



# Stressors and vulnerability during upper secondary school: subjective experiences of classroom climate and coping beliefs as predicting factors of school stress in Norway

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## Abstract

The present longitudinal study was designed to scrutinize how adolescents perceive their life in upper secondary schools in general, and how central aspects of their perceived classroom climate predicted their coping beliefs and experience of school stress in particular. The participants were 1215 students in upper secondary schools (grades 2 and 3) from one county in Norway. The data were analysed by means of structural equation modelling, and the findings reveal gender differences that need further investigation in future research. Our study indicates that a performance-oriented goal structure and social support from peers and teachers seem to be a potential risk factor and/or protective factor when it comes to adolescents' development of coping beliefs and experiences of school stress, especially among girls.

**Keywords** Performance-oriented goal structure · Social support · Coping beliefs · Stress

## 1 Introduction

Increasing academic demands and expectations are facilitating students' learning and development as they move through the educational system. At the same time, these evolving challenges and responsibilities appear to be closely linked to perceptions of stress among adolescents (Klinger et al., 2015; Löfstedt et al., 2019). The literature often separates between objective stress *stimuli* (stressors) and the

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individual's subjective stress *response* (e.g. Byrne et al., 2007; Montgomery, 2012). Stressors include the expectations and challenges that adolescents face in their everyday life at school. In his seminal work, Selye (1956) distinguished between positive (eustress) and negative (distress) stressors. Eustress is associated with positive emotions and can be understood as manageable challenges that provide the basis for learning and development. Distress, however, leads to psychological or emotional activation that will negatively affect students' abilities to learn and perform tasks (Tyng et al., 2017; Vogel & Schwabe, 2016). In this article, we refer to distress when we discuss the stress concept.

Several studies have shown that high levels of stress have a strong correlation with mental health problems such as depression, panic attacks, and anxiety (Eisenberg et al., 2011; Morris et al., 2010). This association seems to be moderated through stress management beliefs (Sawatzky et al., 2012; Varghese et al., 2015). In addition, other research indicates that stress negatively predicts academic performance, especially grades, in both lower secondary (Bücker et al., 2018; Goldstein et al., 2015), and upper secondary school (Pascoe et al., 2020; Schraml et al., 2012). In sum, these findings suggest a reciprocal relationship between high levels of stress and mental health, and low levels of academic performance.

The prevalence of school stress is prominent in the Nordic countries (Lillejord et al., 2017; Löfstedt et al., 2019; Ringdal et al., 2020). This mirrors findings from a cross-national survey involving 72 countries and consisting of 540 000 student respondents aged 15–16, conducted by the Organization for Economic Co-operation and Development (OECD, 2017), where 66% of the students reported feeling stressed about poor grades, and 37% reported feeling tense at school. Furthermore, school stress seems to be higher among girls compared with boys (Dalen, 2014; Klinger et al., 2015). These gender differences are usually explained from two main perspectives. The first is based on the notion that girls are exposed to *stronger or more stressors* across different contexts in their life ecology (Hankin et al., 2007; Högberg et al., 2020). The second is that girls may be *more vulnerable* towards stressors at school as they have higher academic ambitions, and seem to be more responsive to the demands and the expectations of others (Bakken et al., 2018; Giota & Gustafsson, 2016).

After the first PISA survey in Norway in 2001, there has been growing focus on testing and comparison of results between schools. Previous research has found that students experience the school as increasingly more performance oriented as they grow older (Patrick et al., 2011; Skaalvik & Skaalvik, 2013). In addition, a connection is found between the increase in stress during adolescence and the growing focus on testing and performance in schools (Eriksen et al., 2017; Lillejord et al., 2017). On the other hand, it has been reported that some factors protect students against the development of stress in schools. These include, optimistic coping beliefs (Groth et al., 2019; Thapar et al., 2012), and supportive interpersonal relationships with peers, (Pargas et al., 2010; Silk et al., 2007), and teachers (Jennings & Greenberg, 2009; Krane et al., 2016).

