School pressure and emotional problems

The role of perceived stress and gender on the relationship between school pressure and emotional problems in Dutch adolescents

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Abstract

The HBSC 2021 report highlights a significant decline in the mental health of girls in the Netherlands, with emotional problems increasing from 28% to 44% among secondary school girls. The report also indicates a substantial rise in school pressure, particularly affecting girls. Existing research shows that school pressure can significantly impact students' emotional well-being, leading to various psychological challenges. However, how this relationship develops and the role of gender have not yet been investigated. This study aims to explore the role of perceived stress and gender in the relationship between school pressure and emotional problems. To investigate this, regression analyses were performed on data from 5159 secondary education students aged 12 to 16 years old (boys= 50.8% and girls= 49.2%) from the HBSC 2021 dataset. The analysis revealed a significant positive relationship between school pressure and emotional problems, with perceived stress partially mediating this relationship. This means that perceived stress partially explains why school pressure affects emotional problems. Additionally, gender was found to significantly moderate the relationship between school pressure and emotional problems, indicating that gender influences the strength of this relationship. This could explain the significantly greater increase in emotional problems among girls compared to boys between 2017 and 2021. Further research in this area is crucial for developing effective interventions to mitigate the negative psychological consequences of school pressure on adolescents, taking into account gender differences. Understanding these dynamics is essential for providing appropriate support and promoting the emotional well-being of young individuals.

Keywords: School pressure, emotional problems, perceived stress, gender, adolescents.

Introduction

Between 2017 and 2021 the mental health of girls declined at an unprecedented rate in The Netherlands (Boer et al., 2022). Researchers write this in the Health Behavior in School-aged Children (HBSC)-report. The Dutch Health Behaviour in School-aged Children (HBSC) survey, conducted every four years since 2001, provides insights into the health and well-being of Dutch school-aged youth in the 21st century, addressing concerns about mental health, schoolwork pressure, alcohol consumption, online behavior and relationships. The HBSC 2021 report indicates that in secondary education, the percentage of girls experiencing emotional problems increased from 28% to 44% between 2017-2021.

Intriguing, between 2017 and 2021, the proportion of students reporting school pressure also increased noticeably. This percentage has nearly tripled over the past 20 years. Just 16% of secondary school students said they were under a lot of pressure to do their studies in 2001. This number had increased to 45% by 2021. Compared to boys, girls experienced a more unfavorable trend in this regard, which could potentially contribute to their deteriorating mental health, though this has not yet been confirmed (Boer et al., 2022).

This simultaneous rise in both school pressure and emotional problems from 2017 to 2021 sparks curiosity about their potential interconnection. It prompts an exploration into whether heightened school pressure relates with increased emotional problems among Dutch adolescents. There is existing international research on this relationship that confirms that school pressure can cause serious emotional problems (Bersia et al., 2022; Haugan et al., 2021; Högberg, 2021; Izuan et al., 2018; Ringdal et al, 2020 and Song et al., 2020).

The given information that school pressure can result in serious problems is also confirmed by a study by Popma et al. (2019), as they suggest that school pressure can even lead to suicidality. They conducted research under the auspices of 113 Suicide Prevention, the

Dutch national helpline for suicide prevention, to investigate the factors contributing to suicide among adolescents in the Netherlands. This research revealed that young people are increasingly grappling with themselves, which is in line with the research by HBSC (Boer et al., 2022). Popma et al. (2019) found that those who died by suicide often began experiencing psychiatric, psychosocial, and emotional problems at the start of secondary school. There are many reasons for suicide, and each individual had a unique path to it. However, the study found a pattern of similar school-related issues in some cases, such as fear of failure and experiencing significant school pressure. Especially in case of girls a pattern of insecurity and a perfectionist mindset in school was observed leading to their suicide attempt (Popma et al., 2019). The fact that some adolescents have committed suicide due to school-related issues, coupled with the rise in school pressure and emotional problems among Dutch adolescents reported in the HBSC-report (Boer et al., 2022), highlights the societal relevance of delving deeper into the consequences of school pressure.

But how does school pressure possibly affect emotional health? One contributing factor is that school pressure causes a lot of stress. From existing research (Elias et al., 2011; Murphy et al.,2010 and Slimmen et al., 2022) it is known that high levels of school pressure can lead to increased perceived stress among students. When students feel overwhelmed by academic demands, competition, and expectations, they are more likely to perceive their situation as stressful (Pascoe et al., 2019). An inability to effectively manage stress, in this case due to school pressure, may affect emotional well-being. The relation between perceived stress and emotional problems is affected by a complex interaction of biological, psychological, and social factors. Genetic predispositions, early life experiences, social support networks, and environmental stressors all shape an individual's response to stress and their susceptibility to emotional issues (Thorsén et al.,2022 and Yan et al., 2021).

There are several international studies (Bersia et al., 2022; Haugan et al., 2021; Högberg, 2021; Izuan et al., 2018; Ringdal et al, 2020 and Song et al., 2020) that show that there is a relationship between school pressure and emotional problems. However, further exploration of the relationship between school pressure and emotional problems in the Netherlands would be scientifically relevant, as it could offer more detailed insights into this dynamic within the Dutch context. Thereby it is known that school pressure induces heightened levels of stress (Elias et al., 2011; Murphy et al., 2010; Pascoe et al., 2019 and Slimmen et al., 2022) and that perceived stress is associated with emotional problems (Thorsén et al., 2022 and Yan et al., 2021). However, there is currently no research exploring if perceived stress mediates the relation between school pressure and emotional problems. The absence of research on the mediating role of perceived stress between school pressure and emotional problems underscores the scientific relevance of investigating this relationship, to deepen our understanding of how school pressure possibly influences emotional problems.

