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Stress of school performance among secondary students: The role of classroom goal structures and teacher support

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ABSTRACT

With concern growing about the increasing levels of school stress among secondary school students, examining its associations with students' perceptions of important elements in classroom climate can offer valuable scientific information. However, there is minimal research about the role of perceived classroom goal structures and teacher support in school stress. In addition, most research on classroom goal structure has not made a distinction between performance-approach structures and performance-avoidance structures, which may have different effects on school stress. The aim of the present study was to examine the role of classroom goal structures and teacher support in students' stress linked to school performance. We also examined the potential moderating effect of teacher support in the association between classroom goal structures and stress. Our sample consisted of 4768 secondary school students aged 11–17 years (M_{age} = 13.74; 47.9% boys) from 54 schools in Andalusia, Spain. Consistent with the study's aims, hierarchical multilevel multiple regression was used to examine the relationships between mastery goal structure, performance-approach goal structure, performance-avoidance goal structure, and teacher support on our stress of school performance outcome. After controlling for gender, age, and previous academic achievement, performance-avoidance goal structure was significantly associated with higher levels of stress of school performance ($p < .01$). Furthermore, perceived classroom goals and teacher support tended to work together, with the role of performance-approach goal structure being dependent on the levels of mastery goal structure and teacher support ($p < .05$). Practical implications from these findings and future research directions are discussed.

1. Introduction

School is an environment where adolescents regularly encounter potential stressors. In fact, studies examining the relative importance of common stressors in adolescents' lives have indicated that academic-related stressors are common (Anniko et al., 2019; Lin & Yusoff, 2013). More specifically, school performance has been found to be a main source of stress during adolescence, even when important social stressors such as arguments at home, difficulties with peers, and romantic relationships are also taken into consideration (Anniko et al., 2019).

There is a growing concern that the number of adolescent students that experience high levels of school stress may be increasing, which is a concern as stress can result in detrimental effects to their mental health (Wuthrich et al., 2021). Consistent with the salience

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of stress associated with school performance, results from the Programme for International Student Assessment (PISA) in 35 Organisation for Economic Co-operation and Development (OECD) countries and numerous partner countries (for a full list of participating countries, see OECD, 2017, p. 29) show that the majority of students (66% on average across OECD countries) worry about poor grades, 55% feel anxious about tests even when well prepared, and 37% get very tense when studying (OECD, 2017). Most students across OECD countries also express fear of failure, which has been associated with both increased stress and decreased wellbeing (OECD, 2019). The latest data from the WHO-collaborative survey Health Behaviour in School-aged Children (HBSC), which was conducted in samples of 11-, 13-, and 15-year-old students (over 220,000 adolescent students in total) from 45 countries and regions in Europe and Canada, also point in a similar direction (Inchley et al., 2020). Over a third of adolescents reported feeling pressured by school demands, and prevalence in some countries was reported as high as 80% at the age of 15 years (Inchley et al., 2020). In addition, trend analyses suggest that school stress has significantly increased over time in most countries (Löfstedt et al., 2020), with increases in school pressure partially explaining increases in psychosomatic health complaints, especially in higher income countries (Cosma et al., 2020). Adding to the concerns about the negative impact of high stress levels on adolescents' mental health, a recent metanalysis on academic stress concluded that one in six students experienced excessive distress in their final 2 years of secondary school (Wuthrich et al., 2020).

The transactional model of stress and coping (Lazarus & Folkman, 1984) states that levels of stress depend on an individual's appraisal of both the nature of the situation and their available resources for successful coping, which makes students' perceptions of general classroom climate (i.e., perceptions of quality of student-teacher relationships, classroom management, and motivational climate) a main aspect to consider when trying to develop a deeper understanding of school stress. In addition, due to the modifiable nature of classroom climate factors (Wang & Degol, 2016), examining their links with stress can offer valuable evidence for developing interventions in this area. In the present study, we focused on classroom goal structures and teacher support as two of the central elements in the characterization of the general classroom climate (see Eccles & Roeser, 2010, for a detailed description) that may contribute to a better understanding of adolescents' stress of school performance.

2. Classroom goal structures

Achievement goal theory underlines the importance of classrooms being positive motivation and learning environments. Specifically, the concept of *classroom goal structures* (also referred as classroom goals or goal structures) focuses on contextual aspects of the motivational climate and refers to "students' perceptions of the purposes for engaging in academic work that are emphasized in the classroom" (Midgley et al., 2000, p.17). Therefore, goal structures not only encompass goal-related messages explicitly communicated by teachers, but they also include the more general goal-related environment or atmosphere of the classroom as perceived by the student (see Meece et al., 2006, for a review).

Unlike research on personal goals, studies on classroom goal structure to date have focused predominantly on two goal structures: a mastery goal structure and a performance goal structure. *Mastery goal structure* emphasizes the importance of learning (i.e., improving one's competence) as the purpose of engaging in academic work. In a mastery-oriented classroom environment, there is a focus on students' understanding, effort, and improvement, and mistakes are considered a natural part of the learning process (Meece et al., 2006; Patrick et al., 2011). In contrast, *performance goal structure* stresses demonstrating ability as the main goal (Meece et al., 2006), with social comparison and competition having been considered salient aspects of this type of goal structure (e.g., Baudoin & Galand, 2017; Kaplan & Midgley, 1999).

