The Effect of Resilience and Self-Confidence on the Experienced School Stress of Adolescents.

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Abstract

In the Netherlands, school stress among adolescents has increased in the last couple of years. School stress is linked to lower life satisfaction, depression and lower school performance. Previous research showed that resilience and self-confidence are protective factors for school stress, however, not much research has been done concerning these factors in high school populations, especially when looking at the differences for specific subgroups. The present study examined the associations between resilience, self-confidence, and school stress as well as how this was influenced by gender and education level. The data came from a nationally representative sample of 5413 students between ages 12 and 16 which was gathered in the Dutch Sentinel Study. Contrary to previous research, those who reported higher levels of resilience also reported higher levels of school stress. Self-confidence did have a negative association with school stress and both relationships were stronger for girls. However, education level merely moderated the relationship between resilience and school stress, meaning that individuals with a more theoretical education had a stronger positive relationship between resilience and school stress. Further research should focus on the positive link between resilience and school stress and use more comprehensive methods to measure these variables.

Keywords: school stress, resilience, self-confidence, gender, education level, moderation.

Samenvatting

In Nederland is de schoolstress onder jongeren de laatste jaren toegenomen. Schoolstress is gekoppeld aan een lagere tevredenheid met het leven, depressie en lagere schoolprestaties. Eerder onderzoek toonde aan dat veerkracht en zelfvertrouwen beschermende factoren zijn voor schoolstress, maar er is niet veel onderzoek gedaan naar deze factoren bij middelbare scholieren, vooral als we kijken naar de verschillen voor specifieke subgroepen. De huidige studie onderzocht de associaties tussen veerkracht, zelfvertrouwen en schoolstress en hoe dit werd beïnvloed door geslacht en opleidingsniveau. De gegevens zijn afkomstig van een landelijk representatieve steekproef van 5413 studenten tussen 12 en 16 jaar, verzameld in het Nederlandse Peilstationsonderzoek Scholieren. In tegenstelling tot eerder onderzoek rapporteerden degenen die meer veerkracht ervaarden ook hogere niveaus van schoolstress. Zelfvertrouwen had wel een negatieve associatie met schoolstress en beide relaties waren sterker voor meisjes. Het opleidingsniveau modereerde echter alleen de relatie tussen veerkracht en schoolstress, wat betekent dat individuen met een meer theoretische opleiding een sterkere positieve relatie hadden tussen veerkracht en schoolstress. Verder onderzoek zou

zich moeten richten op het positieve verband tussen veerkracht en schoolstress en meer omvattende methoden moeten gebruiken om deze variabelen te meten.

Trefwoorden: schoolstress, veerkracht, zelfvertrouwen, geslacht, opleidingsniveau, moderatie

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Introduction

School stress and pressure to perform among adolescents has increased in the Netherlands in the last couple of years (Doornwaard et al., 2021; de Looze et al., 2020; Stevens et al., 2017). A recent study has shown that one in four adolescents experience stress from school and that adolescents who experience school pressure report lower life satisfaction (Kleinjan et al., 2020). School pressure is related to academic stress, which in turn can lead to burnout, behavioural problems, lower well-being, depression, lower school achievement and a higher risk for school dropout (Östberg et al., 2018; Stevens et al., 2018; Kleinjan et al., 2020; Schoemaker et al., 2019; Walburg, 2020). Additionally, if school stress becomes chronic in high school, it is likely to persist when adolescents move on to college (Leonard et al., 2015). Excessive pressure to excel has even been named as one of the top four risk factors for the quality of the mental health of adolescents (Luthar et al., 2020). As a result of the potential negative effects of school stress, and its recent increase among adolescents, it is important to know more about the protective factors hereof. The present study, therefore, aimed to provide more insight into the associations between self-confidence, resilience and school stress.

Theoretical substantiation

School stress is the difference between perceived possibilities of meeting demands, and the experienced opportunity for recovery within the school setting (Doornwaard et al., 2021). School stress can in part be explained by the job demands-resources model of occupational stress (Salmela‐Aro & Upadyaya, 2014). According to the model, there are two processes that play a role in stress, namely the energy-depleting process and the motivational process (Doornwaard et al., 2021). With the energy-depleting process, too much is demanded of an individual. When this happens over a long period of time, individuals won't have the opportunity to recharge which can lead to stress reactions (Demerouti et al., 2001; Salmela‐Aro & Upadyaya, 2014; Doornwaard et al., 2021). According to the motivational process, an individual that has enough resources that give energy, which can be both school-related or personal, is more likely to be motivated and connected to school (Salmela‐Aro & Upadyaya, 2014; Doornwaard et al., 2021). Furthermore, it can help them to effectively deal with heavy demands (Salmela‐Aro & Upadyaya, 2014). These processes can interact with each other and buffer one another (Doornwaard et al., 2021).

