neuroticism, which may predispose them to responding negatively to perceived threats (Weisberg et al., 2011). These findings indicate that gender differences may make emotional regulation skills more essential for females than for male adolescents.

As adolescence begins, female and male relationship tendencies appear to diverge (Chaplin and Aldo, 2013). Males have more hierarchical organized peer groups that focus on activities. Females, by contrast, engage in dyadic relations characterized by cooperative prosocial behavior and self-disclosure. Males' relationships may,

therefore, be more structured and less dependent on individual relationship skills, whereas female peer interactions likely require more elaborate relation skills to get supportive feedback and feel socially included (Albano and Krain, 2005; Rose and Rudolph, 2006). Therefore, the link between relationship skills and ED may be stronger among females.

Females tend to be more academically motivated than males (Diseth et al., 2014). However, they also appear to experience more school-related stress, which may be related to lower perceived AEB (Bakken, 2019). This could make some SECs particularly critical in maintaining AEB among females. Pekrun and Stephens (2012) suggest that emotions are closely connected to academic motivation, in which AEB is an essential component, and it is therefore likely that good emotional regulation could help to maintain AEB. Since adolescent females appear to invest more effort in schoolwork, emotional regulation may be more closely linked to AEB among females. Higher academic investment among females may also suggest that the ability to structure schoolwork is perceived as more critical and may indicate a stronger relationship with AEB among females.

The study of how gender differences impact the strength of the associations between SECs, AEB, and ED should be considered exploratory with no expectations made.

1.5 Research questions

1. To what extent are relationship skills, emotional regulation, and structuring of schoolwork associated with AEB?
2. How are relationship skills,¹ emotional regulation, structuring of schoolwork, and AEB associated with ED?
3. To what extent do these associations differ between female and male students?

2 Methods

2.1 Participants and procedures

The sample of this cross-sectional study consisted of 1147 eighth-grade students (corresponding to the age of 12–13 years). Students were recruited from 54 classrooms in 11 lower secondary schools in a municipality in a middle-sized county in east Norway. Five subjects were removed from the data set (0.5%) due to poor response quality. The balance between girls and boys was 51% over 49%, respectively.

¹ The cross-sectional design of this study lacks time precedence, and indirect effects do not signal mediation (Kline 2015). The term “indirect effect” simply implies directional assumptions under the theoretical rationale that various SECs reduce emotional distress through AEB.

Assessments took place in September 2018, shortly after the students commenced eighth grade. An Internet-based questionnaire was completed during a 45-min lesson.

The study was reviewed and approved by the Norwegian Centre for Research Data (NSD) on behalf of the Norwegian Data Protection Authority. The NSD were satisfied that the study protocol met the ethical standards required for good practice.

All parents or guardians received an information letter. Additionally, the students received an age-adjusted information letter about what participation in the study would involve and stating that they could withdraw their participation at any time. Only students with written consent from parents or guardians were allowed to participate in the study.

The translations of the measures in the study were completed following recommended procedures for cross-cultural adaption (Beaton et al., 2000; Gjersing et al., 2010). First, lingual experts translated the English worded scales into Norwegian and back to English. Subsequently, an expert group oversaw the adaptation of the items' wording and content to a Norwegian context.

2.2 Statistical data analysis

2.2.1 Analytic overview

Descriptive data analysis reported mean and standard deviation for all scales of the total sample, male and female groups, respectively. Pearson product-moment coefficients were computed for the correlation between study variables in the overall sample and the female and male groups. The Statistical Package for the Social Sciences (SPSS), version 25, was used for these analyses.

Confirmatory factor analysis (CFA) was used to test the fit of the measurement models. Following the recommendations of Jöreskog (1993), measurement models were first investigated individually to fit the data and included in a model in accordance with stepwise regression techniques with an increasing number of constructs to ensure discriminant validity. The latent independent variables—relationship skills, emotional regulation, planning of schoolwork, and structuring of homework—were tested simultaneously in a measurement model. The same procedure was followed for the latent dependent variables of ED and AEB. As some variables in this study exceeded the suggested cut-off value for skewness and kurtosis, the recommendations by Chou and Bentler (1995) were followed using a robust ML-estimator to obtain reliable statistical results, as the assumptions of underlying parametric testing were not met.

To assess the models' goodness of fit, the guidelines developed by Hu and Bentler (1998) were followed using a cut-off value close to 0.08 for standardized root mean squared residual (SRMR), accompanied by the Tucker-Lewis Index (TLI) (Tucker and Lewis, 1973) and the comparative fit index (CFI), with cut-off values close to 0.95. Additionally, the root mean square error of approximation (RMSEA) was calculated with a cut-off value of 0.06 or less indicating a good fit and 0.08 as

an acceptable fit, supplemented by a 90% confidence interval (CI). All scales were also tested for internal consistency. Detailed results are provided in “[Appendix](#)” A.

Measurement invariance was tested for all constructs separately and in combination. Three models with increased restrictions on model parameters were tested against one another. The baseline pattern-model (configural invariance) was tested against the more restricted weak factorial invariance and displayed no worse fit to the model assuming metric invariance. The metric model was tested against a model with equally constrained intercepts and factor loadings. Detailed results are provided in “[Appendix](#)” B.

A structural model with latent variables was used to test the path of association between constructs using Mplus version 8.3 (Muthén and Muthén, 2016).