The theoretical framework in this article is based on Lazarus and Folkman's (1984) transactional model of stress and coping. This model describes the cognitive appraisal of stressors in three phases. The first phase (primary appraisal) deals with

the individual's assessment of the threat level, based on both the objective extent of stressors and the person's subjective experience of them. From this perspective, interpretations of whether something is actually perceived as a stressor are influenced by subjective values and goals connected to how important it is for the individual to manage the situation. When the mastery of a stressor is highly relevant and consistent with one's needs and well-being, the situation elicits a more intense emotional response (Oltenu et al., 2019; Smith & Kirby, 2009). The second phase (secondary appraisal) involves an evaluation of available social support and personal coping abilities. When coping beliefs are low, even small stressors can trigger stress. On the other hand, individuals who have optimistic coping beliefs will be more robust when it comes to coping with the stressors they are exposed to (Groth et al., 2019; Johnson et al., 2017). The last phase deals with the individual's stress response and coping strategies. If the increasing pressure at school becomes too high, students may perceive that the prevailing demands and expectations exceed their available personal and social resources (Salmela-Aro, 2017; Walburg, 2014). Research indicates that such stress responses often will be accompanied by pessimistic beliefs concerning a person's ability to cope with issues such as schoolwork (Groth et al., 2019; Liu et al., 2015). In sum, in addition to the *extent* of objective demands and expectations over time, the subjective *experience* is a key concept when exploring the development of stress. It is not solely the pressure from stressors, but also how the situation is appraised, and perceptions of available personal and social resources, that determine experiences of stress (Lazarus, 1966; Lazarus & Folkman, 1984).

In the present study we will use this theoretical framework as an analytical tool to distinguish between Norwegian students' appraisal of the amount of pressure they are exposed to, their perceptions of personal and social resources, and experience of school stress during their last two years of Upper Secondary School. Therefore, we will not investigate the students' stress response and coping strategies, but demarcate our exploration to how the first two phases in Lazarus and Folkman's (1984) transactional model lead to experiences of stress. In the following, we will review research on the associations between adolescents' perceptions of classroom climate, coping beliefs and school stress. This literature review ends with a formulation of a primary research question with five related hypotheses.

## 1.1 Classroom climate, coping beliefs and school stress

The classroom climate has been defined in various ways. Nevertheless, there is a consensus in conceptualizing the classroom climate as a multidimensional concept (Pianta & Hamre, 2009; Wang & Degol, 2016). This includes "the organisation and structure of the classroom environment; pedagogical, disciplinary, and curriculum practices; and interpersonal relationships among students, peers and teachers" (Wang et al., 2020, p.2). The classroom climate has been found to be strongly associated with coping beliefs (Mehta et al., 2018; Rolland, 2012), and school stress (Byrne et al., 2007; Högberg et al., 2020). Five literature reviews have found evidence that aspects of the classroom climate are related to several affective,

behavioural, academic, health-related, and interpersonal outcomes among adolescents (Aldrige & McChesney, 2018; Thapar et al., 2012; Cohen et al., 2009; Thapa et al., 2013; Wang & Degol, 2016). However, examining the previous research in these reviews indicates a further need to explore of how key aspects of the school climate affect specific student outcomes such as coping beliefs or school stress. In addition, much of the school climate research lacks explicit theoretical underpinnings such as Lazarus and Folkman's (1984) transactional model of stress and coping that is used in the present study. Based on this, we have demarcated our study to the exploration of the classroom climate to the perceptions of the performance-oriented goal structure in the students' classrooms and the social support from peers and teachers, and how these distinct elements affect students' coping beliefs and experiences of school stress.

### 1.1.1 Performance-oriented goal structure

The construct of goal structure arose out of achievement goal theory (Ames & Archer, 1988; Nicholls, 1984). It is conceptualized as competence-relevant environmental emphasis made prominent through "messages in the learning environment (e.g., the classroom or school) that make certain goals salient" (Urda & Schoenfelder, 2006, p. 400). The goal structure is communicated in various ways and from different sources. We can separate the various levels such as the societal level, the school level, the class level and the individual level. At the societal level the goal structure signals can be sent through the public debate, methods for school assessments, and governmental plans and regulations. In addition, each school and each teacher can consciously and unconsciously signal what is important in school to each of the students. This has implications for the individual level. The goal structure is perceived subjectively and individually for each student (Hulleman et al., 2010; Tian et al., 2017). This implies that two students in the same society, school and class may perceive different goal structures.