Review of empirical studies

The process of energy-depleting is amongst others, related to mental resilience (Salmela‐Aro & Upadyaya, 2014). Resilience is known to help individuals cope with the

negative effects of stress, and those with higher resilience are more likely to report psychological growth after a stress attack as well as less educational distress (Lyubomirsky et al., 2005; Wuthrich et al., 2020; Doornwaard et al., 2021). Resilience can be defined as having the cognitive, emotional and social abilities to bounce back from difficulties, setbacks, changes and stress (Schoemaker, et al., 2019). Resilience might reduce the negative effects of stress by forming a buffer for the energy-depleting process of stress (Gungor, 2019). Furthermore, resilience is associated with an individual's self-efficacy, self-esteem, and self-confidence which can be protective factors for school stress (Tan & Tan, 2014; Hirvonen et al., 2019) and are related to the motivational process (Salmela‐Aro & Upadyaya, 2014).

Self-confidence is also an important factor related to stress (Tan & Tan, 2014). It can be defined as the feeling of trust in one's abilities, qualities, and judgement (Oxford References, n.d.). Harpell and Andrews (2013) found that self-concept is positively related to self-confidence and school stress. Furthermore, school stress was negatively associated with self-confidence. This is further supported by previous studies that found that self-confidence is a protective factor for school stress and can reduce examination stress (Hirvonen et al. 2019; Putwain, 2013; Wuthrich et al., 2020; Tan & Tan, 2014). This can be explained by the motivational process, as self-confidence can help cope with stressful situations (Bera, 2016; Demir et al., 2014).

Previous research has also shown that both the levels of stress and the effects of stress differ based on gender. Girls have been shown to perceive higher levels of study pressure, school stress and lower levels of resilience, self-esteem, self-confidence, and overall well-being (Stevens et al., 2018; Kleinjan et al., 2020; Walburg, 2014; Wuthrich et al., 2020; Arslan, 2017; Tan & Tan, 2014; Östberg et al., 2018). Tan and Tan (2014) suggested that lower levels of school stress among boys might be related to their higher self-esteem, self-confidence, and self-efficacy. This can be explained by how, due to the gender differences in their socialization process, girls have more performance-based self-esteem and stress, while boys report more global self-esteem (Schraml et al., 2011; Galanakis et al., 2016). Global self-esteem positively influences self-evaluation, reduces experienced stress, and leads to boys having more coping resources and self-confidence (Schraml et al., 2011). Due to the higher performance-based self-evaluation, girls on the other hand base their self-worth and evaluation more on their performance, the amount of effort they put in, and success (Schraml et al., 2011; Galanakis et al., 2016). When they experience failure, the consequences are more negative for their self-worth and are harder to overcome (Schraml et al., 2011). Girls' lower self-confidence might thus be explained by them basing their

self-esteem more on how they and others evaluate their achievements, having higher standards and demands for themselves, and trying more to fulfil their parents' expectations compared to boys, all of which increase their perceived school stress (Schraml et al., 2011; Galanakis et al., 2016). This process of experiencing pressure due to higher demands and standards might also explain the lower experienced resilience of girls (Stevens et al., 2020). As gender is likely to influence the associations between resilience and self-esteem on the one hand, and school stress, on the other hand, it was added as a moderating factor.

Education level can also be considered a relevant factor in the association between resilience, self-esteem and school stress. Adolescents with a more theoretical education level are more vulnerable to school-related pressure (Stevens et al., 2018), report lower self-confidence (Kleinjan et al., 2020; Walburg, 2014), and are more likely to report school burnouts which are also related to school stress (Gungor, 2019) compared to students with a more practical education level. Education level was therefore also taken into account as a moderating factor as it might influence the associations between resilience, self-esteem and school stress.

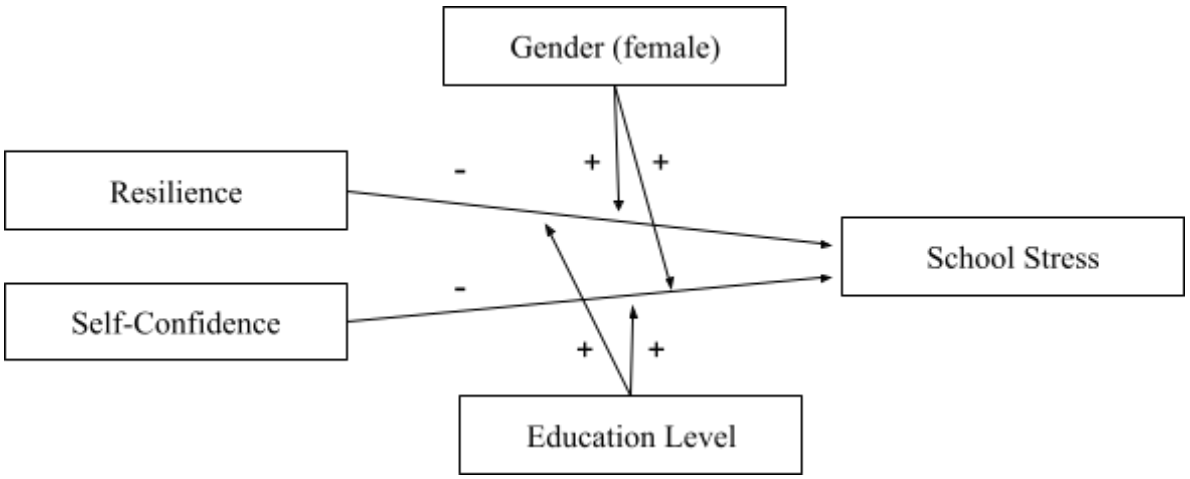
The gaps and the current study

Currently, not much research has been done concerning resilience and self-confidence as protective factors for school stress in high school populations, especially when looking at the differences for specific subgroups such as gender and education level. Therefore, the aim of the present study is to examine whether resilience and self-esteem are protective factors for school stress and if the associations between resilience and self-esteem on the one hand, and school stress, on the other hand, are moderated by gender and education level (Figure 1).