In general terms, mastery goal structure is considered beneficial for the classroom learning environment, whereas an emphasis on performance goals may undermine it (Urdan & Schoenfelder, 2006). Mastery goal structure has been positively associated with students' grit (i.e., inclination to pursue goals with passion and perseverance) and higher academic achievement, with changes in the emphasis in mastery goals predicting changes in grit (Park et al., 2018). This type of goal structure is also associated with adaptive types of classroom relationships (Polychroni et al., 2012), including students' positive coping and positive affect (Kaplan & Midgley, 1999), as well as with lower levels of boredom and anger in students (Baudoin & Galand, 2017). In contrast, findings about performance goal structure have been less positive, with the same studies suggesting that this type of goal structure was associated with negative affect and non-adaptative forms of coping or non-coping (Kaplan & Midgley, 1999), as well as with increased anger, anxiety, and shame (Baudoin & Galand, 2017). However, comparing quasi-experimental classroom goal conditions (i.e., mastery, performance approach, and combined mastery and performance-approach), Linnenbrink (2005) concluded that a combination of mastery and performance-approach goals was the most beneficial for students' help seeking and achievement.

It is possible to employ a tricotomous model of classroom goal structure, as it has frequently been done in research on personal goals. In fact, making a distinction between performance-approach goal structure and performance-avoidance goal structure has been recommended in the literature (Bardach et al., 2020; Schwinger & Stiensmeier-Pelster, 2011). Incorporating the distinction between performance-approach and performance-avoidance goals was first proposed to clarify mixed findings about the effect of personal performance goals (Elliot & Harackiewicz, 1996) and this incorporation increased conceptual clarity in studies of personal achievement goals (e.g., Muyarama et al., 2011). We agree that not making such distinction in research on classroom goal structures may contribute to mixed or incomplete findings, as mentioned in recent research (e.g., Park et al., 2018) and a meta-analysis (Bardach et al., 2020).

Performance-approach goal structure stresses showing competence (i.e., appearance standard) or performing better than peers (i.e., normative standard) as the main goal in the classroom, with aspects such as a focus on high grades and correct answers having been used to describe this kind of classroom goal structure. Previous research has suggested that this type of emphasis may increase in secondary education at the cost of mastery goal structures (see Meece et al., 2006, for a review). As for performance-avoidance

structure, this goal structure places the emphasis on not showing incompetence (i.e., appearance standard) or not performing worse than peers (i.e., normative standard), with elements such as avoiding making mistakes or appearing less competent than others being used to describe this goal structure.

Unfortunately, as noted by Bardach et al. (2020), performance-avoidance goal structure has been a relatively neglected type of goal structure in existing research. Studies on personal goals during adolescence have been quite consistent in associating personal performance-avoidance goals with detrimental effects for students (see Scherrer et al., 2020, for a review), and the same may be the case for performance-avoidance classroom goals. For instance, in one of the few studies making the distinction between performance-approach and performance-avoidance classroom goal structures, Karabenick (2004) concluded that a performance-avoidance goal structure was associated with help-seeking avoidance among college students.

Whereas ample evidence supports the tenet that classroom goal structure has a significant influence in shaping students' personal goals and academic achievement (see Bardach et al., 2020, for a meta-analysis), more research on the links between classroom goal structure and other student outcomes would be beneficial. Of particular interest for the present study, to our knowledge, only one study has examined links between perceived goal structure and school-related stress. In this notable exception, Haugan et al. (2021) examined the longitudinal associations between performance-oriented goal structure and school stress in a convenience sample of Norwegian students aged 17–18 years. They concluded that a performance-oriented goal structure may be a risk factor for school stress in girls but did not predict boys' school stress.

3. Teacher support

Another important aspect of classroom climate included in the present study was student-teacher relationships and the extent to which teachers provide support to students, which are important for understanding school stress. Although teachers can be sources of different types of support (see Malecki & Demaray, 2003, for more on types of support), perceived emotional support (i.e., whether students perceive their relationships with teachers as characterized by care and trust) has been considered a main contributor to student wellbeing and mental health outcomes (see Chu et al., 2010, and Rueger et al., 2016, for more details).

As with classroom goals, decades of research on supportive student-teacher relationships have led to important conceptual and measurement debates. Of interest for the present study, recent developments have emphasized that the fact that secondary school students have several teachers (typically one specialist teacher per subject) allows for supportive student-teacher relationships being measured at different analytical levels. In this respect, some authors (e.g., García-Moya, 2020; Martin & Collie, 2019) have made a distinction between domain-specific measures (i.e., focusing on a specific teacher) and domain-general measures (i.e., focusing on a global assessment of relationships with teachers). Both an emphasis on students' general feelings about relationships with their teachers and a focus on specific one-on-one relationships can provide valuable and complementary information. As a result, this choice should be motivated by study aims, with domain-general measures on teacher support being predominant in research interested in obtaining an assessment of the general climate of students' relationships with their teachers.