Given that there is a gender difference in school pressure (Boer et al., 2022; Kleinjan et al., 2020 and Klinger et al., 2015), perceived stress (Bianchin & Angrilli, 2012; Cohen and Janicki-Deverts, 2012; Costa et al., 2021; Doo, 2015; Graves et al., 2021 and Thorsén et al., 2022) and emotional problems (Boer et al., 2022; Kleinjan et al., 2020 and Yoon et al., 2022), it would be scientifically relevant to investigate the role of gender in the relationship between school pressure and emotional problems. As of now, there is a lack of clear scientific research on this relationship. Through an examination of gender dynamics, this study seeks to elucidate why the increase in emotional problems was notably higher among girls in the HBSC sample.

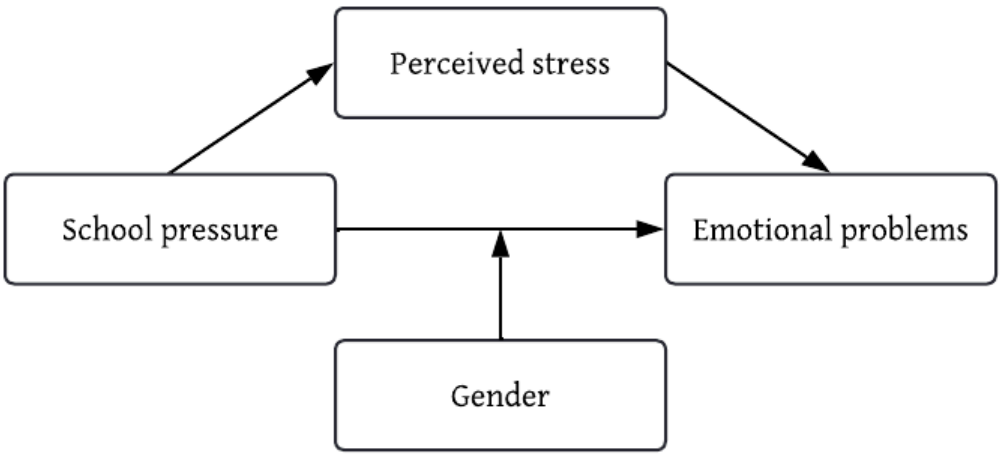
The overarching research question is: *"Is perceived stress a mediator in the relationship between school pressure and emotional problems among Dutch adolescents, and what is the role of gender in this relationship?"*

Theoretical framework

The theoretical framework will commence with a review of existing research on the association between school pressure and emotional problems. Subsequently, the first hypothesis will be formulated. Many studies use the term "academic pressure" instead of "school pressure". In this research, both terms refer to the pressure adolescents experience due to educational expectations, demands and challenges. Furthermore, this research will delve into the relations between school pressure and perceived stress, as well as between perceived stress and emotional problems. Based on this information, the second hypothesis will be formulated. In this research, it is important to distinguish between two variables: school pressure and perceived stress. Instead of referring to academic stress, we focus on how school pressure can potentially lead to perceived stress. Finally, attention will be given to gender differences in school pressure, perceived stress, and emotional problems. This will explore the role of gender in the relationship between school pressure and emotional problems leading to the formulation of the third hypothesis.

Model 1

Conceptual model



Emotional problems

There are two broad categories into which symptoms of mental health problems in childhood and adolescence are usually classified: emotional (internalizing) and behavioral (externalizing) problems (Kovacs & Devlin, 1998). In this study we focus on emotional problems.

Emotional problems in childhood and adolescence refer to a range of symptoms related to anxiety and depression, such as feelings of sadness, loneliness, worry, worthlessness and anxiousness. These problems can impact various aspects of a young individual's life, including their relationships with family and friends, academic performance and overall well-being. Emotional problems in adolescence increases the risk of developing psychiatric disorders later in life (Karevold et al., 2008).

School pressure

As mentioned earlier, the perceived school pressure in the Netherlands has increased (Boer et al., 2022). This is also confirmed by a study from UNICEF, which states that 1 in 4 young people frequently experience stress due to school. Another finding is that adolescents in the Netherlands feel pressure to meet their own or others' expectations. Almost one-third of Dutch young people between the ages of 12 and 16 feel under pressure to meet their own or someone else’s expectations, contributing to the pressure to succeed in school (Kleinjan et al., 2020).

School pressure refers to the expectations, demands and challenges students face to meet educational standards and excel in their studies, arising from various sources such as parents, teachers, peers and the education system. Excessive pressure can negatively impact

students' well-being and performance, necessitating a supportive learning environment (Pascoe et al., 2019).

The educational system significantly influences students' experiences of school pressure through curriculum design, assessment methods and competitive environments. A demanding or rigid curriculum can overwhelm students with workload and academic requirements, creating a high-pressure environment. Due to assessment methods, such as high-stakes exams, frequent testing and grading systems that emphasize competition, students may feel pressured to perform well in assessments to meet academic standards or to outperform their peers. In environments where students are constantly compared to one another based on academic achievements, there may be a culture of competitiveness that fuels stress and pressure to excel academically, leading to heightened levels of perceived school pressure (Klinger et al., 2015).

Additionally, parental expectations for academic success can contribute to the pressure students experience within the educational system (Klinger et al., 2015). Parental educational expectations are expressed through parents' estimations and beliefs regarding their child's potential achievements, encompassing the highest level of education attainable, and academic performance (Long & Pang, 2016). Research shows a significant positive relationship between parental educational expectation and perceived school pressure (Deb et al., 2015; Subramani et al., 2019; Talha et al., 2020). Parental educational expectations can lead to increased school pressure on students for several reasons. Firstly, when parents set high academic standards and expectations, students may feel pressured to meet or exceed these standards, fearing disappointment or not living up to expectations. Additionally, in families with multiple children, students may feel pressure from comparisons with siblings or peers, intensifying the need to succeed academically. Additionally, excessive parental educational expectations can restrict students' autonomy and independence in establishing

their academic goals, which can lead to feelings of overwhelm. Students may also worry about being judged or criticized by their parents if they do not meet expectations, further contributing to the pressure to perform well academically. The cumulative effect of persistent school pressure resulting from parental educational expectations can have negative consequences on students' mental health and overall academic performance (Subramani et al., 2019).