It is hypothesised that both resilience and self-confidence are negatively related to the amount of experienced school stress. Girls seem to have lower levels of self-confidence and resilience, and higher levels of perceived school stress. Furthermore, girls are more likely to have performance-based self-esteem while boys report more global self-esteem. Therefore, it is hypothesised that the associations between resilience and self-confidence on the one hand and school stress, on the other hand, are stronger for girls. A more theoretical education level is expected to be associated with less self-confidence and resilience, and higher levels of perceived school stress. Therefore, it is hypothesised that the protective effects of resilience and self-confidence on school stress are stronger for adolescents with a more theoretical education level compared to adolescents with a more practical education level.

Figure 1

The effect of resilience and self-confidence on school stress, moderated by age and gender



Method

Procedure

The data used in this paper was gathered in the Dutch Sentinel Study (in Dutch: Peilstationsonderzoek Scholieren), which is a nationally representative student survey. Data were gathered among 10-to-18-year-olds, but for this study, only the data of adolescents between 12 and16 years was used. Data collection took place in 2019, in 110 secondary schools, among 6,118 students of which 5,587 students were aged 12 to 16 years. To ensure representativeness, a two-part random selection took place. First, the schools were randomly selected from a list of regular Dutch schools made by the Education Executive Agency (in Dutch: Dienst Uitvoering Onderwijs). To be included, schools had to have independent management, provide regular education and had to have at least four education years at one education level. The second selection round was a random selection among the classes to get 2 or 3 classes, depending on the size of the school. Classes with less than 10 students were not included. The response rate of schools was 40%, mostly due to schools already participating in other research.

Students filled in a digital questionnaire in the classroom while being under the supervision of a trained research assistant from the Trimbos Institute. Parents provided passive informed consent and were given the opportunity to object to their child's participation in the study. Students provided active informed consent. The procedure of the study was ethically approved by the Trimbos Ethical Reviews Committee (TET). This study was approved by the Ethical Review Board of the Faculty of Social and Behavioural Sciences of Utrecht University (FETC 21-2338).

Measurements

School stress was measured by asking how often the respondent experienced stress due to school or homework (Stevens et al., 2018). This was measured on a ratio level. One was removed from the answers, making the lowest value ‘0’ and the highest ‘2’, with two meaning more school stress.

Resilience was measured by one of the two questions from the Brief Resilience Scale (Smith et al., 2008) asking for the respondent’s ability to endure stressful situations. The other resilience item asked for the respondent's ability to recover from stressful situations. This item was not included as the intercorrelation between the two items was too low to be combined and the second question fitted less with the theories used in the introduction. Resilience was recoded so the values went from ‘0’, meaning completely disagree to ‘4’, completely agree.

Self-confidence was measured by asking how fitting the phrase: “I have a lot of self-confidence.” was (Robins et al., 2001). This was a single item measure that went from ‘0’ meaning not true to ‘2’ meaning definitely true.

From the questionnaire, demographic questions were used to determine the respondent’s gender, age, and education level. *Gender* was recoded so that ‘0’ represented boys and ‘1’ represented girls. *Education level* was recoded so as ‘0’ meant vmbo-bt and mavo, while ‘1’ meant havo and vwo. Vmbo-bt and mavo represented a more practical education level while havo and vwo represented a more theoretical education level. The original questions can be found in appendix C.

Data analysis

Respondents older than 16 or younger than 12 years and those who did not answer all the questions were removed. In total, 120 respondents were removed of which 12 were due to some form of non-response, which left 5,413 respondents remaining. This was followed by checking if all assumptions were met. First, linearity was checked by creating scatterplots between resilience, self-confidence and age as x-variables and school stress as y-variables. Secondly, multicollinearity was tested using Spearman and Pearson's correlation, as well as Variance Inflation Factor (VIF) values. Additionally, to see if the variables were normally distributed, a P-P plot was generated. Finally, homoscedasticity was tested by plotting the standardised residuals against the predicted values. All assumptions were met except the assumption of homoscedasticity. However, due to the high power of the data set, the regression analysis could be conducted.

After testing the assumptions, the descriptive statistics were calculated, as well as the Pearson and Spearman correlations. This was followed by a multiple linear regression analysis. The first model contained the dependent variable, school stress, the moderating variables, gender and education level, and the control variable age. In the second model, the independent variables, self-confidence and resilience were added. The last model contained the above-mentioned variables as well as the interaction variables with resilience and self-confidence to measure the possible moderating effects of gender and education level. All significant interaction effects were plotted afterwards, to determine the nature of the moderations.