In a performance-oriented goal structure, the students perceive learning predominantly as a means to achieve recognition of worth and extrinsic rewards. Performance in standardized tests and the like is emphasized and success is indicated by social comparison with peers in class, other classes or normative standards. Thus, the results are interpreted in terms of students' relative performance (Ames, 1992; Meece et al., 2006). Girls seem to report higher levels of a performance-oriented goal structure and school pressure compared with boys (Klinger et al., 2015; Löfstedt et al., 2020), and research indicates that this has several negative outcomes. These include increased occurrence of cheating (Anderman et al., 2009), academic self-handicapping (Urda, 2004), procrastination (Wolters, 2004), lower levels of positive relations towards both peers and teachers (Lerang et al., 2019; Polychroni et al., 2012), decreased coping beliefs when facing stressors (Dull et al., 2015; Huang, 2016), and an increased experience of school stress (Randall et al., 2019; Wang et al., 2020). These findings from previous studies lead us to expect that a perceived performance-oriented goal structure has a negative association with coping beliefs and a positive association with experiences of school stress, especially among girls.

### 1.1.2 Social support

Social support is another classroom climate variable that seems to affect students' experience of coping beliefs and school stress. This relationship is implicit in the following definition that views social support as: "(...) an individual's perception of general support or specific supportive behaviors (available or enacted upon) from people in their social network, which enhances their functioning and/or may buffer them from adverse outcomes" (Malecki & Demaray, 2002, p. 2). The most important sources for support in adolescents' social networks are family, peers and teachers (Danielsen et al., 2009; Tian et al., 2016). Having positive social relationships is recognized as a basic psychological need and seems critical for engagement and optimistic coping beliefs at school (Deci & Ryan, 2000; Poots & Cassidy, 2020).

The teacher-student relationship is often mentioned when teachers and students are asked about the key factors in a good learning environment and what matters most for the students' academic development (Patrick et al., 2011) and well-being at school (Zullig et al., 2011). The students' sense of teacher support seems to affect the development of enhanced motivation and higher academic performance (Davis, 2006), as well as more positive relationships with peers (Wentzel et al., 2010). In addition, such students also report less emotional distress (Lei et al., 2018; Suldo et al., 2009), and higher levels of perceived ability and mastery expectations (Sowislo & Orth, 2013; Yeoh et al., 2017), compared to students who experience lower levels of teacher support. In contrast, a deteriorating teacher-student relationship is associated with aggression (Henry et al., 2011), dropout (Fortin et al., 2013), poorer academic performance (Givens Rolland, 2012), higher levels of experienced stress (Gallagher & Vella-Brodrick, 2008; Kong et al., 2013), and similar negative student outcomes (Rudasill et al., 2010). Other research studies have found that peer support is even more important than teacher support for adolescents' coping beliefs and experience of school stress (Arslan, 2009; Turner, 1999). Findings indicate that students with positive peer relationships are more behaviourally and emotionally engaged in school (Garcia-Reid, 2007; Long & Sweeting, 2020). This contrasts with those who experience peer rejection (French & Conrad, 2001). Research has also found positive effects of close friendships and that positive interactions with friends foster interpersonal and intrapersonal protective buffers such as increased coping beliefs (Raboteg-Saric & Sakic, 2014), and reduced experiences of school stress (Moses & Villodas, 2017).

Research on gender differences report how girls and boys perceive support and the effect it has on coping beliefs and school stress (Cheng & Chan, 2004; Rueger et al., 2008). Girls seem to experience more support from peers than from teachers, while boys perceive less support from both teachers and peers compared with girls. In addition, some researchers claim that social support might be more important for girls as interpersonal stressors are stronger predictors of negative psychological outcomes among girls compared with boys (Hankin et al., 2007; Rose & Rudolph, 2006). Based on this previous research, we expected that both peer and teacher support were positively related to coping beliefs, and negatively related to experiences of school stress, especially among girls.