Moving to a synthesis of research on the links between teacher support and school stress, the abovementioned study about classroom goal structure and stress (i.e., Haugan et al., 2021) also concluded that teacher support significantly contributed to increased coping beliefs and decreased school stress. Scientific literature coincides with these results. For example, some authors concluded that, because of their proximity with school demands, teachers who offer support can prevent the negative consequences of school stress by reducing perceived school demands (Plenty et al., 2014). The influential role of relationships with teachers is also supported by the finding that problematic relationships with teachers are significant predictors of school stress (Wang & Fletcher, 2017).

4. Rationale and aims for the present study

The state of the art described in the previous sections suggests that little is known about how classroom goal structures and teacher support may work in concert and about potential interaction effects. Interactions have been found in the associations of different types of classroom goals and students' personal goals (Schwinger & Stiensmeier-Pelster, 2011). Valuable efforts have also been made to explore potential convergences between goal structure and teacher support, with the work by Patrick et al. (2011) being a notable example. However, to our knowledge the potential interactive effects of classroom goal structures and teacher support on school stress have not been examined.

For that reason, the aim of this study was to examine the role of classroom goal structures and teacher support in students' stress of school performance. The potential moderating effect of teacher support in the association between classroom goal structures and stress of school performance was also explored to contribute to addressing that gap in existing research. In examining these relationships, we controlled for factors that have been associated with school-related stress and classroom climate, namely student gender, age, and previous academic achievement. Consistent with previous research findings (e.g., Anniko et al., 2019; Hirvonen et al., 2019), our preliminary analyses also indicated that these control variables were significantly associated with stress of school performance in the present study.

5. Method

5.1. Participants

Participants included 4768 secondary school students (47.9% boys, 52.1% girls) aged 11–17 years ($M = 13.74$, $SD = 1.30$) from 54

schools in Andalusia, which is a southern region of Spain. This sample comes from a specific project about school stress in secondary education (Project EASE), for which online questionnaires were collected during the 2020–2021 academic year. The sample included the four grades corresponding with compulsory secondary education in Spain. Specifically, it consisted of 1172 Grade 1 students (M_{age} = 12.18 years), 1293 Grade 2 students (M_{age} = 13.24 years), 1103 Grade 3 students (M_{age} = 14.29 years), and 1200 Grade 4 students (M_{age} = 15.31 years). Most students in the sample had been born in Spain (96.9%). Also, based on students' self-reports about their family economic situation, the sample included 12.5% low-SES students (i.e., they stated that their families had difficulties to make ends meet or just managed each month but could not afford any extras).

Multi-stage cluster sampling was used for recruitment with schools acting as the primary sampling units from which students were selected. Students (n = 3725) were recruited via 45 randomly selected schools through stratified random sampling with the stratification strategy taking into consideration type of school (i.e., state vs private) and geographic area (i.e., differentiating the eight regions in Andalusia) so that proportions of students selected in each stratum mirrored the actual proportions in the population of reference. A census list of schools in each stratum was used for random selection of participating schools and potential replacement schools. As a result, alternative randomly selected schools with similar characteristics were contacted in cases where the originally selected school was unable to take part. As expected, not all randomly selected schools agreed to participate, with increased workload at schools due to the COVID-19 pandemic (e.g., new protocols, teachers having to replace fellow colleagues during COVID-19 infections) being a main factor for those who declined participation. The remaining 1043 students came from a convenience sample of nine schools that were recruited during the same period as part of a contingency plan to strengthen the feasibility of the study in the context of the COVID-19 pandemic. Students in this strand were found to be similar to the abovementioned representative sample in composition (i.e., gender, age, and socioeconomic status), previous academic achievement, and their reported levels of school-related stress and thus were included in the total sample for the present study.

5.2. Measures

To address this study's aims, the following measures included in the Project EASE questionnaire were used and are described below.

5.2.1. Control variables

At the beginning of the Project EASE questionnaire, students provided self-reported information on gender (boy/girl) and age. In addition, they were asked about their final grades for the previous academic year in Math and Language, with answer options ranging from 1 to 10 that correspond with the grading system for secondary school students in Spain (academic grades < 5 are failing grades). Reported final grades in Math and Language were averaged to obtain an indicator of previous academic achievement, with higher scores representing higher achievement.

5.2.2. Stress of school performance

The Adolescent Stress Questionnaire-Student (ASQ-S; Anniko et al., 2018), which is an abbreviated version of the revised Adolescent Stress Questionnaire (ASQ2; Byrne et al., 2007), was used for the assessment of stress of school performance. As in the original ASQ-S, the assessment of stress of school performance in the present study involved students being asked how stressful these situations had been during the last 6 months; items consist of "Having to study things you don't understand", "Teachers expecting too much from you", and "Keeping up with school work". Answer options ranged from 1 (*not at all stressful*) to 5 (*very stressful*). A sum score ranging from 3 to 15 was calculated in which a higher score represents higher levels of stress of school performance. The ASQ-S has shown good psychometric properties consistent with those from the full instrument (see Anniko et al., 2018, for more details). In the present study, McDonald's omega was 0.768.