School pressure and emotional problems

As mentioned by Subramani et al. (2019) school pressure can have negative consequences on students' mental health. According to two comprehensive surveys, academic pressure is one of the most significant sources of stress for adolescents, adversely affecting their mental health (Fildes et al., 2014; YoungMinds, 2019). The results from a study by Löfstedt et al. (2020) indicate that academic pressure among adolescents has increased, coinciding with rising rates of anxiety, depression, self-harm, and suicide during the same period.

In line with this, studies by Bersia et al. (2022), Elias et al., 2011; Haugan et al. (2021), Högberg (2021), Izuan et al. (2018), Ringdal et al. (2020), and Song et al. (2020) all found a significant positive relationship between school pressure and emotional problems, such as feelings of anxiety and depression. This indicates that the stress and demands experienced within the school environment play a crucial role in influencing students' emotional well-being.

Hypothesis 1

School pressure arises from multiple sources, such as parental and teacher expectations, peer comparisons, and the educational system, all of which can have a detrimental impact on students' mental health. Given this, it is expect to observe, in line with studies conducted by Bersia et al. (2022), Elias et al. (2011), Haugan et al. (2021), Högberg (2021), Izuan et al. (2018), Ringdal et al. (2020), and Song et al. (2020), that school pressure significantly impacts emotional problems. So, the first hypothesis is as follows:

There is a positive relationship between school pressure and emotional problems.

School pressure and perceived stress

As mentioned, there is an established relationship between school pressure and emotional problems (Bersia et al., 2022; Haugan et al., 2021; Högberg, 2021; Izuan et al., 2018; Ringdal et al., 2020; and Song et al., 2020). But how does school pressure lead to emotional problems? Research indicates that school pressure can induce significant stress, leading to higher levels of perceived stress (Pascoe et al., 2019). This stress is not solely determined by the objective demands of the situation but also by how individuals interpret those demands (Cohen et al., 1983). Elevated levels of school pressure can result in increased perceived stress among students. When students feel overwhelmed by academic expectations, competition and demands, they are more likely to perceive their circumstances as stressful (Pascoe et al., 2019).

The results of the studies by Elias et al. (2011), Murphy et al. (2010) and Slimmen et al. (2022) also indicate a strong positive association between academic pressure and perceived stress. Academic pressure was found to have a significant impact on perceived stress levels, with higher levels of academic pressure correlating with increased perceived

stress. Academic pressure impacts physiological measures of stress, such as salivary cortisol levels. During periods of stress, such as midterm exams, salivary cortisol concentration increases, reflecting the body's physiological reaction to perceived pressure and academic demands (Murphy et al., 2010).

Perceived stress and emotional problems

Research by Yan et al. (2021) on the relationship between perceived stress and emotional problems has shown that higher levels of perceived stress are associated with increased emotional distress. When individuals perceive high levels of stress in response to various events or situations, it can trigger emotional distress, leading to symptoms such as anxiety, depression and other psychological issues. The cognitive appraisal of stress plays a significant role in shaping emotional responses, as heightened stress levels can disrupt emotional regulation processes and contribute to the development or exacerbation of emotional problems. Additionally, chronic or intense stress can impact neurobiological pathways involved in emotional processing, further linking perceived stress to emotional problems.

The study by Thorsén et al. (2022) also explores the link between perceived stress and emotional health in adolescents. Their findings reveal that perceived stress is linked to higher prevalence of emotional issues like irritability, low mood, and anxiety. These issues are linked to various interconnected factors, including psychological responses like anxiety and depression and the body's stress response system, which releases hormones that disrupt neurobiological processes involved in emotional regulation. Cognitive appraisal of stressors is critical, as negative interpretations can amplify distress and contribute to emotional problems. The relationship between perceived stress and emotional problems is influenced by

a complex interplay of biological, psychological and social factors. Genetic predispositions, early life experiences, social support networks and environmental stressors contribute to an individual's response to stress and susceptibility to emotional problems.

Hypothesis 2

Several studies (Bersia et al., 2022; Haugan et al., 2021; Högberg, 2021; Izuan et al., 2018; Ringdal et al, 2020 and Song et al., 2020) have consistently confirmed the positive relationship between school pressure and emotional problems. Additionally, existing research (Elias et al., 2011; Murphy et al., 2010; Pascoe et al., 2019 and Slimmen et al., 2022) suggests a relationship between school pressure and perceived stress, as well as between perceived stress and emotional problems (Thorsén et al., 2022 and Yan et al., 2021). Considering this information, the second hypothesis is as follows:

Perceived stress mediates the relationship between school pressure and emotional problems.

Gender differences

School pressure

According to the HBSC report, Dutch girls experience more school pressure than boys (Boer et al., 2022). Kleinjan et al. (2020) also identified gender differences in school pressure, with girls in secondary education reporting higher levels of school-related stress compared to boys. Girls are more likely to feel stressed due to schoolwork demands, score lower on resilience in managing school-related stress, and experience greater pressure from peers and academic expectations.