## 1.2 The present study

The present study was designed to explore how students perceive life in school in general, and how central aspects of the school ecology predict their coping beliefs and experiences of school stress in particular. Based on the literature review, the following research question was formulated: “Are upper secondary school students’ perceptions of coping beliefs and school stress related to gender, the performance-oriented goal structure in the classroom and their perceptions of social support from teachers and peers?” Based on this research question and our findings from the literature review, five hypotheses were formulated, and a theoretical path model was specified:

- H1: Girls perceive lower levels of coping beliefs and higher levels of school stress, compared with boys (Dalen, 2014; Klinger et al., 2015).
- H2: A performance-oriented goal structure will predict coping beliefs negatively and school stress positively (Huang, 2016; Wang et al., 2020).
- H3: Peer support will predict coping beliefs positively and school stress negatively (Moses & Villodas, 2017; Raboteg-Saric & Sakic, 2014).
- H4: Teacher support will predict coping beliefs positively and school stress negatively (Kong et al., 2013; Sowislo & Orth, 2013)
- H5: Coping beliefs will predict school stress negatively (Groth et al., 2019; Johnson et al., 2017)

## 2 Method

### 2.1 Participants and procedure

This study was part of a larger data collection and analysis of students’ perceptions of their life in school. The compulsory elementary school in Norway consists of 10 years of education—seven in primary school and three in lower secondary school. Upper secondary school is not compulsory, but the publicly funded education provides this as a statutory right to adolescents aged up to 21. Almost 98% of the students who complete elementary school in 10th grade immediately enrol in upper secondary education (Statistics Norway, 2018). The sample comprises 1215 students (63% response rate), 688 girls and 527 boys, in upper secondary school (grades 2 and 3, aged approximately 17–18), from both rural and urban areas in thirteen schools in one county in Norway. We used longitudinal data to record change over time for an individual, developmental differences between groups (e.g. gender), and to examine causal relationships amongst theoretically relevant variables over time (Card & Little, 2007; Shek & Catalina, 2016). The data can be described as a convenience sample (McQueen & Knussen, 2006), and were collected in the spring of 2017 and 2018.

The informants were made familiar with the study’s voluntary participation and that we appraised their consent as they handed in a completed questionnaire. The

data were collected on paper-based questionnaires and administrated by members of the research team. The Norwegian Centre for Research Data approved the survey.

## 2.2 Instruments

All scales were measured with items answered on a six-point Likert scale from 1=very untrue to 6=very true, and the reliability was measured by Cronbach's alpha.

### 2.2.1 Performance-oriented goal structure

Students' perception of the classroom performance-oriented goal structure in upper secondary school grade 2 was evaluated with four items based on the Patterns of Adaptive Learning Scales (PALS) (Midgley et al., 2000). Examples of statements: "The most important thing in our class is to get good grades", "The most important thing in our class is to perform well in school". Cronbach's alpha for the scale was 0.87/0.86 for girls/boys, respectively.

### 2.2.2 Social support

*Social Support from Peers* in upper secondary school grade 2 was measured with four items from The Child and Adolescent Social Support Scale (CASSS) (Malecki & Demary, 2002). Examples: "My classmates are nice to me" and "My classmates treat me with respect". Cronbach's alpha for the scale was 0.83 for both girls and boys.

The prevailing research literature discusses whether *Teacher support* should be described as a multidimensional phenomenon or by a single underlying quality (Downer et al., 2015). For instance, Pianta et al. (2010) suggest dividing the concept in three: emotional support, academic support and classroom organization. In line with this, we constructed two scales; one for emotional support and one for academic support from the teacher. Both the scales consisted of four items based on Malecki and Demary (2002). Examples of items: "I feel that my teachers care about me", "I feel that my teachers treat me in a friendly manner" (emotional support), and "The teachers explain what I don't understand", "My teachers continue to explain until I understand" (academic support). However, a factor analysis showed a single factor structure. Based on this, we decided to use one scale for teacher support in upper secondary school grade 2 based on all eight statements. Cronbach's alpha for the scale was 0.93 for both girls and boys.

### 2.2.3 Coping beliefs

In this study, we use the concept of coping competence as an indicator of *coping beliefs* in upper secondary school grade 3. Coping competence is defined as "(...) the capacity to effectively cope with failure and negative life events as indicated by a reduced likelihood of helplessness reactions and fast recovery from any occurring

helplessness symptoms” (Schroder & Ollis, 2013, p. 288). Coping beliefs was measured with five items from The Coping Competence Questionnaire (Schroder & Ollis, 2013). This instrument had originally 12 items, and we used the 5 items with the highest loadings from the factor analysis. All the statements are formulated negatively and were turned before we made the scale. Examples of statements: “When I do not succeed right away, I think I will never get it”, “When I perform poorly at school, I begin to doubt my abilities”. Cronbach’s alpha for the scale was 0.88/0.87 for girls/boys, respectively.