5.2.3. Classroom goal structures

Nine items from the Perception of Classroom Goal Structure Scale of the Patterns of Adaptive Learning Survey (PALS; Midgley et al., 2000) were selected by the research team to allow for the same number of items for the assessment of mastery, performance-approach, and performance-avoidance goal structure (the specific items are presented in Appendix A). Selection was guided by a combination of three criteria: (a) uniqueness of the item content and salience in the conceptualization of that type of goal structure, (b) straightforward translation into Spanish, and (c) specificity (specific items were prioritized over items including abstract ideas). Average scores for mastery goal structure (e.g., "In our class, how much you improve is really important"), performance-approach goal structure (e.g., "In our class, getting good grades is the main goal"), and performance-avoidance goal structure (e.g., "In our class, it is important that you don't make mistakes in front of everyone") were obtained. These questions were preceded by an introduction that stated "We would also like to ask you some questions about YOUR CLASS", with 'class' in this study context referring to a single clearly identifiable unit that each student belonged to (i.e., a set group of students who are taught lessons together by the same teachers during an academic year). Students were not asked about a specific lesson or a specific subject/content area. Answer options ranged from 1 (*not at all true*) to 5 (*very true*). Average scores were calculated, with higher scores indicating a higher perceived emphasis on the type of goal structure being assessed. In the present study, McDonald's omega was 0.654, 0.766, and 0.707 for mastery goal structure, performance-approach goal structure, and performance-avoidance goal structure, respectively.

Given awareness in the field of goal theory that the type of measures used may affect associations between goals and the examined outcomes (Bardach et al., 2020; Hulleman et al., 2010), two considerations are important. First, we selected a measure coherent with the aims of this study (i.e., because our study focused on classroom climate, we used the classroom goal structure scale of PALS, which is a measure of goal structure climate; Bardach et al., 2020). As for the standard in the operationalization of the performance-approach

goal structure items to which we referred to in the introduction, all were appearance items. Performance-avoidance goal structure items were also appearance items, except for "In our class, it's important not to do worse than other students", which was the only normative-referenced item.

5.2.4. Teacher support

The Health Behaviour in School-aged Children (HBSC) measure on teacher support was used. The HBSC teacher support scale was initially developed by Torsheim et al. (2000) and has been subjected to subsequent refinement within the HBSC network (Inchley et al., 2020). The measure consists of three items, including "I feel that my teachers accept me as I am", "I feel that my teachers care about me as a person", and "I feel a lot of trust in my teachers" that are rated on Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Average scores were calculated with higher scores being indicative of greater support from teachers. This measure has been a useful indicator for the assessment of the general climate of student-teacher relationships and it has been used in more than 50 countries (see Inchley et al., 2020). In the present study, McDonald's omega was 0.799.

5.3. Procedure

Data collection dates and times were set by participating schools; schools made necessary arrangements via a designated person among school staff for their students to complete the project EASE online questionnaire. The questionnaire covers four content areas that appear in the following order: (a) demographics and general student information (from which relevant control variables were selected), (b) school experience (the remaining variables used in the present study belong to this content area), (c) family relationships, and (d) wellbeing and personality. Based on a pilot study of the Project EASE questionnaire, schools were informed that questionnaire completion should require no more than 40 min. Instructions indicated that questionnaires could be answered using a computer, tablet, or cellphone, with students using computers during a class session being the recommended option. Nevertheless, schools were allowed to adjust their different realities (e.g., student bubbles, limited availability of online resources, attendance rotation schemes) in consultation with the research team. Any agreed arrangements required that students answered the questionnaires by themselves at the specified times/dates indicated by their teacher or responsible person among the school staff and that students' anonymity was ensured. Informed parent consent forms were provided. In addition, student participation was conditional on the student's assent. The questionnaire and all procedures employed were approved by the Comité Coordinador de Ética de la Investigación Biomédica de Andalucía.

Data collection took place during the 2020–2021 academic year (specifically between October 2020 and March 2021). Although this occurred during the COVID-19 pandemic, the 2020–2021 academic year was characterized by a re-opening of schools and the return of in-person instruction. Even when spikes in COVID-19 cases in Spain occurred during the data collection period, most schools remained opened. According to the Spanish national government, at the end of March 2021 (La Moncloa, 2021) the percentage of classrooms in quarantine remained below 2% during that period and the percentage of schools that had to close due to COVID-19 at any time during the same period ranged from 0.01% to 0.15% of the total. Direct contact with schools during the recruitment phase made it clear that school personnel's workload was very high during this period due to the COVID-19 pandemic.

Statistical analyses were conducted using IBM SPSS Statistics 25. First, we conducted descriptive analyses (Student's *t*-tests or correlations, as appropriate) by gender, age, and previous school achievement. Bivariate correlations between the classroom goal structure indicators, teacher support, and stress of school performance were also calculated.