ED and AEB were treated as dependent latent variables, whereas relationship skills, emotional regulation, and structuring of schoolwork were treated as independent latent variables. AEB was also treated as an intermediate variable between the other SECs and ED. To test whether gender moderated any of the structural paths, a multi-group approach was used. The chi-square difference test with scaling correction was used to compare the nested models (Satorra and Bentler, 2001).

The amount of missing data for the control variable used to assess students’ basic academic performance in Norwegian reading, English, and math ranged from 20.1 to 21.4%, and these data were missing completely at random, χ^2 (df=7)=5.94, $p=0.55$ (Little, 1988). Accordingly, the model parameter was estimated using list-wise deletion (Enders, 2010).

2.3 Measures

All scales in the questionnaire had introductory texts. Information about the items’ wording, the introductory text for the scales, and reliability may be found in “[Appendix](#)” A.

2.3.1 Emotional distress (ED)

ED was assessed by the Hopkins Symptoms Checklist 10-item version (HSCL-10) (Derogatis et al., 1974; Strand et al., 2003). The scale’s statements were designed to capture different conditions of emotional distress, such as anxiety (e.g., “*Sudden fear for no reason*”) and depression (e.g., “*Feeling that everything is a waste*”). Items had four response options: *Not at all*; *A little*; *Quite a bit*; and *Extremely*. CFA yielded an acceptable fit for a one-factor solution, including the error terms for the items displayed above, which are believed to measure additional perceptions of negative emotions. The omega value indicated a high internal consistency of 0.90.

2.3.2 Academic efficacy beliefs (AEB)

AEB was assessed using a scale developed and described by Gaumer Erickson and Noonan, (2018). The scale is based on the understanding that AEB consists of an individual’s belief in their ability to accomplish specific challenging tasks and that

this ability grows with effort (e.g., “*I can figure out anything if I try hard enough*”) and students’ beliefs about academic challenges (e.g., “*When I have decided to accomplish something that’s important to me, I keep trying to complete it, even if it is more difficult than I thought.*”) Two items from the original scale were omitted from this study because of their culture-specific formulations that were not applicable to the Norwegian educational context. The scale consisted of 11 items on a six-point Likert scale (*I totally disagree* to *I totally agree*, scored from 1 to 6). CFA yielded results indicating that the items reflect one latent construct. The omega value was 0.83.

2.3.3 Relationship skills

The perception of the ability to build relationships with others was used as an indicator of relationship skills. The scale was developed for this particular study and included the following items: “*I get to know others easily*”, “*I get in touch with others quickly*”, “*I know how to make contact with others*”, “*I capture the interests of others in a positive way*”, “*I easily find something to talk to others about*”. The scale adopted a six-step scoring format (from 1 to 6): *Strongly disagree, disagree, disagree a little, agree a little, agree, strongly agree*. CFA indicated that the scale yielded good fit, including the error terms for “*I get to know others easily*” and “*I get in touch with others quickly*,” probably indicating that, in addition to reflecting this latent construct, these items also measure individuals’ perceptions of how quickly they make contact with others. The omega value was 0.91.

2.3.4 Emotional Regulation

The five-item *Reappraisal* subscale from The Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA; Gullone and Taffe, 2012), was used to assess students’ regulation of their emotions (e.g., “*When I want to feel happier, I think about something else*,” “*I control my feelings about things by changing the way I think.*”) The subscale had a six-step scoring format (from 1 to 6): *Strongly disagree, disagree, disagree a little, agree a little, agree, strongly agree*. Due to the similar wording, it allowed for correlation of residuals between the items “*When I want to feel happier, I think about something different*” and “*When I want to feel less bad [e.g., sad, angry or worried], I think about something different*”. Correlations between the same residuals were equally evident in an earlier study that applied the scale among a similar age group (Gullone and Taffe, 2012). The measurement model promoted a good fit when error terms were included. The omega value was 0.88.

2.3.5 Structuring of schoolwork

Two scales assessed the students’ ability to structure their schoolwork. The *Planning* subscale from the Coping inventory, which assesses different types of coping strategies (Carver et al., 1989), was implemented to measure planning as a problem-focused coping strategy related to schoolwork. The subscale has five items, for example, “*I make a plan of action*,” “*I try to come up with a strategy about what to do*”. The introduction

was designed to relate the item to schoolwork and read as follows: “There are many ways to cope with challenges. What do you do when you are experiencing academic challenges at school?” In the present study, the original four-step scoring format was changed to a six-step format (from 1 to 6) as follows: *strongly disagree*, *disagree*, *disagree a little*, *agree a little*, *agree*, *strongly agree*. A one-factor CFA with correlation of error terms for the items “*I make a plan of action*” and “*I try to come up with a strategy about what to do*” yielded a good fit. The need for correlating residuals may reflect that the terms used in the items “plan” and “strategy” indicate a stronger focus on the cognitive aspects of planning. The omega value was highly reliable at 0.91.

Students’ ability to do homework effectively was assessed by a subscale derived from the Self-Regulation Strategy Inventory—Self-Report (SRSI-SR) (Cleary, 2006). Items measured strategies for doing homework, e.g., “*I make a schedule to help me organize my study time.*” A six-step scoring format was used (from 1 to 6): *Strongly disagree*, *disagree*, *disagree a little*, *agree a little*, *agree*, *strongly agree*. A one-factor solution yielded a good fit for the five items with an omega value of 0.75.