### 2.2.4 School stress

*School stress* in upper secondary school grade 3 was measured using three items based on a scale developed for the international survey, Health Behavior in School-Aged Children (Samdal et al., 2016), organized and administrated by the World Health Organization. Examples of statements: “I feel exhausted because of schoolwork”, “I’m stressed by schoolwork”. Cronbach’s alpha for the scale was good for both girls (0.88) and boys (0.85).

## 2.3 Data analysis

Initially, an exploratory factor analysis was conducted on five sum scales (school stress, performance-oriented goal structure, peer support, teacher support, and coping beliefs), with a total of 24 statements (2.2 Instruments for details).

The Kaiser-Meyer-Olkin value was 0.90, exceeding the recommended value of 0.60 (Kaiser, 1970; 1974) and Bartlett’s Test of Sphericity (Bartlett, 1954) reached statistical significance, supporting the factorability of the correlation matrix. Principal component analysis revealed the presence of five components with eigenvalues exceeding 1. The five-component solution explained a total of 69% of the variance. To aid the interpretation of these three components, oblimin rotation was performed. The rotated solution revealed the presence of a simple structure (Thurstone, 1947) with all five components showing strong loadings and all variables loading substantially on only one component.

The hypothesized model of the connections between the variables presented in Fig. 1 were tested statistically to explore to what degree it was coherent with the observed data. Structural equation modelling (SEM) in the AMOS 26 program was used to analyse the model with latent (unobserved) variables. None of the error terms were allowed to correlate. The coherence between observed data and the hypothesized model is reported as the goodness of fit statistics. The goodness of fit indicators used to assess the model are the Non-Normed Fit Index (NNFI, also known as TLI), the Comparative Fit Index (CFI), and the Root Means Square Error of Approximation (RMSEA), the study also includes chi square.  $RMSEA \leq 0.07$ ,  $IFI \geq 0.90$ ,  $TLI \geq 0.90$ ,  $CFI \geq 0.90$  are considered as indicators of acceptable fit (Byrne, 2001; Hu & Bentler, 1999). This indicates a plausibility of the associations between the constructs. The model was tested with the whole sample, and then separate



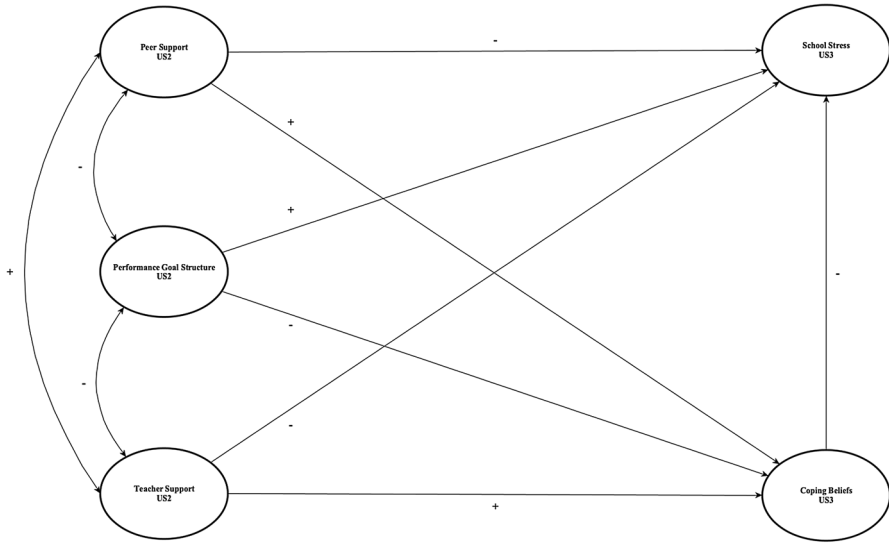


Fig. 1 Theoretical path model

analyses were performed for girls and boys, as research indicates gender differences in the importance of the hypothesized relation between constructs.

### 3 Results

#### 3.1 Zero order correlations

Zero order correlations between the study variables as well as N, statistical means, standard deviations and Cohen`s D for girls and boys are shown in Table 1.