Next, hierarchical multilevel multiple linear regression was used to examine the relationships between our classroom climate variables (i.e. mastery goal structure, performance-approach goal structure, performance-avoidance goal structure, and teacher support) and stress of school performance, controlling for the effects of gender, age, and previous academic achievement. With the exception of gender (dummy-coded), all Level-1 explanatory variables were grand-mean centered.

In terms of the analytical strategy, building a null model allowed for calculation of intraclass correlation coefficients (ICC) and design effect (DEFF) statistics at the school level and provided a benchmark of deviance for model comparison. Researchers (e.g., Huang, 2018; Peugh, 2010) have cautioned that even low values of ICC should not lead to ignoring clustering effect,s and calculating DEFF has been recommended. When DEFF values are 1.5 or higher, clustering should not be ignored due to the risk of biased estimation of standard errors increasing the probability of Type I errors (Huang, 2018). After estimation of the null model, we built several random intercept models based on the study aims with a view to compare model fit. Model 1 was a random-intercept model including our control variables (i.e., gender, age, and previous academic achievement) as explanatory variables. Model 2 included both control variables and main predictors of interest. Finally, an additional model was calculated in which interactions between teacher support and goal structure variables were tested. If the resulting model showed that the association between any of these predictors and stress of school performance may be dependent on two moderators, an additional model of contrast was tested that included the 3-way interaction term and any additional 2-way interaction terms needed, if any. Following existing recommendations (Dawson, 2014), we excluded non-significant interaction terms to calculate the final model (Model 3), which facilitates optimal interpretation (Dawson, 2014). Significant interactions in Model 3 were plotted to facilitate interpretation using the worksheets developed by Dawson (2014). For this purpose, we used $+1SD$ and $-1SD$ levels of the moderators, a common procedure in situations where there is not a clear science-based rationale for the selection of values of the moderator variables (Aiken & West, 1991).

All models were estimated using Full Information Maximum Likelihood, which made it possible to use a likelihood ratio test based on the difference in deviance values between models to compare model fit. We also reported pseudo R^2 and Snijders and Bosker's R^2 at Level 1 (students) and Level 2 (schools) to provide some approximation to the level of explained variance for each model (Hox et al., 2018; Huang, 2018).

6. Results

6.1. Classroom goal structures, teacher support, and stress of school performance by gender, age and previous academic achievement

As shown in Table 1, gender was significantly associated with stress of school performance, with girls reporting significantly higher levels of stress, $p < .001$, $d = 0.23$. In contrast, differences between boys and girls in perceived classroom goal structure variables and teacher support either were not significant or showed a negligible effect size ($d < 0.20$).

Table 2 shows the correlations of age and previous academic achievement with both stress of school performance and the examined classroom climate variables. Age and previous academic achievement were significantly associated with stress of school performance ($p < .001$); older age was associated with increased stress, whereas higher academic achievement correlated with lower stress. Regarding classroom climate variables, age was significantly associated with lower levels of teacher support and mastery classroom goals and with higher performance-approach classroom goals. In contrast, age did not show a significant association with performance-avoidance classroom goals ($p = .067$). Finally, higher academic achievement was associated with higher levels of teacher support and mastery classroom goals and lower levels of performance-avoidance classroom goals. No significant correlation was found between previous academic achievement and performance-approach classroom goals ($p = .273$).

6.2. Associations of classroom goal structure and teacher support with stress of school performance controlling for gender, age, and academic achievement

The results of multilevel hierarchical regression analyses with stress of school performance as the dependent variable are presented in Table 3. Based on results of the null model (ICC = 0.04, DEFF = 2.54), clustering should not be ignored, so a series of random-intercept models were calculated. As shown by deviance difference (see Table 3), each of these models represented an improvement in model fit compared to the previous one.

Compared to the null model, the final model (random intercept final model) included a pseudo R^2 of 0.13, which is an approximation of the level of explained variance in stress of school performance (for proportion of explained variance at each level and pseudo R^2 for each model, see Table 3). All control variables were significantly associated with stress of school performance ($p < .01$) in that being a girl and being older were associated with higher stress, whereas higher achievement was linked to lower stress. Performance-avoidance goals also were significantly associated with increased stress ($p < .01$). Consistent with Model 2 (main effects only), performance approach goals and teacher support also showed significant associations with stress of school performance in the final model, but these associations must be interpreted in the context of the significant 3-way interaction term mastery goals × performance-approach goals × teacher support ($p < .05$) in the final model. The interaction plot is presented in Fig. 1.

Fig. 1 shows that, regardless of levels of classroom goals, students reporting higher teacher support (slopes 1 and 3) tended to show

Table 1
Stress of school performance, classroom goal structures, and teacher support by gender.