2.4 Control variables

Studies have shown that students from economically disadvantaged backgrounds are at higher risk of experiencing ED than economically secure students (Reiss, 2013; Weinberg et al., 2019). Academic optimism has also been shown to vary by socioeconomic status (SES) in that economically disadvantaged students may have a lower perception of their AEB than more privileged students (Bolger et al., 1995). Furthermore, the involvement of parents in students’ academic work has been shown to influence optimistic academic beliefs (Fan and Williams, 2010), and empirical results suggest that parents’ involvement in students’ schoolwork also tends to reduce ED (Wilkinson-Lee et al., 2011). Moreover, research indicates that students’ academic achievement influences their motivation toward school (Maddux and Kleiman, 2018). Based on findings from earlier studies, self-reported SES, parents’ academic support, and an indicator of academic performance were used as control variables for AEB and ED.

2.4.1 Socioeconomic status

Socioeconomic status was measured using one item assessing social inequality in adolescence derived from the Family Affluence Scale-II (Boyce et al., 2006). The item conceptualized home affluence and an economy based on a Norwegian prosperity standard: “*During the past 12 months, how many times did you travel on holiday with your family?*” using a four-step scoring format ranging from 0 to 3: *Not at all 0; Once 1; Twice 2; More than twice 3*. Item mean score was used as a control variable.

2.4.2 Parents’ academic support

Parents’ academic support was assessed using the composite of three items. The items capture various forms of parental educational support, e.g., “*My parents are interested in my schoolwork,*” “*My parents help me with schoolwork when I ask them*

to,” “*My parents often praise me for my efforts with schoolwork.*” A five-step scoring format was used (from 1 to 5): *Strongly disagree, disagree, disagree a little, agree, strongly agree.* The scale was reliable with an omega value of 0.83.

2.4.3 Academic performance

Academic performance was measured using a composite score of results from the national test assessing eighth-grade students’ performance in reading of Norwegian, math, and English. The omega value was 0.83.

3 Results

3.1 Preliminary analysis

The results of tests conducted on the measurement models in line with the recommendations of Jöreskog (1993) may be found in the overview of measurement models in “Appendix” A. All measurement models yielded a good fit. In testing for measurement invariance, scalar invariance was supported using the recommended criteria for invariant differences in $CFI \leq -0.010$ and $RMSEA \geq 0.015$ (Chen, 2007; Cheung and Rensvold, 2002). A detailed overview may be found in “Appendix” B.

The samples in this study were clustered at the class level. However, an inspection of intraclass correlation (ICC) for all variables showed low coefficients (ranging from 0.5 to 4%). The design-effect estimate was below 2.0. Type=complex analysis was applied. The structural model was run both with and without the complex to ascertain whether model fit and standard error were changed. The results did not convey any change in SE values or model fit, and the use of type=complex was excluded.

3.2 Primary analysis

Table 1 presents the inter-correlation, mean, and standard deviation among all study variables used to assess SEC, AEB, and ED for the overall sample. All correlations were significant and ranged from small to moderate in size (Cohen, 1988).

Table 2 displays bivariate intercorrelations, means, and standard deviations for the females and males separately. All correlations, except that between planning schoolwork and ED for females, were significant and ranged from small to moderate in size.

3.3 The structural latent path modeling

The latent path model for the overall sample yielded a good fit: $X^2=0.1645.07$ (760); $RMSEA: 0.032$; 90% CI (0.030-0.034); $CFI: 0.954$; $TLI: 0.950$; $SRMR: 0.039$. In answering research question 1, structuring of homework was observed to have the strongest direct effect on AEB for the overall sample. A slightly weaker direct effect

Table 1 Intercorrelations mean and standard deviations for the study variables

| | 1 | 2 | 3 | 4 | 5 | 6 |
|-------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Emotional distress | – | – | – | – | – | – |
| Academic efficacy beliefs | –.34 ** | – | – | – | – | – |
| Relationship skills | –.25** | .34** | – | – | – | – |
| Emotional regulation | –.19 ** | .37** | .25** | – | – | – |
| Planning and structuring schoolwork | –.09** | .37** | .18** | .33** | – | – |
| Structuring of homework | –.15** | .38** | .21** | .29** | .37** | – |
| <i>M (SD)</i> | 1.53 (0.57) | 5.09 (0.74) | 4.90 (0.98) | 4.12 (1.09) | 4.05 (1.24) | 4.61 (0.83) |

** $p < .01$ **Table 2** Intercorrelations, mean, and standard deviation among the study variables for males and females, respectively

| Scale | 1 | 2 | 3 | 4 | 5 | 6 |
|---------------------------|------------|-------------|-------------|-------------|-------------|-------------|
| Emotional distress | – | –.35** | –.27** | –.27** | –.05 | –.18** |
| Academic efficacy beliefs | –.29** | – | .30** | .39** | .35** | .41** |
| Relationship skills | –.16 ** | .36** | – | .21** | .12** | .18** |
| Emotional regulation | –.13** | .35** | .30** | – | .36** | .27** |
| Planning schoolwork | –.11* | .37** | .23** | .32** | – | .37** |
| Structuring homework | –.12 ** | .35** | .25** | .31** | .37** | – |
| <i>M (SD) females</i> | 1.66 (.63) | 5.00 (0.76) | 4.78 (1.00) | 4.12 (1.00) | 3.95 (1.23) | 4.59 (0.80) |
| <i>M (SD) males</i> | 1.39 (.48) | 5.18 (0.71) | 5.03 (0.91) | 4.12 (1.18) | 4.15 (1.25) | 4.62 (0.87) |