Results

Descriptive statistics

The descriptive statistics are presented in Table 1, showing the means, percentages and standard deviations of all variables. Of the respondents (N=5,413), 49.0% were female (N=2,650). The average age of the respondents was 13.96 years old (SD =1.33) and they were slightly more theoretically educated (52.9%, havo/vwo). Of the respondents, 15.8% reported low levels of self-confidence, 39.7 % medium levels of self-confidence and 44.5% high levels of self-confidence. The students had a low average of school stress.

Tabel 1

Descriptives statistics of model variables

	N	M	% total	SD
School stress (range 0-2)		.41		.40
Resilience (range 0-4)		1.96		1.18
	738		13.6	
	1175		21.7	
	1535		28.4	
	1497		27.7	
	466		8.6	
Self Confidence (range 0-2)		1.29		.72
	853		15.8	
	2149		39.7	
	2411		44.5	
Gender				
Boys	2762		51.0	
Girls	2650		49.0	
Education level				
Vmbo-bt/mavo	2550		47.1	
Havo/vwo	2863		52.9	
Age		13.96		1.33

Correlations

Table 2 shows the correlations between all model variables. The Spearman correlation was reported when one or more variables were categorical. Otherwise, the Pearson correlation was reported. Self-confidence and resilience were treated as continuous variables. Looking at Table 2, both resilience and self-confidence were significantly related to school stress. However, the association between resilience and school stress was positive instead of negative. Furthermore, education level and age were not related to resilience. Education was positively related with school stress, meaning that students who were more theoretical educated seemed to experience more school stress. Lastly, gender had no association with age but was significantly related to school stress, meaning that girls seemed to have higher levels of school stress.

Table 2

Correlations between model variables

	1	**2**	**3**	**4**	**5**	**6**
School Stress	1.00					
Resilience	.35***	1.00				
Self-Confidence	-.41***	-.25***	1.00			
Gender	*.29***	*.21***	*-.26***	1.00		
Education-Level	*.14***	*.01*	*-.06***	*.04***	*1.00*	
Age	.19***	-.01	-.07***	*-.01*	*.07***	1.00

p<.05;p<0.01;p***<0.001*

Note. Spearman correlations are italicised while the Pearson correlations are represented straight.

Linear Regression analyses

The direct associations with school stress

A multiple linear regression analysis was carried out to test whether there were negative associations between self-confidence and resilience with school stress as well as how these associations were influenced by gender and education level. The results of the

multiple linear regression are shown in Table 3. The first model showed the relationship between the control variables, gender, education level, age, and the outcome variable school stress, which explained 13.3% of the variance ($p<.001$). The results indicated that the first model was a significant predictor of school stress ($F(3,5409)=277.69$, $p<.001$). In the second model, the variables resilience and self-confidence were added to measure their direct relationships to school stress ($R^2=.294$, $F(5,5407)=451.53$, $p<.001$). The last model included the above-mentioned variables and the moderating factors between gender and education level on the one hand and self-confidence and resilience on the other hand ($R^2=.305$, $F(9,5403)=265.13$, $p<.001$).

Looking at the direct paths, there was a significant relationship between resilience and school stress. However, this was positive, meaning that an increase in resilience seemed to be related to an increase in school stress. There was a significant negative relationship between self-confidence and school stress. Furthermore, gender and education level both had a significantly positive relation with school stress.

Table 3

Regression analysis of Resilience and Self-confidence predicting School Stress

Model		Unstandardized coefficient		Standardised coefficient	
		B	SE B	β	t
1	Constant	-.53	.05		-9.87
	Gender	.24	.01	.29***	23.14
	Education Level	.08	.01	.10***	7.62
	Age	.06	.00	.19***	14.72
2	Constant	-.36	.05		-6.98
	Gender	.13	.01	.17***	13.86
	Education Level	.06	.01	.08***	7.01
	Age	.05	.00	.17***	14.76

	Resilience	.08	.00	.24***	20.47
	Self-confidence	-.16	.01	-.29***	-23.83
3	Constant	-.39	.05		-7.20
	Gender	.13	.01	.17***	14.04
	Education Level	.07	.01	.08***	7.09
	Age	.05	.00	.17***	14.63
	Resilience	.06	.01	.17***	8.79
	Self-confidence	-.10	.01	-.18***	-8.55
	Resilience_Gender	.03	.01	.06***	3.70
	Selfconfidence_gender	-.09	.01	-.12***	-7.01
	Resilience_EducationLevel	.03	.01	.05**	3.17
	Selfconfidence_EducationLevel	-.01	.01	-.01	-.81

p<.05;p<0.01;p***<0.001*

Moderating effects

As seen in Table 3, gender had a moderating effect on the relation between self-confidence and school stress. Gender also had a moderating effect on the relationship between resilience and school stress. Education level showed no significant moderating effect on the relation between self-confidence and school stress but did have a moderating effect on the relationship between resilience and school stress.

To see how gender and education level moderated the effects of resilience and self-confidence on school stress, the relationships were plotted in the models below. Figure 1 shows the different relation between resilience and school stress for girls compared to boys. Female students had higher levels of school stress compared to boys when they both reported low resilience, however, this difference was rather small. When resilience increased, school stress increased more strongly for girls compared to boys. The effect of resilience was thus stronger for girls, compared to boys.