	N	*M*	*SD*	*t*	Cohen's *d*
Stress of school performance					
Boys	2221	9.7794	3.25423	−7.865***	−0.23
Girls	2439	10.5047	3.01892		
Total	4660	10.1590	3.15382		
Mastery goal structure					
Boys	2201	3.4757	0.98285	−3.020**	−0.08
Girls	2414	3.5612	0.93963		
Total	4615	3.5204	0.96133		
Performance-approach goal structure					
Boys	2207	3.3052	1.02488	1.601	–
Girls	2414	3.2571	1.01741		
Total	4621	3.2801	1.02116		
Performance-avoidance goal structure					
Boys	2191	2.4817	0.99576	−0.765	–
Girls	2395	2.5042	1.00084		
Total	4586	2.4935	0.99837		
Teacher support					
Boys	2232	3.6420	0.96945	3.224**	0.09
Girls	2434	3.5525	0.92778		
Total	4666	3.5953	0.94889		

** $p < .01$.
*** $p < .001$.

Table 2
Associations of age and previous academic achievement with stress of school performance, classroom goal structures, and teacher support.

	M	*SD*	1	2	3	4	5	6
1. Age	13.74	1.30	–					
2. Previous academic achievement	7.01	1.69	−0.292***	–				
3. Stress of school performance	10.16	3.15	0.131***	−0.094***	–			
4. Mastery goal structure	3.52	0.96	−0.093***	0.067***	−0.017	–		
5.Performance-approach structure	3.28	1.02	0.042**	−0.016	0.193***	0.240***	–	
6.Performance-avoidance structure	2.49	1.00	0.027	−0.063***	0.252***	0.072***	0.571***	–
7. Teacher support	3.60	0.95	−0.106***	0.162***	−0.190***	0.363***	−0.038*	−0.128***

* $p < .05$.
** $p < .01$.
*** $p < .001$.

Table 3
Summary of hierarchical multilevel regression models on stress of school performance.

Parameters	Null model	Random intercept model 1	Random intercept model 2	Random intercerpt final model
Regression coefficients (fixed effects)				
Intercept	10.11 (0.10)**	9.72 (0.10)**	9.75(0.10)**	9.72(0.10)**
Gender		0.74(0.09)**	0.70(0.09)**	0.69(0.09)**
Age		0.24(0.04)**	0.21(0.04)**	0.22(0.04)**
Academic achievement		−0.16(0.03)**	−0.10(0.03)**	−0.10(0.03)**
Mastery goals			0.04(0.05)	0.07(0.05)
Performance-approach goals			0.21(0.06)**	0.15(0.06)*
Performance-avoidance goals			0.60(0.06)**	0.59(0.06)**
Teacher support			−0.49(0.05)**	−0.51(0.05)**
Mastery goals × Teacher support				0.13(0.05)**
Performance-approach goals × Teacher support				−0.10(0.05)*
Mastery goals × Performance-approach goals				−0.01(0.05)
Mastery goals × Performance-approach goals × Teacher support				0.09(0.03)*
Variance components (random effects)				
Residual (Level 1)	9.544151	9.234844	8.449006	8.408128
Intercept (Level 2)	0.368705	0.312493	0.259303	0.253953
Model summary				
Deviance	21,936.146	21,789.961	21,404.779	21,383.414
Number of estimated parameters	3	6	10	14
Deviance difference	–	146.185**	358,182**	21.365**
AIC	21,942.146	21,801.961	21,424.779	21,411.414
Pseudo R^2	0	0.03	0.09	0.01
Level 1 Proportion of explained variance (Snidjers & Bosker)	0	0.04	0.09	0.01
Level 2 Proportion of explained variance (Snidjers & Bosker)	0	0.11	0.14	0.01

Note. Parameter estimate standard errors listed in parentheses.
* $p < .05$.
** $p < .01$.

lower levels of stress of school performance than those reporting lower teacher support (slopes 2 and 4). If we focus on moderating effects, the role of performance-approach classroom goals seemed to be different for students reporting lower levels of both mastery classroom goals and teacher support (slope 4; black squares). Specifically, high performance-approach classroom goals, if coupled with low mastery goals and low teacher support, were significantly associated with an increase in stress of school performance ($p < .01$). In contrast, in the remaining conditions (i.e. if mastery classroom goals, teacher support or both are high), no significant association between high performance-approach classroom goals and stress of school performance was found ($p = .06$ for slope 1; $p = .11$ for slope 2, and $p = .97$ for slope 3).

7. Discussion

This study examined the role of classroom goal structures and teacher support in stress of school performance among secondary school students. In conducting those analyses, we focussed on independent and interaction effects. Overall, both classroom goal structures and teacher support were important for stress of school performance, which confirms the role of the examined factors as