Intercorrelations for the study variables among males ($n=560$) are presented below the diagonal. Intercorrelations for the study variables among females ($n=582$) are presented above the diagonal. ** $p < .01$

was observed for the variables relationship skills and emotional regulation in the direct path of association with AEB. The weakest path of association appeared for the planning of schoolwork and AEB. The SEC variables explained 35% of the variation in AEB for the entire sample.

Following research question 2, results displayed that AEB had the strongest (negative) path of association with ED for the entire sample. For the other SEC variables, the model allowed for a direct path of association and indirect path of associations via AEB with ED. For the entire sample, relationship skills yielded the second strongest total association with ED. Emotional regulation had the third strongest path of association with ED for the entire sample. Planning of schoolwork and structuring of homework showed only very weak paths of association with ED. SEC variables accounted for 17% of the variance in ED among the entire sample.

3.3.1 Indirect effects

Regarding research question 2, relationship skills were significantly negatively and indirectly associated with ED ($\beta = -0.06$, $p < 0.001$). The same significant negative path of indirect effect was observed for emotional regulation and ED ($\beta = -0.06$, $p < 0.001$). Planning of schoolwork was significantly and indirectly negatively associated with ED ($\beta = -0.05$, $p < 0.001$), and the same was true for structuring of homework ($\beta = -0.07$, $p < 0.001$). The results indicate that students' ED tends to decrease indirectly through AEB per standard deviation increase in SEC.

3.3.2 Gender differences

Regarding research question 3, the moderating effects of gender were evident for the paths of emotional regulation [females ($X^2 = 4.5$ (1), $p < 0.05$, $B = 0.23$)] vs. [males $p < 0.001$, $B = 0.13$] and structuring of homework with AEB [females ($X^2 = 4.4$ (1), $p < 0.05$, $B = 0.34$)] versus [males $p < 0.001$, $B = 0.20$]. The paths were significantly stronger for females than for males. Moreover, moderation occurred in favor of females for the paths relationship skills [females ($X^2 = 8.8$ (1), $p < 0.01$, $B = -0.11$)] vs. [males $p = 0.54$, $B = -0.01$], emotional regulation [females ($X^2 = 11.9$ (1), $p < 0.001$, $B = -0.13$)] vs. [males $p = 0.60$, $B = -0.01$], and structuring of homework [females ($X^2 = 5.3$ (1), $p < 0.05$, $B = -0.07$)] vs. [males $p = 0.44$, $B = 0.03$] with ED. SECs with AEB accounted for 33% of the variance for males and 37% for females. SECs with ED accounted for 11% of the variance among males compared to 22% among females.

Note: Covariates are given in a standardized (β) metric for the entire sample.

4 Discussion

This study was conducted to investigate how perceived relationship skills, perceived emotional regulation abilities, and perceived ability to structure schoolwork were related to academic efficacy beliefs (AEB). Moreover, the ways in which these aspects of SEC were related to emotional distress (ED) were also examined. Finally, gender differences in these associations were explored. Findings related to the research questions will be discussed below (Fig. 1).

4.1 Associations with academic efficacy beliefs

This study's first research question concerns how the various SECs were associated with AEB. The strongest association with AEB occurred for structuring of homework. Planning of schoolwork yielded a relatively strong bivariate but a weak, multivariate association with AEB. However, taken together, findings for the two variables assessing perceived ability to structure schoolwork indicate that such an ability

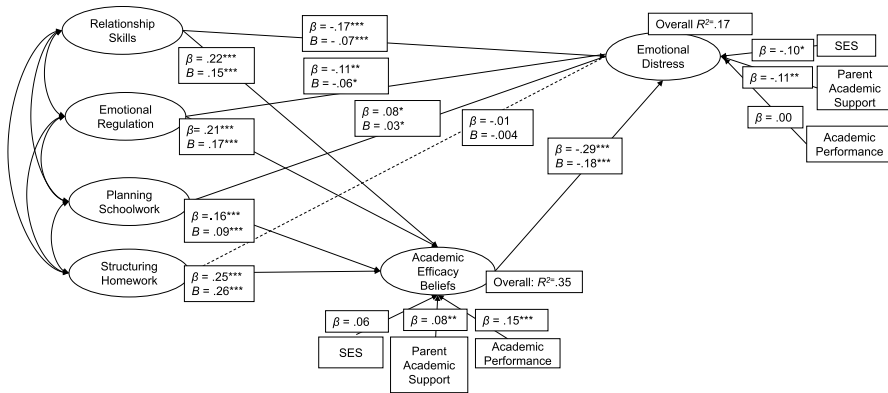


Fig. 1 Structural equation latent path modeling. Coefficients are given for the overall sample in standardized (β) and unstandardized metric (B) ($N = 1142$). $*** = p < .001$, $** = p < .01$, $* = p < .05$

is linked to increased AEB. This corroborates findings from earlier studies indicating that students' self-management in school activities increases their AEB (Cook and Artino, 2016; Diseth et al., 2014).