Figure 1

The effect of Resilience on School Stress shown for Girls and Boys

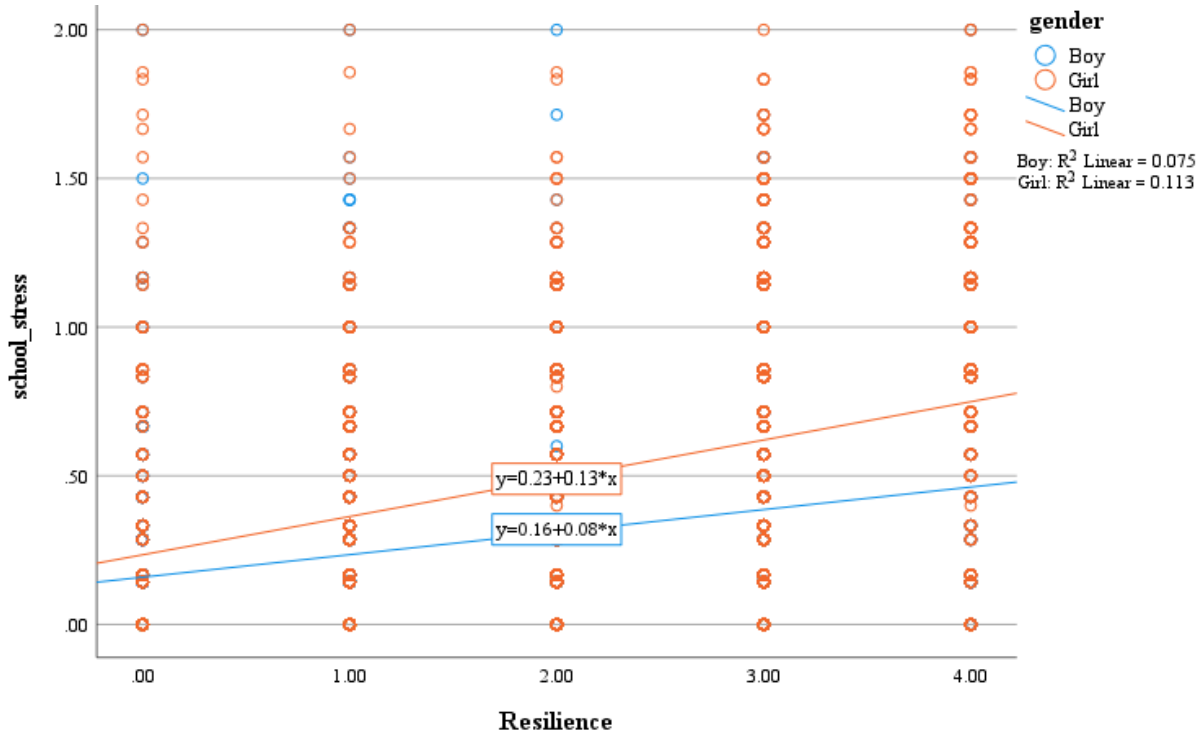


Figure 2 shows the different relation between self-confidence and school stress for girls compared to boys. Female students had higher levels of school stress when they reported having low self-confidence compared to boys. This decreased more strongly for girls when their self-confidence increased compared to boys. Thus the negative relation between self-confidence and school stress was stronger for girls.