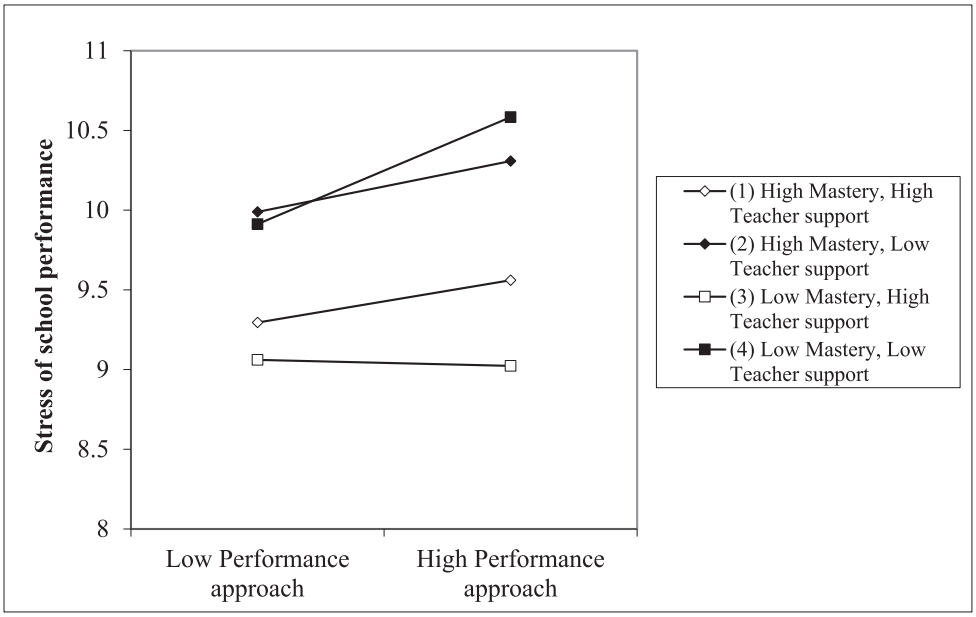

Fig. 1. Interaction plot for the significant three-way interaction involving mastery goal structure, performance-approach goal structure, and teacher support.

central elements of classroom climate (Eccles & Roeser, 2010). In addition, our findings suggest significant associations between control variables (i.e., gender, age, and previous academic achievement) and stress of school performance. Specifically, girls and older students reported significantly higher levels of stress, which is consistent with previous research (e.g., Byrne et al., 2007). The finding that low achievement was associated with higher stress of school performance was also expected, although some research has warned that some groups of high-achieving students may experience high stress too (Banks & Smyth, 2015; Låftman et al., 2013). Our findings show that not understanding things, high expectations from teachers, and keeping up with school work were sources of greater stress of school performance for low-achievement students; nevertheless, previous research suggests that other factors, such as the pressure to live up to high family expectations and a self-image of a high-performing student, may play a more salient role for high-achieving students (e.g., Låftman et al., 2013).

Importantly, our findings emphasize the need to make a distinction between performance-approach and performance-avoidance goal structures. One clear message from the present study is that performance-avoidance goal structure was consistently linked to higher levels of stress of school performance. Performance-avoidance goal structure may discourage students' help-seeking (Karabenick, 2004) and some of its defining characteristics, such as the emphasis on avoiding mistakes can lead to fear of failure among students, which has been associated with increased stress (e.g., Borgonovi & Won Han, 2021). Overall, when it comes to stress of school performance, our findings on performance-avoidance goal structures are consistent with evidence of their negative effects on a variety of students' outcomes found in research examining the role of personal goals (see Scherrer et al., 2020, and Urdan & Kaplan, 2020, for recent reviews). In contrast, the relationship between performance-approach goal structure and stress of school performance was more complex because it was moderated by other climate aspects. As noted by several authors (e.g., Bardach et al., 2020; Schwinger & Stiensmeier-Pelster, 2011), the distinction between performance-approach and performance-avoidance goals that has been widely and successfully incorporated into the study of personal goals has mostly been neglected in studies about goal structures. Our findings support the view that not incorporating such distinction may obscure important differences that are worth exploring.

The present study also provided additional insights on how the remaining goal structures and teacher support may work together in their associations with stress of school performance. Our results suggest that the role of performance-approach goal structure was dependent on the levels of mastery goal structure and teacher support. Specifically, high performance-approach classroom goals, if coupled with low mastery goals and low teacher support, were significantly associated with an increase in stress of school performance. In contrast, there was no significant association between a strong emphasis on performance-approach classroom goals and stress of school performance if either the goal structure included an emphasis on mastery, high levels of teacher support were available, or both.

Previous quasi-experimental research (Linnenbrink, 2005) suggested that a combination of mastery and performance-approach classroom goals may be more beneficial than mastery only or performance-approach only goals for students' help seeking and achievement. However, in the case of stress of school performance, our results are more consistent with the idea that a combination of performance-approach and mastery goal structures would be preferable to a sole emphasis on performance-approach goals and they also point to the importance of teacher support as a protective factor against stress.

These results are consistent with the idea that supportive relationships with teachers are protective against school stress whereas non-supportive relationships can contribute to increased school stress levels (Haugan et al., 2021; Wang & Fletcher, 2017). These findings also coincide, to some extent, with the conclusion by Haugan et al. (2021) who indicated that performance-oriented goal

structures may be a risk factor for school stress in some students; nevertheless, the incorporation of other types of goal structures and the analysis of interactions in the present study allowed for a more nuanced conclusion on the role of a performance-approach goal structure.