The second most salient association was found for perceived relationship skills with AEB and may indicate that such skills increase the students' likelihood of getting support from their peers in school contexts and that this promotes AEB (Shin and Ryan, 2012). This corroborates earlier studies' findings that students' positive peer relationships influenced the probability that they would seek academic support, thereby increasing their AEB (Mikami et al., 2017; Putwain et al., 2013).

The third strongest association was for emotional regulation and AEB. These results are in line with recent empirical findings suggesting that the ability to reappraise situations in a way that generates more positive emotions relates to positive thoughts and actions concerning the ability to master schoolwork (Gross, 2015). Moreover, as suggested by Pekrun and Stephens (2012), positive academic emotions influence students' expectations of their future ability to master various school subjects. Hence, the ability to reappraise situations more positively may enhance students' beliefs about their ability to cope adequately in an academic context (Castella et al., 2013).

4.2 Associations with emotional distress

The second research question of this study concerned how the various SECs were associated with ED. A relatively strong tendency to experience less ED was observed in students with high AEB. These results suggest that educational achievements have become increasingly important and that individuals' beliefs in their ability to succeed protect them against ED (Deci and Ryan, 2008). Moreover, in the present study, AEB conceptually includes optimism and a growth mindset as aspects of self-awareness, known to be mechanisms that protect against ED (Durlak et al., 2011; Taylor et al., 2017).

Our results showed a moderately strong tendency for those perceiving themselves as having good relationship skills to report less ED. This result supports findings from earlier studies indicating that the ability to build positive relationships promotes mental health (Malecki and Elliot, 2002; Patrick et al., 2016). The ability to form positive peer relationships and to seek social support when needed increases the likelihood that an individual will fulfill their need for relatedness and protect themselves against ED (Niemiec and Ryan, 2009; Ryan and Deci, 2000). Despite earlier inconsistent findings regarding adolescents' ability to seek social support to reduce ED (Murberg and Bru, 2004b, 2009; Rueger et al., 2016), the present study's results may indicate that relationship skills matter in gaining social support as a strategy for the minimization of stressful experiences. Furthermore, the indirect negative path from relationship skills to ED may indicate that students seek social support regarding academic work and that this influences their belief in their ability to succeed academically, which in turn reduces ED. This finding further supports results from earlier studies (Blakemore et al., 2004; Chu et al., 2010).

Students' perceived ability to regulate emotions was also moderately linked to lower ED in the present study. The result is in accordance with the notion that ability to reappraise negative emotions more positively may help individuals to perceive stressful encounters from a more resilient perspective (Shapero et al., 2019). This also aligns with a recent study suggesting that positive reappraisals allowed for greater adaptability in emotional situations, and thereby counteracted experiences of ED (De France and Hollenstein, 2019). Moreover, the negative indirect associations through AEB may suggest that students' ability to adequately regulate the emotions that arise in relation to their academic lives leads to increased AEB, which then will function as a protection against ED (Weinstein and Ryan, 2011).

The two variables concerning structuring of schoolwork exhibited weak associations with ED, suggesting that these SECs may play only a minor role in ED.

4.3 Gender differences

The third research question in this study explored gender differences, which were evident in the strengths of several paths in the structural model, in favor of females. For ED in particular, independent variables accounted for greater variance among females. Perceived relationship skills were more strongly linked to less ED among females. This finding is in accordance with earlier studies indicating that females more actively seek social support to cope with stress (Eschenbeck et al., 2007; Kort-Butler, 2009). Moreover, female interactions, more than male interactions, are suggested to be close but also to be associated with anxiety about social exclusion and self-disclosure, factors that may increase ED (Rose and Rudolph, 2006; Rudolph and Conley, 2005). Taken together with this notion, the present study's results may indicate that females require functional relationship skills to prevent ED.

The path from emotional regulation to ED was also stronger for females than for males. This finding may suggest that, as females tend to experience more negative emotions, they will benefit from the ability to appraise situations in a way that engenders positive emotions (Chaplin and Aldao, 2013; Weisberg et al.,

2011). Furthermore, early adolescence is a period of emotional instability (Zimmermann and Iwanski, 2014), and it may be particularly important for adolescent females to have functional emotional regulation strategies to reduce ED. Earlier studies' findings that females implement more strategies of emotional regulation support this interpretation (Nolen-Hoeksema and Aldao, 2011). Our findings suggest that it may be especially beneficial to enhance adolescent females' competence in emotion regulation to prevent or reduce ED (Bender et al., 2012).

The association between emotional regulation and AEB was also stronger for females. Findings may reflect that adequate emotional regulation could contribute more to AEB among females. This aligns with previous findings indicating that positive academic emotions were more closely linked to a general optimism toward school among female students (Neumann et al., 2010). Furthermore, adolescent females tend to have lower AEB than male students (Diseth et al., 2014). This underscores the fact that efforts to help students regulate unpleasant academic emotions may be beneficial for adolescent female students.

Gender differences, although weak, were evident in the strengths of the paths from structuring homework to ED and AEB, respectively, in favor of females. Earlier studies indicated that females invest more in schoolwork and tend to perceive schoolwork as more stressful (Bru et al., 2019; Goldstein et al., 2015). The present study's findings suggest that structuring homework by managing time and behavior may help females to remain optimistic in the academic context and prevent ED. To test this assumption, further experimental research is required.