Table 1 shows that all correlations between school stress and the other variables were statistically significant for both girls and boys, with the exception of the correlations between performance-oriented goal structure and school stress that was not significant for the boys ( $p > 0.05$ ). The correlations between school stress and performance-oriented goal structure were positive for the girls (0.21). This indicates that the higher the girls perceive a performance-oriented goal structure, the higher they perceive school stress. The correlations between school stress and peer support ( $-0.17/-0.12$ ), teacher support ( $-0.24/-0.20$ ), and coping beliefs ( $-0.47/-0.34$ ) were negative for girls/boys, respectively. This indicates that the higher levels of social support and coping beliefs the students experience, the lower levels of school stress they report.

In addition, the mean of school stress was significantly higher for girls (4.31) compared with boys (3.58). An opposite pattern is shown for coping beliefs (4.01/4.60), as the boys have a statistically significant higher mean. Considering effect size, Cohen (1988) claims that an effect of 0.2 is small, 0.5 is medium, and 0.8 is high. The Cohen`s D measure thus indicates that the difference in effect size

**Table 1** Zero order correlations between observed variables for girls and boys

Variables	1		2		3		4		5	
	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys
1. School stress US3	–		.21**	.06	–.17**	.12**	–.24**	–.20**	–.47**	–.34**
2. Perf. goal structure US2			–		–.08*	.00	–.08*	.11*	–.23**	–.06
3. Peer support US2					–		.46**	.49**	.29**	.20**
4. Teacher support US2							–		.28**	.21**
5. Coping beliefs US3									–	
N	639	448	687	524	679	519	688	527	675	503
Mean	4.31	3.58	3.12	3.28	4.92	4.90	4.30	4.39	4.01	4.60
SD	1.14	1.17	1.15	1.18	.86	.86	.95	.96	1.15	.97
Cohen's D	.63		.14		.02		.09		.56	

\*\* $p < .01$  \* $p < .05$

is above medium for both school stress (0.63) and coping beliefs (0.56). The effect size for performance-oriented goal structure (0.14), peer support (0.02), and teacher support (0.09) was under Cohen’s limit for concluding a small effect. However, it is somewhat surprising that the boys perceive higher levels of a performance-oriented goal structure, hence they perceive a more competitive environment, but the mean difference from the girls is low and not significant. In all, these findings support H1.

### 3.2 SEM analysis

The relations between the variables were further analysed by means of SEM analysis for latent variables. The model had a satisfactory fit to data: CFI=0.960/0.964, TLI=0.951/0.955, RMSEA=0.047/0.043, chi square=604.857/475.187, df=242/242,  $p=0.000/0.000$ , for girls/boys respectively. Figure 2 shows the SEM between performance-oriented goal structure, peer support, teacher support, coping beliefs and school stress. Table 2 presents the significant direct, indirect and total effects in the Structural Equation Model divided by gender.

Figure 2 indicates that the correlation between a perceived classroom performance-oriented goal structure and social support from peers and teachers is not significant, with the exceptions of the correlation between teacher support and a performance-oriented goal structure for boys (0.14). This is somewhat surprising in light of our theoretical path model based on earlier research. However, in line with expected findings, the correlations between peer and teacher support are statistically significant for both girls and boys (0.50/0.57).

A perceived classroom performance-oriented goal structure seems to predict coping beliefs negatively for the girls ( $\beta = -0.20$ ), but not for the boys. In addition, a performance-orientation seems to positively predict school stress for girls both directly ( $\beta = 0.10$ ) and indirectly through coping beliefs (0.10). However, in contrast to expected findings, we found that the associations between a perceived performance-oriented

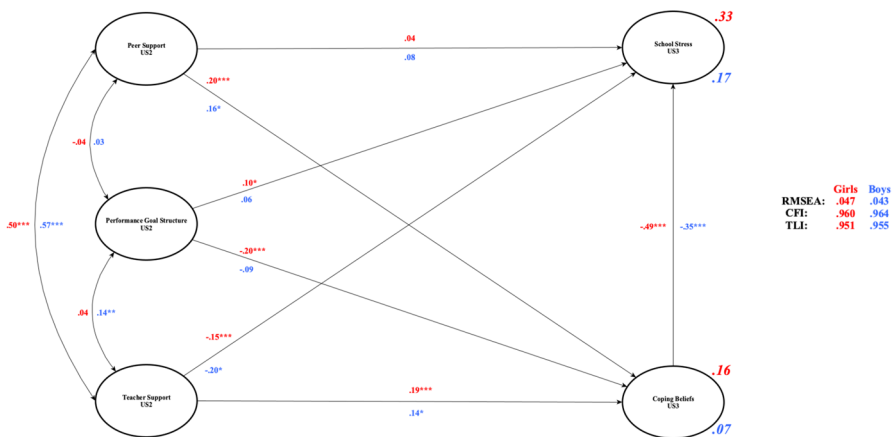


Fig. 2 Structural Equation Model between performance goal structure, peer support, teacher support, coping beliefs and school stress, divided by gender (girls/boys)