Some limitations must be taken into consideration in the interpretation of these findings. First, this is a cross-sectional study, meaning that conclusions cannot be drawn about the directionality of the associations found. In addition, we used students' self-reports only, which could be complemented with other sources of information such as classroom observation to obtain a more comprehensive picture. However, in studies on the links between classroom climate and students' outcomes, there is consensus in the literature that student's subjective perceptions are an appropriate source of data (Meece et al., 2006; Schwinger & Stiensmeier-Pelster, 2011) given that significant variability in perceptions of classroom goal messages have been found among students within the same classroom (Urdan & Schoenfelder, 2006). In fact, most research on goal structures has been conducted using students' self-reported information (Bardach et al., 2020). Second, although our discussion of moderating effects is supported by the significant interaction effect found, we must take into consideration that the level of explained variance was small. In addition, although not a limitation in itself, it is important to consider that consistent with our study aims, our measure of goal structure refers to goal structure climate (see Bardach et al., 2020, for a description of goal structure climate vs goal structure practices levels of analysis). Future research may want to explore the role of goal structure practices (i.e., specific strategies and messages by teachers) too. For instance, there is an interesting research line pursuing the study of the role of specific teacher practices, such as fear appeals (e.g., Putwain & Remedios, 2014), and combining assessments of goal structure climate and specific practices may contribute to deeper understandings in this area. Incorporating individual variables, such as anxiety proneness and emotional self-efficacy, which have been proven useful for a better understanding of stress in secondary school in recent studies (e.g., Wuthrich et al., 2021), and specific examination of the role of SES can also be an interesting direction for future research. Finally, although we used schools as Level 2 units in the multilevel analyses due to our sampling procedure (i.e., schools used as sampling units), studies using classrooms as Level 2 units in multilevel analyses would also be beneficial to gain additional insights in future research.

Despite these limitations, findings from this study contribute to expanding our current understanding of the links between classroom goal structure, teacher support, and stress of school performance in at least two directions. First, they provide valuable evidence on the differential role of performance-approach and performance-avoidance goal structures, a distinction that in our view is necessary in future studies of classroom goal structure. Second, thanks to the consideration of different types of goal structures and the moderating role of teacher support, our findings provide a more nuanced view on the types of elements in classroom climate that can protect and accentuate stress of school performance.

8. Conclusions and practical implications

This study provides some insights regarding the characterization of the types of classroom environments that can exacerbate the high school stress levels found in previous studies (e.g., Löfstedt et al., 2020). Specifically, students tended to report significantly higher levels of stress of school performance in environments where they perceived a strong emphasis on demonstrating their ability coupled with low teacher support and little emphasis on learning, deep understanding, and effort. An emphasis on performance-avoidance structures also showed detrimental effects.

Practical implications from our findings are consistent with previous recommendations on the importance of guarding against decreased emphasis on mastery goals (e.g. Urdan & Midgley, 2003) and being aware of the detrimental effects of performance-avoidance (e.g. Karabenick, 2004). Specifically, as part of their work to support teachers and students, school psychologists should take every opportunity to stress the message that learning and self-improvement is the main goal in education. Practitioners should also support the view that mistakes are an essential part of learning. In addition, it is important for school psychologists to consider the complex nature of stress of school performance, thereby avoiding simplistic approaches where stress is seen primarily as the result of student characteristics or a specific situation. A transactional view (Lazarus & Folkman, 1984) is recommended instead. Finally, high teacher support, which was associated with lower levels of stress of school performance across different combinations of mastery and performance-approach goals, can be seen as a protective factor that offers promise for interventions aimed at reducing stress of school performance among secondary school students. Continuing research on the convergence between teacher support and goal structures (e.g., Patrick et al., 2011) will further inform these efforts.

School psychologists can play a fundamental role in the aforementioned areas because they can consult with educators to increase emotional support practices and shape goal structures in ways that reduce school stress. In addition, given our findings about the protective role of teacher support, lessons learned from existing interventions such as *My Teaching Partner-Secondary*, which has been proven effective in promoting high-quality teacher-student interactions (Allen et al., 2011, 2015), or *Check & Connect*, where school psychologists can act as coordinators and emotional closeness with mentors/monitors is seen as a central factor for improving students' engagement (Anderson et al., 2004; Maynard et al., 2013), can support the inclusion of supportive student-teacher relationships among the building blocks for interventions aimed at reducing students' school stress.

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Declaration of Competing Interest

The authors have no competing interests to declare.

Appendix A. Items used for the assessment of classroom goal structure

Goal structure	Items selected from PALS
Mastery goal structure	In our class, how much you improve is really important
	In our class, it's important to understand the work, not just memorize it
	In our class, it's OK to make mistakes as long as you are learning
Performance-approach goal structure	In our class, getting good grades is the main goal
	In our class, getting right answers is very important
	In our class, it's important to get high scores on tests
Performance-avoidance goal structure	In our class, showing that you are not bad at class work is really important
	In our class, it's important that you don't make mistakes in front of everyone
	In our class, it's important not to do worse than other students

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