Figure 2

The effect of Self-Confidence on School Stress shown for Girls and Boys

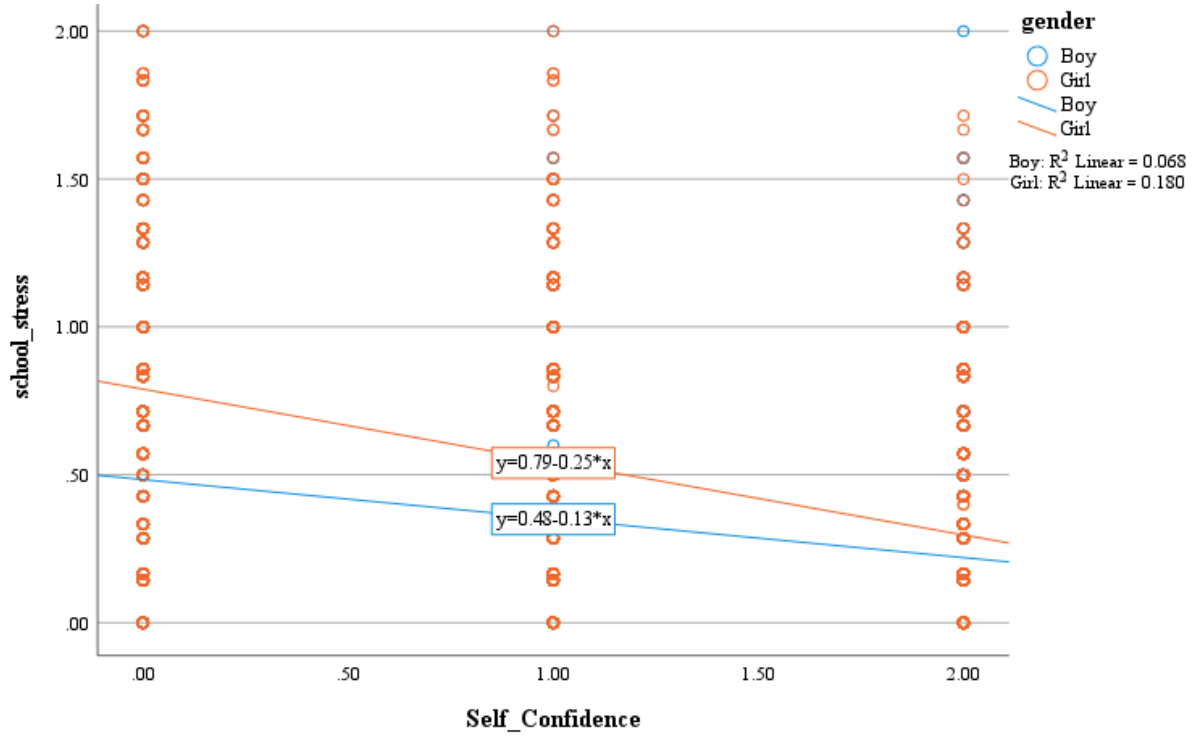
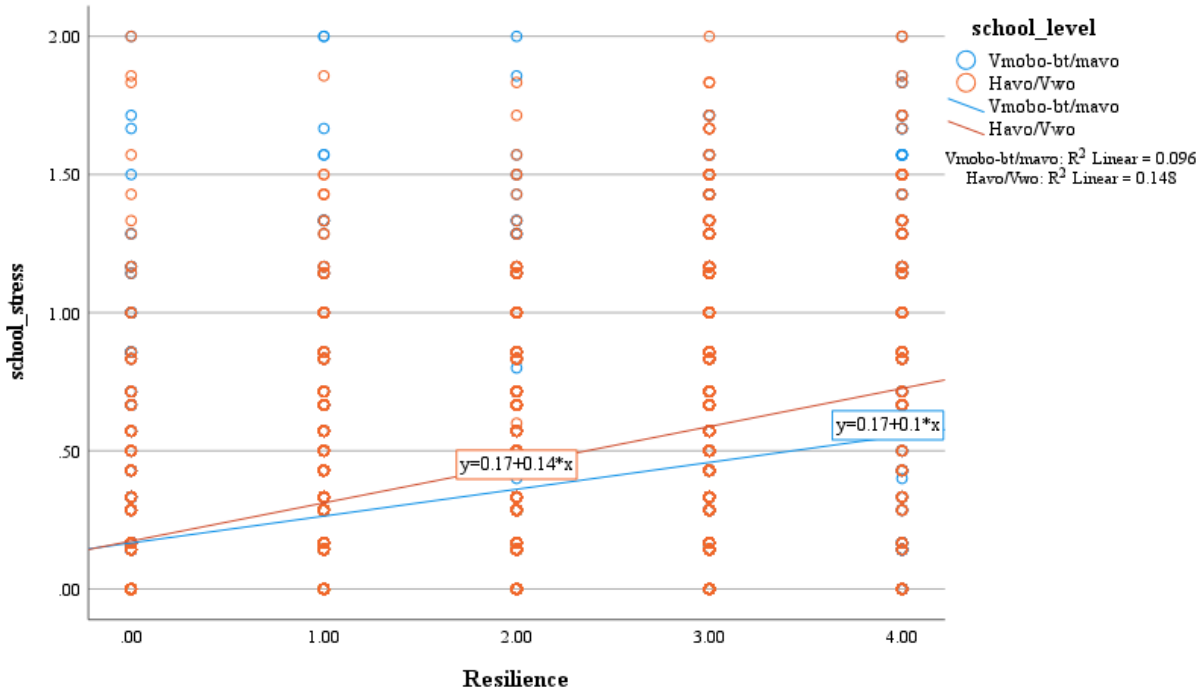


Figure 3 shows the different relation between resilience and school stress for theoretically educated students (havo/vwo) compared to more practically educated students (vmbo-bt/mavo). The levels of school stress did not differ between the education levels if students reported low resilience. However, when their resilience increased, school stress increased more strongly for more theoretically educated students compared to more practical educated students. The effect of resilience was thus stronger for more theoretically educated students.