Perceived stress

Research indicates that women tend to experience higher subjective stress levels than men, which may explain their greater frequency of stressful life events (Cohen and Janicki-Deverts, 2012; Costa et al., 2021; Doo, 2015). Both men and women exhibit similar physiological responses to stimuli, but women report higher arousal levels, particularly for unpleasant stimuli. They also show greater heart rate deceleration to pleasant images, suggesting increased attention to positive stimuli. Women also display a larger startle response and are more responsive to unpleasant stimuli in terms of brain activity. These findings suggest that women may be more sensitive to negative life experiences and lowered mood (Bianchin & Angrilli, 2012).

Graves et al. (2021), Östberg et al. (2014) and Thorsén et al. (2022) also found significant gender differences in perceived stress and health outcomes among adolescents, with girls reporting higher levels of perceived stress and a greater frequency of psychiatric and somatic symptoms compared to boys. This higher prevalence of perceived stress and psychiatric symptoms may be attributed to various factors, including differences in social constructions of gender, performance-based self-esteem, and social responsibilities (Graves et al., 2021). Girls often face unique stressors related to academic pressures, social expectations, and interpersonal relationships, which can contribute to elevated levels of perceived stress and psychological symptoms. The complex interplay of biological, psychological, social and environmental factors contributes to the higher prevalence of stress and psychiatric symptoms among adolescent girls (Thorsén et al., 2022).

Emotional problems

As noted in the introduction, the prevalence of emotional problems among girls increased from 2017 to 2021 (Boer et al., 2022). This trend is corroborated by Kleinjan et al. (2020), who also confirmed that girls experience a higher incidence of emotional problems compared to boys.

Yoon et al. (2022) also indicates that girls tend to report higher levels of mental health problems, such as depression and anxiety, compared to boys. Girls may experience more mental health complaints compared to boys due to a combination of biological, social, and psychological factors. Biologically, girls undergo puberty earlier than boys, leading to hormonal changes that can impact mood and mental health. Socially, girls may face different societal pressures and expectations, such as academic performance or body image standards, which can contribute to higher levels of stress and anxiety. Additionally, girls may be more sensitive to peer relationships, which can result in increased internalizing symptoms and emotional distress.

Hypothesis 3

Given that there are gender differences in school pressure (Boer et al., 2022 and Kleinjan et al., 2020), perceived stress (Bianchin & Angrilli, 2012; Cohen and Janicki-Deverts, 2012; Costa et al., 2021; Doo, 2015; Graves et al., 2021 and Thorsén et al., 2022) and emotional problems (Boer et al., 2022; Kleinjan et al., 2020 and Yoon et al., 2022) due to a combination of biological, social and psychological factors, it is anticipated that the relationship between school pressure and emotional problems differ for boys and girls. Therefore, the third hypothesis is as follows:

Gender moderates the relationship between school pressure and emotional problems.

Method

Research design

For this thesis, quantitative research has been chosen to test the hypotheses formulated based on existing studies. When testing and/or confirming a hypothesis, it is best to opt for quantitative research (Bhandari, 2022). Another reason for choosing quantitative research is that the studied population is large and therefore requires a large sample. With quantitative research, information can be easily and quickly provided about many people (Bhandari, 2022).

Respondents

The multistage sampling approach was employed to ensure a representative national distribution of schools and students, thereby addressing selection bias and enhancing sample representativeness.

The research population of the HBSC 2021 dataset includes students from group 8 of primary education and students from all years of secondary education throughout the Netherlands. After cleaning and excluding data with missing or unreliable information, a total of 1525 students from primary education and 5733 students from secondary education remain. The average age of primary education students is 11.1 years, while for secondary education students, it's 13.9 years. In primary school, there's an equal split between boys and girls (50% each), while in secondary school, there are slightly more boys (51%) than girls (49%). Within secondary education, the breakdown of students is 17.3% vmbo-b-k, 28.3% vmbo-t, 30% havo, and 24.4% vwo. The socioeconomic status of the students was determined by asking them about their family's prosperity, based on inquiries regarding factors such as car ownership, vacations, and whether they have their own place. In primary

education, 40.6% of students are in the “middle” category, and around 6% are in the “low” category. In secondary education, 37.2% of the students are in the “middle” category and 7.9% are in the “low” category. The rest of the students are classified as having a “high” level of prosperity (Boer et al., 2022).

In this research only secondary education students are included because primary education students did not answer the questions about perceived stress. Data was collected from 5787 secondary education students, but after cleaning, data from 54 students was excluded due to missing or unreliable information. Ultimately, the data consists of information from 5733 secondary education students. As HBSC focuses its reports and trend analyses on students aged 12 to 16 in secondary education, this study also chose to include only students within this age range. Therefore, data from 5159 secondary education students aged 12 to 16 was used for the analyses of this study. Among the 5159 respondents, 50.8% were boys (N=2623) and 49.2% were girls (N=2536). 20.3% were 12 years old (N=1046), 22.6% were 13 years old (N=1166), 24.5% were 14 years old (N=1262), 19.9% were 15 years old (N=1027) and 12.8% were 16 years old (N=658). Table 1 shows the frequencies of age and gender.

Table 1

Frequencies Age and Gender

Age	Boys	Girls	Total
12	506	540	1046
13	610	556	1166
14	629	633	1262
15	521	506	1027
16	357	301	658
Total	2623	2536	5159

Procedure

To recruit a sufficient number of students for the study, the HBSC research team targeted participation from 75 primary schools and a minimum of 80 to 90 secondary schools. Only schools providing regular education were approached for the study. The first step involved sampling schools from databases provided by the Education Executive Agency (DUO). Schools were selected while stratifying by Public Health Service (GGD) region and ensuring a representative mix of schools from urban and rural areas.