**Table 2** Significant direct, indirect and total effects in the structural equation model for girls and boys

Variables	Effects					
	Direct		Indirect		Total	
	Girls	Boys	Girls	Boys	Girls	Boys
<i>Performance goal structure (USII)</i>						
Coping beliefs (USIII)	-.20	ns	-	-	-.20	ns
School stress (USIII)	.10	ns	.10	ns	.20	ns
<i>Peer support (USI)</i>						
Coping beliefs (USIII)	.20	.16	-	-	.20	.16
School stress (USIII)	ns	ns	-.10	-.06	-.10	-.06
<i>Teacher support (USII)</i>						
Coping beliefs (USIII)	.19	.14	-	-	.19	.14
School stress (USIII)	-.15	-.20	-.09	-.05	-.24	-.25
<i>Coping beliefs (USIII)</i>						
School stress (USIII)	-.49	-.35	-	-	-.49	-.35

goal structure and neither coping beliefs nor school stress were statistically significant ( $p > 0.05$ ) for the boys. This is a surprising finding as it indicates that the perceptions of a performance-orientation in the classroom does not impact the boys' coping beliefs or experiences of school stress. These findings support H2 for the girls, but H2 has to be discarded for the boys.

Peer support seems to positively predict coping beliefs for both girls ( $\beta = 0.20$ ) and boys ( $\beta = 0.16$ ). However, we also find it surprising that peer support does not have a significant direct association with school stress, even though it has a significant negative indirect effect through coping beliefs for both girls ( $\beta = -0.10$ ) and boys ( $\beta = -0.06$ ). These findings support H3 with regard to the relationship between peer support and coping beliefs, but H3 on the negative association between peer support and school stress has to be discarded for both girls and boys.

Teacher support positively predicts coping beliefs ( $\beta = 0.19/0.14$ ) and negatively predicts school stress ( $\beta = -0.15/-0.20$ ) for both girls and boys, respectively. In addition, there are indirect negative effects through coping beliefs for both girls ( $\beta = -0.09$ ) and boys ( $\beta = -0.05$ ) These findings are in support of H4.

Coping beliefs negatively predict school stress for both girls ( $\beta = -0.49$ ) and boys ( $\beta = -0.35$ ). These findings support H5. In total, the model explains 16% and 7% of the variance of perceptions of coping beliefs, and 33% and 17% of the variance of the perceptions of school stress, for girls and boys respectively. In all, this indicates that the model fits the girls' development of coping beliefs and experiences of school stress better than it does for the boys.

## 4 Discussion

The primary goal of this study was to further explore the prevalence of school stress and a proposed pathway between the students' perceptions of a performance-oriented goal structure, social support, coping beliefs and experiences of school stress during Norwegian student's last two years of Upper Secondary School. We adopted Lazarus and Folkman's (1984) transactional model of stress and coping as a theoretical framework, based on an understanding that in addition to the objective demands and expectations over time, the subjective experience is a key concept when we explore the development of stress. It is not solely the pressure from stressors, but also how students appraise the situation, and their available personal and social resources, that determine whether they experience stress (Lazarus, 1966; Lazarus & Folkman, 1984). The following research question guided the study: "Are upper secondary school students' perceptions of coping beliefs and school stress related to gender, the performance-oriented goal structure in the classroom and their perceptions of social support from teachers and peers?"

The first finding is that coping beliefs are significantly lower and school stress is significantly higher among girls compared with boys. This finding supports our hypothesis based on previous research (Dalen, 2014; Klinger et al., 2015). For the remaining three variables, the effect size was not statistically significant, indicating that both genders perceived their social support from peers and teachers, and the performance-oriented goal structure to the same degree.