4.4 Methodical considerations

The present study's strength lies in the relatively large sample size. The measures' validity was ensured by using established measures and testing measurement models. Moreover, the reliability of the SEC variables' unique associations was strengthened by controlling for SES and parents' academic support. Additionally, access to students' national test results minimized the bias known to be present in students' self-reported grades, and advanced statistical methods contributed to statistical validity. Low ICCs and design effects did not imply a need for multilevel analysis, and the complex solution confirmed that clustering at the class level did not influence the results. The cross-sectional design has its limitations in that the exposure and outcome were assessed simultaneously, providing no evidence of a temporal or causal relationship between variables. Suggestions concerning the benefits of SECs should therefore be regarded as assumptions for further research. Moreover, this study included a limited number of SECs, and future studies should examine how other SECs are linked to AEB and ED in early adolescence. The present study collected data from students' self-report questionnaires, which may have influenced data and findings. Future research should expand the approach to incorporate other assessment methods, such as behavioral skills observations and informant observation, to gain more comprehensive insights into students' SECs.

4.5 Conclusions

Structural equation modelling highlighted that all the SECs we examined had a role in promoting AEB. This appeared to be particularly important for female students where perceived relationship skills, emotional regulation, and structuring of schoolwork were more strongly related to less ED. Similarly, emotional regulation and structuring of schoolwork were more strongly associated with AEB. These findings indicate that these SECs may be more important for the emotional well-being of female adolescent students.

Although we cannot establish causality, our results suggest that the ability to structure schoolwork, establish relationships at school and regulate emotions have a role in AEB and, via this, in the prevention or reduction of ED. The role of AEB in ED underscores the important role of schools in preventing ED among adolescence. Lower secondary schools should give priority to helping students develop relationship and emotional regulation skills.

Appendix A: Factor loadings and goodness-of-fit indices for all measurement models. Internal consistency for factor-based indexes is given in Cronbach's alpha and omega-values*.

| Measurements models for SECs, AEB and ED | | | | | | Factor loadings |
|---|------------|-----------------------------------|----------|----------|---------------|-----------------|
| <i>Relationship skills</i> | SRMR=0.036 | RMSEA=0.13 90% CI (0.10-0.15) | CFI=0.95 | TLI=0.89 | $\alpha=0.90$ | – |
| * <i>Correlation of residuals</i> | SRMR=0.013 | RMSEA=0.05, 90% CI (0.03-0.08) | CFI=0.99 | TLI=0.98 | $\omega=0.91$ | – |
| Introduction: Below are some statements regarding how you interact with others. Select the option that suits you best | | | | | | – |
| I get to know others easily | | | | | | 0.79 |
| I get in touch with others quickly | | | | | | 0.84 |
| I know how to take contact with others | | | | | | 0.86 |
| I capture the interests of others in a positive way | | | | | | 0.75 |
| I easily find something to talk to others about | | | | | | 0.76 |
| <i>Emotional Regulation</i> | SRMR=0.05 | RMSEA=0.14, 90% CI (0.12-0.16) | CFI=0.91 | TLI=0.83 | $\alpha=0.88$ | – |
| * <i>Correlation of residuals</i> | SRMR=0.012 | RMSEA=0.03 90% CI (0.00-0.06) | CFI=0.99 | TLI=0.99 | $\omega=0.88$ | – |
| Introduction: Below are several statements about how you may handle your emotions. Think about how you regulate your feelings and mark the option that suits best | | | | | | – |
| When I want to feel happier, I think about something else | | | | | | 0.61 |
| When I want to feel less bad [e.g. sad, angry, or worried], I think about something else | | | | | | 0.67 |