The second step involved selecting classes. In primary education, if there were multiple Grade 8 classes, one class was selected. In vertical or combined classes, only Grade 8 students were included. For secondary education, a random selection of classes was made based on a list provided by the school. The number of selected classes depended on school size: three classes for small schools (<500 students), four classes for medium-sized schools (500-1000 students), and five classes for large schools (>1000 students). Classes with fewer than ten students and classes consisting solely of students receiving learning support were excluded from the selection.

Ethics

The HBSC research was submitted to the Ethical Review Committee of the Trimbos Institute, which approved the research after making adjustments to the research design, questionnaires, and data storage methods. The research involved primary and secondary students, with primary students receiving sealed envelopes and secondary students using digital questionnaires. Parental consent was obtained through school communication, with options for objection. They were directed to the Dutch HBSC study website for privacy protocol. Eventually, seven primary and 35 secondary students did not participate due to

objections. Students were informed of voluntary participation and provided support resources. The study adhered to ethical guidelines, with data collection methods prioritizing anonymity and confidentiality to prevent identification of students reporting significant mental health issues.

Instruments

School pressure is measured with one question: "Do you feel pressured by the schoolwork you have to do?". Responses are recorded on a 4-point Likert scale with the following score distribution: 1= not at all, 2= a little, 3= quite a lot, 4= a lot.

Emotional problems are measured using five items from the Strengths and Difficulties Questionnaire (SDQ), specifically addressing emotional issues. Example questions include "Often unhappy" and "I get scared easily". These five questions are answered on a 3-point Likert scale with the following score distribution: 1= not true, 2= somewhat true, 3= definitely true. The responses are used to calculate a subscore ranging from 0 to 10, where a score of 0 corresponds to an actual score of 5, and a score of 10 corresponds to an actual score of 15. Higher scores indicate a greater level of emotional problems. The Cronbach's Alpha for emotional problems is 0.75, indicating sufficient reliability. According to the analysis, the Cronbach's Alpha does not increase when items are removed, so all items are included in the analysis.

Perceived stress is measured using a 4-item scale developed by Cohen et al. (1983). The Perceived Stress Scale (PSS) is a widely utilized tool for assessing individual stress levels, querying feelings and thoughts over the past month, and is a valid scale (Xiao et al., 2023). Respondents indicate how often they experienced certain feelings, such as "How often

have you felt that problems were so overwhelming that you couldn't cope? (Last month)". The four questions are answered on a 5-point Likert scale with the following score distribution: 1= never, 2= almost never, 3= sometimes, 4= fairly often, 5= very often. The responses are summed and divided by 4 to obtain a scale score ranging from 1 to 5, indicating the level of perceived stress. The Cronbach's Alpha for perceived stress is 0.67, indicating insufficient reliability. Since deleting any items would not increase the Cronbach's alpha, the decision was made to include all the items.

Gender is measured by asking, "Are you a girl or a boy?" with the response options being "boy" or "girl", scored as 1= boy and 2= girl.

Analysis strategy

The data from the HBSC 2021 dataset was analyzed using JASP, an open-source program for statistical analysis. Prior to conducting any analyses, the assumptions requisite for regression analysis were evaluated, encompassing assessments of linearity, multicollinearity, normality, homoscedasticity, and the identification of outliers and influential cases. Upon confirming all assumptions, the reliability of the variables emotional problems and perceived stress was assessed via a reliability analysis. After this the descriptive statistics and the correlation of the main variables were examined, stratified by gender to elucidate disparities between boys and girls. An independent sample t-test was performed to determine if there is a statistically significant difference in the means of school pressure, emotional problems and perceived stress between boys and girls. Moreover, two items of perceived stress were recoded due to inversed questioning, resulting in the creation of a new variable where higher scores denoted increased perceived stress. Additionally, to address multicollinearity concerns, the predictors school pressure and gender were centered.

Cases with missing data on primary variables were excluded via listwise deletion in the analyses.

Following all preparatory steps, two regression analyses were conducted. To examine the relationship between school pressure and emotional problems and discern the influence of gender in this association, a multiple linear regression analysis was conducted. In this analysis, the dependent variable is emotional problems. Model 1 includes school pressure as the independent variable. Model 2 adds gender as an additional independent variable alongside school pressure. Model 3 incorporates school pressure, gender, and the interaction variable school pressure*gender as independent variables. To assess whether perceived stress mediates the relationship between school pressure and emotional problems, a mediation analysis was conducted with gender as background confounder. This analysis aimed to ascertain whether perceived stress fully, partially, or did not explain the relationship between school pressure and emotional problems. Mediation analysis may not be the most common method in cross-sectional research, but given the available data, it was the best option to investigate how school pressure influences emotional problems.

Results

Descriptive statistics

Table 2 presents the descriptive statistics and correlations for the independent variable (school pressure), the dependent variable (emotional problems), and the mediator (perceived stress) for boys and girls and the Pearson's correlations between these variables. The mean score for school pressure is 2.51, with girls reporting a higher mean score (Mean= 2.69) compared to boys (Mean= 2.34). The mean score for emotional problems is 3.06, with girls showing a higher mean score (Mean= 4.13) than boys (Mean= 2.02). The mean score for

perceived stress is 2.52, with girls again reporting a higher mean (Mean= 2.66) compared to boys (Mean= 2.38). The independent samples t-test shows significant p-values; this suggests that there is a statistically significant difference in the means of school pressure, emotional problems and perceived stress between boys and girls.

The Pearson correlation revealed a significant, moderate association between school pressure and emotional problems ($r = .40$, $p < .001$). The Pearson correlation also showed a significant, strong association between perceived stress and emotional problems ($r = .60$, $p < .001$). Furthermore, the Pearson correlation indicated a significant, moderate association between perceived stress and school pressure ($r = .36$, $p < .001$).