The second finding is that the proposed pathway between the students' perceptions of a performance-oriented goal structure, social support, coping beliefs and experiences of school stress during their last two years of Upper Secondary School predicts girls' development of school stress to a higher degree than it does for boys, 33% and 17%, respectively. Parts of this can be explained by the fact that performance-oriented goal structure neither predicts coping beliefs nor experiences of school stress for boys, while both are statistically significant for girls. The effect of social support on coping beliefs and school stress is more similar between the genders. However, it is surprising that peer support does not predict experiences of school stress directly. Rather it seems that the effect of support from peers is indirect through coping beliefs. In support of earlier research and in line with our proposed pathway and earlier research, teacher support predicts coping beliefs positively and school stress negatively. In addition, as expected, coping beliefs predict experiences of school stress negatively for both genders.

In all, these findings are interesting in light of Lazarus and Folkman's (1984) transactional model and earlier research. It does not seem to be the *extent* of performance pressure or social support that leads to the girls having more extensive experiences of school stress, instead it suggests that girls are more *vulnerable* towards school stressors, particularly the performance pressure in the goal structure at school, compared with boys. The difference between the two genders' mean level of perceptions of a performance-oriented goal structure is not statistically significant, and the mean level between both coping beliefs and experiences

of school stress has a relatively high effect size. Based on this, it is plausible to argue that it is not the objective extent of pressure, but the subjective interpretation of the amount of this pressure that leads to high levels of experienced school stress amongst adolescent girls.

One possible explanation is that girls to a greater extent than boys reflect their self-worth in how they succeed at school (Oltenau et al., 2019; Smith & Kirby, 2009). As external stressors depend on subjective interpretations, characterized by our values, the social roles we hold and past experience, the same amount of actual demands and expectations can be considered unproblematic for some and pose a health risk for others (Avison, 2010; Thoits, 2010). At the same time, the potential for experiencing a situation with extensive pressure as stressful can be related to gender differences in optimistic coping beliefs, and to differences in girls' and boys' coping strategies that were not scrutinized in this study.

#### 4.1 Limitations and future directions

This study has some limitations. Future studies should use more extensive longitudinal and experimental designs to test the development of different associations between adolescents' sense of stress, and personal and environmental factors from several microsystems over time. In addition, all data were based on students' self-reports. It seems appropriate and expedient to employ more objective measures of social dynamics (e.g. social network analysis) and triangulate the subjective perceptions in the self-reports by the use of several informants, such as friends, parents, and teachers. Furthermore, this study has only measured individual-level factors. Future studies should include factors at the class-level and school-level through multi-level analysis to investigate how these systemic variables may influence students' perceived school ecology, coping beliefs and school stress. Several studies have revealed that differences in the classroom or school environment exist across classes at school level (e.g. Danielsen et al., 2010; Kashy-Rosenbaum et al., 2018). These possible associations are in need of further scrutiny.

## 5 Conclusion

Although this study has some limitations, the results mainly support previous research. The importance of social support in the school environment, especially from teachers, is supported in this study. In addition, our results indicate some surprising gender differences related to the impact of the goal structure at school that need to be explored in future research. A holistic understanding of school stress should include knowledge of both internal and external stressors and resources. This encompasses knowledge of which external factors in the social environment at school protect and challenge adolescents' experience of stress. In addition, a holistic understanding requires that we also develop knowledge about which personal factors reduce and increase subjective experiences of stress, respectively. In a school context, the school organization and workforce have a responsibility to keep the

challenges at a level that enables adolescents to cope with them. At the same time, the school has a responsibility to build resistance resources in the individual adolescent in order to reduce the possibility that everyday school life is perceived as overwhelming. In all, our findings call for further scrutiny of the quality, characteristics and dynamics of external factors such as the classroom climate, and internal factors such as coping beliefs, when it comes to understanding adolescents' experience of school stress.

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## Declarations

**Conflict of interest** The authors declare no conflict of interest.

**Ethical approval** The study was considered and accepted by the Norwegian Centre for Research Data, the 0 Regional Committees for Medical and Health Research Ethics, Norway and the Norwegian Data Protection Authority.

**Informed consent** Informed consent was obtained from all participants. Additionally, parents were sent an information letter with the option to opt their child out of the study. The study was approved by the Norwegian Data Inspectorate.

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