| Measurements models for SECs, AEB and ED | | | | | | Factor loadings |
|--|------------|----------------------------------|----------|----------|--------------------------------|-----------------|
| When I am worried about something, I think about it in a way that helps me feel better | | | | | | 0.78 |
| When I want to feel better in relation to something, I change the way I think about it | | | | | | 0.89 |
| I control my feelings about things by changing the way I think | | | | | | 0.80 |
| <i>Planning of School-work</i> | SRMR=0.03 | RMSEA=0.13 90% CI (0.11-0.16) | CFI=0.95 | TLI=0.89 | $\alpha=0.91$ | – |
| * Correlation of residuals | SRMR=0.011 | RMSEA=0.05 90% CI (0.02-0.08) | CFI=0.99 | TLI=0.99 | $\omega=0.91$ | – |
| Instructions: There are many ways to cope with challenges. What do you do and feel when you are experiencing academic challenges at school? | | | | | | – |
| I make a plan of action | | | | | | 0.76 |
| I try to come up with a strategy about what to do | | | | | | 0.82 |
| I think about how I might best handle the problem | | | | | | 0.82 |
| I think hard about what steps to take | | | | | | 0.87 |
| I have done what must be done step by step | | | | | | 0.77 |
| <i>Structuring homework</i> | SRMR=0.02 | RMSEA=0.05 90% CI (0.03-0.07) | CFI=0.98 | TLI=.96 | $\alpha=0.75$ $\omega=0.75$ | – |
| Instructions: How do you set yourself up for success regarding homework? | | | | | | – |
| I make sure no one disturbs me when I study | | | | | | 0.57 |
| I make a schedule to help me organize my study time | | | | | | 0.64 |
| I finish all of my studying before I play video games or visit my friends | | | | | | 0.57 |
| I try to study in a quiet place | | | | | | 0.62 |
| I think about how best to study before I begin studying | | | | | | 0.66 |
| <i>Academic efficacy beliefs</i> | SRMR=0.04 | RMSEA=0.06 90% CI (0.05-0.06) | CFI=0.95 | TLI=0.94 | $\alpha=0.92$ $\omega=0.83$ | – |
| Instruction: Do you agree or disagree with the following statements about opportunities to learn and develop? Select the option that best suits you. There are no correct or incorrect answers | | | | | | – |
| I can learn what they teach at school this year | | | | | | 0.62 |
| I can figure out anything if I try hard enough | | | | | | 0.72 |
| If I practice every day, I can become good at almost anything | | | | | | 0.69 |
| When I have decided to accomplish something that is important to me, I keep trying to complete it, even if it is more difficult than I thought | | | | | | 0.74 |
| I am certain that I will achieve the goals that I have set for myself | | | | | | 0.70 |
| When I'm struggling to accomplish something difficult, I focus on the progress I make instead of feeling discouraged | | | | | | 0.67 |
| I believe hard work pays off | | | | | | 0.70 |
| My abilities grow based on the effort I make | | | | | | 0.82 |
| I believe that the brain may be developed like a muscle | | | | | | 0.73 |
| I think that regardless of who you are, you may make considerable changes to your abilities | | | | | | 0.74 |
| I can change my capabilities significantly | | | | | | 0.76 |

| Measurements models for SECs, AEB and ED | | | | | | Factor loadings |
|---|--------------|------------------------------------|------------|------------|--|-----------------|
| <i>Emotional distress</i> | SRMR = 0.05 | RMSEA = 0.08 90% CI (0.07-0.09) | CFI = 0.92 | TLI = 0.90 | | – |
| *Correlation of residuals | SRMR = 0.037 | RMSEA = 0.06 90% CI (0.05-0.07) | CFI = 0.95 | TLI = 0.94 | $\alpha = 0.90$ $\omega = 0.90$ | – |
| Instruction: Below is a list of various worries. Have you experienced any of these worries in the last week (even today)? | | | | | | – |
| Sudden fear for no reason | | | | | | 0.61 |
| Feeling scared or anxious | | | | | | 0.64 |
| Fatigue or dizziness | | | | | | 0.58 |
| Feeling tense or anxious | | | | | | 0.64 |
| Easy to blame yourself | | | | | | 0.75 |
| Sleep problems | | | | | | 0.57 |
| Depressed, heavy-hearted (sad) | | | | | | 0.81 |
| Feeling of being useless, little worthwhile | | | | | | 0.79 |
| Feeling everything is an effort | | | | | | 0.76 |
| Sensation of hopelessness with regard to the future | | | | | | 0.75 |
| <i>Measurement model for the dependent variables emotional distress and AEB</i> | SRMR = 0.05 | RMSEA = 0.05 90% CI (0.04–05) | CFI = 0.94 | TLI = 0.93 | $X^2 = 695.3$ (187), $p < 0.001$ | – |
| <i>Measurement model for the independent variables—relationship skills, emotional regulation, planning of school-work and structuring of homework</i> | SRMR = 0.03 | RMSEA = 0.02 90% CI (0.02–0.03) | CFI = 0.99 | TLI = 0.99 | $X^2 = 259.2$ (161), $p < 0.001$ | – |

| Measurements models for SECs, AEB and ED | | | | | | Factor loadings |
|--|-------------|---------------------------------------|------------|------------|--|-----------------|
| <i>The overall measurement model</i> | SRMR = 0.04 | RMSEA = 0.03 90% CI (0.03–0.04) | CFI = 0.95 | TLI = 0.95 | $\chi^2 = 1645$ (760), $p < 0.001$ | – |

*Internal consistency is given in both Cronbach's alpha and omega because of the non-unidimensionality of some scales. Alpha values are expected to overestimate the reliability in cases where error variances are allowed to correlate. Omega and alpha will yield the same results if alpha is not violated by the data.

Appendix B: Measurement invariance across gender following the guidelines of Chen, 2007, $RMSEA = \geq 0.15$, $CFI = \leq -0.010$ for configural, metric, and scalar models in the study.