Figure 3

The effect of Resilience on School Stress moderated by Education Level



Discussion

The aim of this study is to gain more insight into the associations between self-confidence and resilience on the one hand and school stress on the other hand as well as how these associations are influenced by gender and education level. Remarkably, and contrary to the hypothesis, a positive association is found between resilience and school stress; adolescents who report higher levels of resilience also report higher levels of school stress. Overall, previous research finds that resilience is a protective factor for stress in general and school stress specifically (Tan & Tan, 2014; Hirvonen et al., 201; Lyubomirsky et al., 2005; Wuthrich et al., 2020; Doornwaard et al., 2021). A possible explanation for this contradictory result might lie in the study methodology. As this is a cross-sectional study, no

direction of the relationship can be established. Morales (2000) describes the development of resilience as a cycle in which students identify risk, seek factors to reduce this risk, evaluate and refine these factors and use these refined factors to combat future risk. Furthermore, the process between risks and resilience is a reciprocal one, meaning that resilience influences risks and vice versa (Morales, 2000; Martin et al., 2013). As resilience is only measured by asking about being able to cope with stressful situations in general, not school stress specifically, it might be possible that those who experience more school stress, develop more factors to cope with or reduce school stress. These factors in turn could be used to cope with stressful situations in general, thus creating a positive link between school stress and resilience. Additionally, unlike in previous studies, resilience in this study is only measured with one question from the Brief Resilience Scale (Smith et al., 2008). Therefore, it could be that the construct resilience is not optimally assessed and that certain aspects are not taken into account, which may have impacted the results.

Supporting hypothesis two, the findings show that students who have higher levels of self-confidence, report lower levels of school stress, when controlled for resilience. This finding is supported by previous research that reports that self-confidence is a protective factor for both school stress and examination stress (Hirvonen et al. 2019; Putwain, 2013; Wuthrich et al., 2020; Tan & Tan, 2014). This link between the two can be explained by the job demands-resources model of occupational stress (Salmela‐Aro & Upadyaya, 2014). Self-confidence is a resource in the motivational process behind stress and as such, can help with effectively dealing with heavy demands and stressful situations (Bera, 2016; Demir et al., 2014; Salmela‐Aro & Upadyaya, 2014).

In line with the third hypothesis, gender indeed moderates the relationship between resilience and school stress. However, the effect is not in the hypothesised direction. As explained above, this might be due to the direction of the main association between resilience and school stress or the manner in which resilience was measured. As coping resources have a greater effect on reducing the level of stress among boys compared to girls (Österberg et al., 2018), it might be possible that girls develop more coping resources to combat the same risk factors, which is strengthened by how girls experience more study-related stress than boys (Walburg, 2014; Wutricht et al., 2020; Tan & Tan, 2014; Österberg et al., 2018), thus giving them more opportunity to develop resilience for other types of stressful situations. This line of thought is supported by Tan and Tan's (2014) findings that show that lower reported levels of school stress by boys might be related to the higher self-esteem and self-efficacy they reported, as controlling for both factors removes the effect of gender on school stress.

Together, this might explain why the positive link between resilience and study-stress is stronger for girls.

In line with the fourth hypothesis, a moderating effect of gender is found in the association between self-confidence and school stress; this association is stronger for girls. This finding is in line with previous research (Stevens et al., 2018; Kleinjan et al., 2020; Walburg, 2014; Wuthrich et al., 2020; Arslan, 2017; Tan & Tan, 2014; Östberg et al., 2018). This might be explained by the different socialisation processes of boys and girls, causing girls to have a more performance-based self-esteem and stress instead of global self-esteem (Schraml et al., 2011; Galanakis et al., 2016). Therefore, girls are more likely to base their self-esteem on how they and others evaluate their achievements, having higher standards and demands for themselves, and trying more to fulfil their parents' expectations compared to boys, which together might increase their perceived school stress and lower their self-confidence and resilience (Schraml et al., 2011; Galanakis et al., 2016).

In line with hypothesis five, education level moderates the relationship between resilience and school stress. However, the main effect is not in the hypothesised direction, namely, resilience has a positive instead of negative relation with school stress. This relation is stronger for more theoretical educated people. The moderation might be explained by how theoretically educated students are more vulnerable to study-related pressure, leading to school stress (Schoenmaker, 2019). This in turn can lead to them developing a broader repertoire of protective factors (Morales, 2000) to combat other stressful situations. Another explanation might be that there is some overlap between the answering categories of education level, in the sense that some of those who are on ‘havo’ level are grouped in the more practically educated group instead of the theoretically educated group (see method section), potentially making the differences between the two groups less distinct from each other. This might have influenced the results.

The sixth and final hypothesis was not confirmed; no moderating effect of education is found for the association between self-confidence and school stress. Previous research finds that more theoretically educated students have lower self-confidence (Kleinjan et al., 2020; Walburg, 2014), are more vulnerable to study-related pressure (Stevens et al., 2018), and are more likely to report study burnouts which are also related to school stress (Gungor, 2019). However, Stevens et al. (2018) report that students who are more practically educated, perceive less social support which could increase the likelihood of stress as social support is a potential buffer for stress. Potential lower levels of social support in practically educated students may suppress a possible moderating effect of education level, which may partly

explain the lack of significant results. Another explanation might, as discussed above, be the overlap between the answering categories of education level, which might explain the lack of results found.