Table 2
Descriptive Statistics and Pearson's correlations of main variables

	Boys	Girls	Total			
	M (SD)	M (SD)	M (SD)	1.	2.	3.
Main Variables						
1. School Pressure	2.34^a (.90)	2.69^b (.93)	2.51 (.93)	-		
2. Emotional Problems	2.02^a (2.03)	4.13^b (2.64)	3.06 (2.58)	.40*	-	
3. Perceived Stress	2.38^a (.69)	2.66^b (.76)	2.52 (.74)	.36*	.60*	-

Note. *p<.001. Different superscripts indicate significant differences (p< .001).

Regression analyses

Before conducting the regression analyses, the assumptions were checked. All criteria of the assumptions have been met; refer to the appendix for the full output of the assumptions check. The multiple linear regression analysis was conducted to test hypotheses 1 and 3. See table 3 for the output of the multiple linear regression analysis. For hypothesis 1, the results of model 1 are examined. The p-value for school pressure is significant and the unstandardized coefficient for school pressure is positive, indicating a significant, positive

relationship between school pressure and emotional problems. For hypothesis 3, the interaction variable school pressure*gender in model 3 is examined. In model 3, it can be seen that the interaction variable is significant, indicating that gender plays a moderating role in the relationship between school pressure and emotional problems.

Table 3
Multiple linear regression analysis

Model		B	SE	CI	R^2 (ΔR^2)
0	Emotional Problems	3.07*	.04	3.00- 3.14	
					.00
1	Emotional Problems	2.95*	.03	2.88- 3.02	
	School Pressure	1.11*	.04	1.04- 1.18	
					.16 (.16)
2	Emotional Problems	2.96*	.03	2.89- 3.02	
	School Pressure	.93*	.03	.86- .99	
	Gender	1.80*	.06	1.67- 1.92	
					.28 (.12)
3	Emotional Problems	2.91*	.03	2.85- 2.98	
	School Pressure	.92*	.03	.85- .98	
	Gender	1.75*	.06	1.62- 1.87	
	School Pressure*Gender	.50*	.07	.36- .63	
					.28 (.01)

Note. B= unstandardized coefficient; SE= standard error; CI= 95% Confidence Interval.
* $p<.001$

A mediation analysis was conducted to test hypothesis 2. See table 4 for the output of this analysis. The analysis reveals that perceived stress partially mediates the relationship between school pressure and emotional problems because both the direct effect (see step 1 in table 4) and the indirect effect are significant (see step 3 in table 4). All steps are controlled

for gender. Refer to model 2 for the final model, which includes the unstandardized coefficients for all the individual relationships. Examining the total explained variance reveals that 48.4% ($R^2 = .48$) of the variability in emotional problems can be explained by the predictors school pressure, perceived stress, and gender in the mediation model.

Table 4

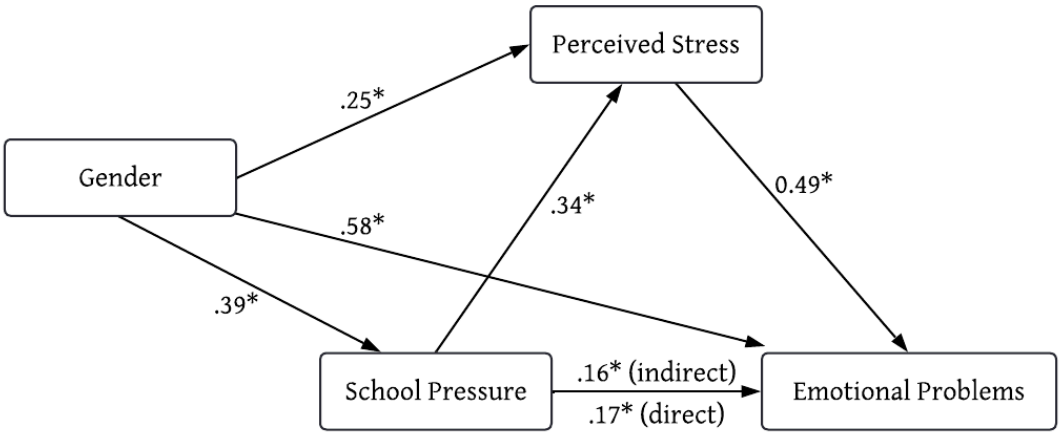
Steps of mediation analysis

Variable	Step 1 (X on Y): Emotional Problems			Step 2 (X on M): Perceived Stress			Step 3 (X on Y via M): Emotional Problems		
	B	SE	CI	B	SE	CI	B	SE	CI
School Pressure	.17*	.01	.15- .19	.34*	.01	.31- .36	.16*	.01	.15- .18
Perceived Stress	-			-			.49*	.01	.47- .51

Note. B= unstandardized coefficient; SE= standard error; CI= 95% Confidence Interval. All steps are controlled for gender.
* p<.001

Model 2

Unstandardized coefficients of all the individual relationships in the mediation analysis



Note. * p<.001

Discussion

The HBSC 2021 report underscores a notable decline in the mental health of girls in the Netherlands. Additionally, the report highlights a significant increase in school pressure, particularly affecting girls. This study aims to investigate the roles of perceived stress and gender in the connection between school pressure and emotional problems.

The results indicated a significant impact of school pressure on emotional problems, suggesting that increased school pressure is linked to heightened emotional issues among adolescents. This finding supports hypothesis 1, which posited a positive, significant relationship between school pressure and emotional problems. The outcome of this study is consistent with previous research (Bersia et al., 2022; Haugan et al., 2021; Högberg, 2021; Izuan et al., 2018; Ringdal et al., 2020; Song et al., 2020), which also asserted that school pressure significantly influences emotional problems.