| Measurement models: | χ^2 | df | Number of free parameters | p-value | RMSEA 90% CI | CFI | TLI | SRMR |
|-----------------------------|----------|----|---------------------------|---------|------------------|------|------|------|
| <i>Relationship skills</i> | | | | | | | | |
| Model males | 6.24 | 4 | – | 0.18 | 0.03 (0.00–0.07) | 1 | 0.99 | 0.01 |
| Model females | 10.43 | 4 | – | 0.05 | 0.05 (0.01–0.09) | 0.99 | 0.98 | 0.01 |
| Configural | 16.34 | 8 | 32 | 0.001 | 0.04 (0.01–0.07) | 1 | 0.99 | 0.01 |
| Metric | 25.64 | 12 | 28 | 0.001 | 0.05 (0.02–0.07) | 0.99 | 0.99 | 0.06 |
| Scalar | 45.62 | 16 | 24 | 0.001 | 0.06 (0.04–0.08) | 0.98 | 0.98 | 0.08 |
| <i>Planning schoolwork</i> | | | | | | | | |
| Model males | 13.46 | 4 | – | 0.05 | 0.07 (0.03–0.11) | 0.99 | 0.97 | 0.02 |
| Model females | 14.60 | 4 | – | 0.05 | 0.07 (0.03–0.11) | 0.99 | 0.97 | 0.01 |
| Configural | 27.97 | 8 | 32 | 0.001 | 0.07 (0.04–0.09) | 0.99 | 0.97 | 0.02 |
| Metric | 36.65 | 12 | 28 | 0.001 | 0.06 (0.04–0.08) | 0.99 | 0.98 | 0.03 |
| Scalar | 46.66 | 16 | 24 | 0.001 | 0.06 (0.03–0.08) | 0.98 | 0.98 | 0.04 |
| <i>Structuring homework</i> | | | | | | | | |
| Model males | 16.53 | 5 | – | 0.05 | 0.06 (0.03–1.00) | 0.97 | 0.94 | 0.03 |
| Model females | 6.66 | 5 | – | 0.25 | 0.02 (0.00–0.07) | 1.00 | 0.99 | 0.02 |
| Configural | 23.41 | 10 | 66 | 0.05 | 0.05 (0.02–0.07) | 0.98 | 0.97 | 0.02 |
| Metric | 28.26 | 14 | 56 | 0.05 | 0.04 (0.02–0.07) | 0.98 | 0.97 | 0.04 |
| Scalar | 36.75 | 18 | 46 | 0.05 | 0.04 (0.02–0.06) | 0.98 | 0.97 | 0.05 |
| <i>Emotional regulation</i> | | | | | | | | |
| Model males | 2.32 | 4 | – | 0.68 | 0.00 (0.00–0.05) | 1.00 | 1.00 | 0.01 |
| Model females | 9.06 | 4 | – | 0.06 | 0.05 (0.00–0.09) | 0.99 | 0.98 | 0.02 |
| Configural | 11.1 | 8 | 32 | 0.20 | 0.03 (0.00–0.06) | 1.00 | 0.99 | 0.02 |
| Metric | 18.48 | 12 | 28 | 0.11 | 0.03 (0.00–0.06) | 1.00 | 0.99 | 0.05 |
| Scalar | 29.42 | 16 | 24 | 0.02 | 0.04 (0.02–0.06) | 0.99 | 0.99 | 0.06 |

| Measurement models: | X^2 | df | Number of free parameters | p -value | RMSEA 90% CI | CFI | TLI | SRMR |
|--|---------|------|---------------------------|------------|------------------|------|------|------|
| <i>Academic efficacy beliefs</i> | | | | | | | | |
| Model males | 133.47 | 44 | – | 0.001 | 0.06 (0.05–0.07) | 0.94 | 0.93 | 0.04 |
| Model females | 199.113 | 44 | – | 0.001 | 0.08 (0.07–0.09) | 0.93 | 0.91 | 0.04 |
| Configural | 325.79 | 88 | 30 | 0.001 | 0.07 (0.06–0.08) | 0.94 | 0.92 | 0.04 |
| Metric | 348.18 | 98 | 26 | 0.001 | 0.07 (0.06–0.08) | 0.93 | 0.92 | 0.06 |
| Scalar | 378.99 | 108 | 22 | 0.001 | 0.07 (0.06–0.07) | 0.93 | 0.93 | 0.07 |
| <i>Emotional distress</i> | | | | | | | | |
| Model males | 71.08 | 34 | – | 0.001 | 0.05 (0.03–0.06) | 0.97 | 0.96 | 0.03 |
| Model females | 154.55 | 34 | – | 0.001 | 0.08 (0.07–0.09) | 0.94 | 0.92 | 0.04 |
| Configural | 218.67 | 68 | 62 | 0.001 | 0.06 (0.05–0.07) | 0.95 | 0.93 | 0.04 |
| Metric | 224.45 | 77 | 53 | 0.001 | 0.06 (0.05–0.07) | 0.95 | 0.94 | 0.04 |
| Scalar | 249.32 | 86 | 44 | 0.001 | 0.06 (0.05–0.07) | 0.95 | 0.94 | 0.05 |
| <i>Invariance of the overall measurement model</i> | | | | | | | | |
| Configural | 2563.23 | 1520 | 284 | 0.001 | 0.04 (0.03–0.04) | 0.95 | 0.94 | 0.05 |
| Metric | 2618.32 | 1555 | 249 | 0.001 | 0.04 (0.03–0.04) | 0.95 | 0.94 | 0.05 |
| Scalar | 2718.63 | 1590 | 214 | 0.001 | 0.04 (0.03–0.04) | 0.94 | 0.94 | 0.05 |

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Declarations

Conflicts of interest The authors declare that they have no conflict of interest.

Ethics approval To ensure that the present study adheres to the proper guidelines for the protection of human subjects, the study was formally approved by the Norwegian Social Science Data Services (NSD).

Consent to participate Only students with written consent from parents or guardians were allowed to participate in the study.

Consent for publication All participant had a signed consent from parents or guardian allowing for publication of data.

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