Consistent with hypothesis 2, which proposed that perceived stress would mediate the relationship between school pressure and emotional problems, the results indicated that perceived stress partially mediates the relationship between school pressure and emotional problems. Comparing the findings with previous empirical studies demonstrates consistency and enriches the understanding of the development of the relationship between school pressure and emotional problems. This study advances existing literature by providing empirical evidence that supports the theoretical framework indicating that heightened school pressure increases perceived stress (Elias et al., 2011; Murphy et al., 2010; Pascoe et al., 2019; Slimmen et al., 2022), thereby contributing to greater emotional distress among adolescents (Thorsén et al., 2022; Yan et al., 2021).

The study's findings highlight that gender significantly influences the strength of the relationship between school pressure and emotional problems, supporting hypothesis 3,

which suggests that gender moderates this relationship. This finding together with the observation that school pressure was significantly higher among girls compared to boys and the significant relationship between school pressure and emotional problems (hypothesis 1) provides a potential explanation for the significant increase in emotional problems among girls between 2017 and 2021 relative to boys. These findings can be supported by previous research indicating that girls experience school pressure and emotional problems earlier than boys due to biological, social and psychological factors. Previous studies (Boer et al., 2022; Kleinjan et al., 2020) have shown that societal expectations placed on girls by society, parents, peers and themselves have significantly intensified over time, resulting in increased perceived (school) pressures. Moreover, previous research has shown that women biologically experience higher subjective stress levels than men (Cohen and Janicki-Deverts, 2012; Costa et al., 2021; Doo, 2015). Women experience higher arousal and physiological responses when exposed to unpleasant stimuli than men. They also show a stronger startle response and increased brain activity in response to negative stimuli than men, suggesting heightened sensitivity to negative life experiences and mood fluctuations (Bianchin & Angrilli, 2012).

Strengths and limitations

The study's strengths include its quantitative approach, which enables hypothesis testing and the potential for generalizability to a larger population. Its large sample size enhances reliability by providing results that are more representative of the population and yielding more accurate estimates. This facilitates drawing robust conclusions and supporting valid scientific findings. However, a limitation is that the cross-sectional design and exclusive focus on Dutch adolescents restrict the generalizability of the results. Conducting a mediation

analysis with cross-sectional data is also not ideal because it hinders the establishment of causal relationships among variables. Without longitudinal data, it is hard to confirm the order of events needed to establish mediation. This can lead to inaccurate or misleading conclusions about how variables influence each other over time.

Recommendations

The study highlights the importance of considering perceived stress when examining how school pressure can lead to increased emotional problems in adolescents. It emphasizes the need for targeted interventions and support strategies that consider both school pressure and perceived stress. The research also emphasizes the need to consider gender differences in mental health issues, emphasizing the biological, social, and psychological differences between boys and girls.

Educators can use this understanding to tailor support mechanisms and interventions, addressing both school pressure and perceived stress, and creating a more supportive learning environment. Parents can offer better emotional support, encourage healthy coping strategies, and communicate more effectively with their children about their academic experiences. Policymakers can use this knowledge to develop informed policies and programs that address the root causes of emotional problems in adolescents. Mental health professionals can enhance the effectiveness of interventions targeting emotional problems associated with school pressure by incorporating strategies that address perceived stress. Understanding gender-specific responses to stress can also help design more personalized and effective therapeutic approaches for boys and girls.

Future work should include longitudinal studies to explore the long-term effects of school pressure and perceived stress on emotional well-being. For future research, it is recommended to delve deeper into the factors contributing to increased school pressure, given the understanding from this study that school pressure significantly impacts emotional problems. Previous studies have shown that the educational system and parental educational expectations play a substantial role in shaping school pressure among young people (Deb et al., 2015; Klinger et al., 2015; Subramani et al., 2019; Talha et al., 2020). It would be valuable to investigate how these factors specifically influence school pressure, while also considering gender differences as indicated by the findings of this study.

In summary, the study provides new insights in how school pressure, perceived stress, gender and emotional problems interact. It underscores the importance of including gender and perceived stress in investigations of the relationship between school pressure and emotional problems. Hopefully, armed with this knowledge, serious action will now be taken to combat school pressure, so that in the next HBSC report, we can observe a significant decrease in emotional problems. Recognizing that these emotional issues can otherwise lead to devastating consequences.

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Appendix 1: Reflection on interdisciplinarity

Understanding the relationship between school pressure and emotional problems and the role of perceived stress and gender in this relationship requires insights from multiple scientific disciplines. By integrating perspectives from psychology, sociology and educational science, researchers can gain a comprehensive understanding of the complex interplay of factors influencing adolescent mental well-being.

Psychology provides insights into individual behavior, cognition and emotions. Incorporating psychological theories gave insight into how adolescents perceive and respond to school pressure, stress and emotional challenges. Understanding mechanisms such as coping strategies, stress perception and emotional regulation was helpful to understand where certain expressions could have come from. Sociology helps to examine the social context in which adolescents experience school pressure and emotional problems. Considering factors such as social support networks, peer relationships, and societal norms helps uncover how social structures influence stress levels and emotional outcomes among adolescents. This perspective is essential for understanding the broader societal influences on individual well-being. Educational theories explore the impact of academic pressure on students' emotional well-being. By considering the educational context, including expectations, challenges, and support systems within schools helped identify how school-related stressors contribute to emotional problems among adolescents. Insights from education help in understanding the unique pressures faced by students in the academic environment.

Combining these disciplines provides a multidimensional analysis of the factors influencing adolescent mental health. This interdisciplinary approach enriches research by offering a nuanced understanding of the underlying mechanisms and societal influences shaping adolescent well-being.

Engaging with stakeholders outside academia is crucial for enhancing the understanding of the problem and bridging the gap between research findings and practical applications. Educators, parents, policymakers, and mental health professionals bring diverse viewpoints, practical experiences, and real-world implications that enrich the research process and contribute to more effective interventions. Educators provide insights into the impact of school pressure on students' emotional well-being. Their understanding of daily student experiences, classroom dynamics and educational challenges offers valuable context for interpreting research findings and developing practical strategies to support students' mental health within the school environment. Parents offer a unique perspective on how academic pressure and stress manifest in the home environment. Their observations of their children's behavior, emotional responses and coping mechanisms inform interventions and support mechanisms that consider the family context. Policymakers shape the educational landscape and mental health support systems for adolescents. Their understanding of policy implications, resource allocation and systemic changes can influence the implementation of interventions to address school pressure and emotional problems at a broader level. Engaging policymakers in discussions based on research findings can lead to evidence-based policy decisions that promote student well-being. Collaboration between researchers and mental health professionals ensures that research findings are translated into practical interventions that support adolescent mental health.

An interdisciplinary approach is more beneficial compared to a monodisciplinary approach for this research. The complexity of adolescent mental health, influenced by school pressure, perceived stress, and gender dynamics, requires a comprehensive examination from various perspectives, such as the psychology perspective, sociology perspective and educational science perspective. An interdisciplinary approach allows for exploring how

different factors interact and influence each other, leading to a more nuanced analysis of the underlying mechanisms and relationships.

Using multiple scientific research methods leads to a deeper understanding of the relationship between school pressure, perceived stress, gender, and emotional problems among Dutch adolescents. For future research it would be beneficial to combine quantitative surveys, qualitative interviews, observational studies, and longitudinal studies leading to a more comprehensive understanding of the issue.

Employing a systems perspective, which examines the problem at different levels of analysis, such as individual, interpersonal, institutional and societal levels, uncovers the interconnectedness, dynamics and influences shaping the relationship between school pressure and perceived stress affecting adolescent emotional problems. This comprehensive approach allows for a thorough analysis of the underlying mechanisms and the development of targeted interventions and support strategies. By jointly analyzing these levels, researchers can identify leverage points for intervention and develop comprehensive strategies to promote mental health and resilience among Dutch adolescents. This integrative approach facilitates the design of effective interventions that address the multifaceted nature of the issue, ultimately promoting the well-being of adolescents.

Appendix 2: Assumption checks

To assess whether there is a linear relationship between the independent variable and the dependent variable, a scatter plot was generated, see image 1. The points form a linear line, indicating that the assumption of linearity is met. Furthermore, outliers are checked using boxplots, see images 2 and 3. The boxplots indicate that there are 0 outliers. The rule of thumb for multicollinearity is that a VIF > 5 indicates a potential problem and a VIF > 10 indicates a serious problem. The analysis shows that the Variance Inflation Factors (VIF) are as follows: VIF for school pressure is 1.04, VIF for gender is 1.05, and VIF for the interaction term (school pressure*gender) is 1.02. The VIF values of 1.04, 1.05, and 1.02 are all below 5, indicating that there is no potential multicollinearity issue. Therefore, the assumption of multicollinearity is met in this study. Finally, the histogram is checked to follow the shape of a normal distribution, see image 4. The histogram follows the shape of a normal distribution, confirming the assumption of normality.

Image 1

Scatterplot School Pressure and Emotional Problems

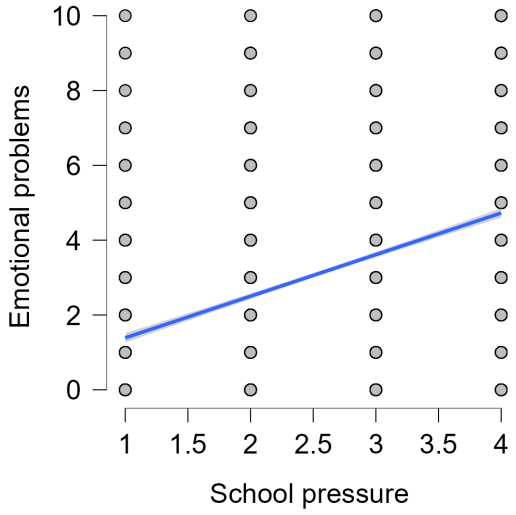

Image 2

Boxplot School Pressure

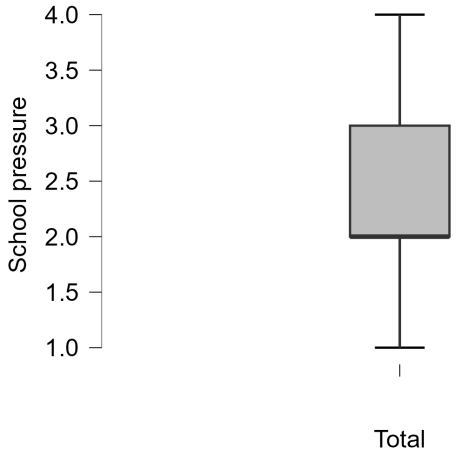

Image 3

Boxplot Emotional Problems

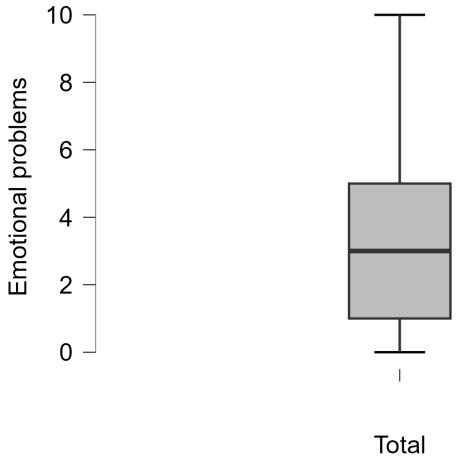

Image 4

Histogram regression analysis