This study has several strengths. First of all, the dataset contains a large number of respondents, resulting in high power. Furthermore, due to the nature of the data collection, sampling bias is decreased and the results are representative of Dutch high school students between the ages of 12 and 16 in the Netherlands. However, there are also some limitations. Firstly, the data is cross-sectional, so no statements can be made about the directions of the relations (Kleinjan et al., 2020). Secondly, the data is gathered using self-report which might have created recollection bias (Shiffman et al, 2008). Using self-report as a data collection method may also lead to social desirability when completing the questionnaires, which may result in over- or under-reporting (Kleinjan et al., 2020). Furthermore, as mentioned above, only one question of the Brief Resilience Scale (Smith et al., 2008) is used to measure resilience, possibly resulting in not capturing resilience in all its aspects. The same could be said for self-confidence and school stress, which are also assessed with a single item. Moreover, gender is assessed as a dichotomous variable, with no option for other identities, possibly excluding a minority group. Education-level is recoded to be bivariate, however, the two groups have some overlap due to “havo" being an answer category on its own but also part of the answering combination with ‘vmbo-t”. Finally, the normality assumptions are not met, as the Komernov Smirnov test is significant. School stress is also left-skewed, thus reducing the changes to find variance. However, because of the high power of the data set, the analysis could be conducted, but a possible impact on the results should be kept in mind.

In further research, resilience should ideally be measured with the entire Brief Resilience Scale (Smith et al., 2008) or measures that take multiple aspects of resilience into account. Other resilience scales take for example self-efficacy and perseverance into account (Rossouw & Rossouw, 2016; Cassidy, 2016) which might be relevant to include as this gives a broader picture of resilience. Furthermore, school stress could be assessed in more detail. For instance, not only asking if stress is experienced due to study but also asking what aspects generate the most stress, such as the internal pressure or external pressure to perform or time pressure. Furthermore, additional research is recommended to further explore the nature of the relationship between resilience and school stress.

Additionally, using ecological momentary assessment (EMA) instead of cross-sectional research is recommended as this gives a more day by day picture of the variables (Shiffman et al, 2008), thus making it possible to look at temporality. By using

EMA, the researchers will be able to reduce recollection bias, increase ecological validity, and investigate micro-processes that influence behaviour in real-world situations (Shiffman et al, 2008). Additionally, researchers may be better able to distinguish between the sources of school stress and the various types of resilience associated with them, thus making them more able to capture the dynamic process between resilience and stress.The same can be true for the relationship between self-confidence and school stress.

It should be noted that there are two different methods when using EMA, namely event-based monitoring and time-based monitoring schemes (Shiffman et al, 2008). To further research study stress, it is recommended to use event-based monitoring, which lets subjects complete assessments not based on a schedule but on an event (Shiffman et al, 2008). This allows researchers to better determine how often and how long students experience study stress as well as how they handled these different experiences, as the students don't have to rely on their memory as much compared to the time-based monitoring. This method, therefore, gives a more comprehensive picture of study stress itself and its relation to different types of resilience.

As interventions targeting stress positively influence students' well-being (Lammers, 2016), a practical implication of this paper might be further stimulation of interventions that focus on self-confidence to reduce school stress as self-confidence seems to be a protective factor. In the same line, it is also useful to incorporate resilience in interventions, as interventions targeting school stress by increasing coping skills seem to be effective (Kleinjan et al., 2016). Right now, there seem to be few interventions that target resilience specifically to decrease school stress, which could potentially be a relevant target for interventions.

Conclusion

The results of the present study show that there is a positive link between resilience and school stress while there is a negative link between self-confidence and school stress. As the main consensus in the literature is that there is a negative link between resilience and school stress, more research should be done regarding this relationship.

References

Arslan, N. (2017). Investigating the relationship between educational stress and emotional self-efficacy. *Universal journal of educational research, 5*(10), 1736-1740. https://doi.org/10.13189/ujer.2017.051010

Bera, N. (2016). Towards stress management and self-care among school students. *International Journal of Humanities & Social Science Studies*, *3*(1), 157-164.

Cassidy, S. (2016). The academic resilience scale (ARS-30): a new multidimensional construct measure. *Frontiers in psychology,* 7, 1787. https://doi.org/10.3389/fpsyg.2016.01787

de Looze, M. E., Cosma, A. P., Vollebergh, W. A., Duinhof, E. L., de Roos, S. A., van Dorsselaer, S., van Bon-Martens, M. J. H., Vonk, R., & Stevens, G. W. J. M. (2020). Trends over time in adolescent emotional wellbeing in the Netherlands, 2005-2017: links with perceived schoolwork pressure, parent-adolescent communication and bullying victimization. *Journal of youth and adolescence,* 49, 2124-2135. https://doi.org/10.1007/s10964-020-01280-4

Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology, 86*(3), 499–512. https://doi.org/10.1037//0021-9010863499

Demir, S., Demir, S. G., Bulut, H., & Hisar, F. (2014). Effect of mentoring program on ways of coping with stress and locus of control for nursing students. *Asian nursing research, 8*(4), 254-260. https://doi.org/10.1016/j.anr.2014.10.004

Doornwaard, S., Peeters, M., Leijerzapf, M., de Haas, J., Efat, A., Kleinjan, M. (2021). *Mentaal kapitaal: welke factoren spelen een rol bij ongezonde stress, prestatiedruk, schoolverzuim/thuiszitten en schooluitval?.* Regionale Kenniswerkplaats Jeugd en Gezin Centraal. https://jeugdengezincentraal.nl/wp-content/uploads/2021/10/Rapport-RKJGC-Deelonderzoek-1_FINAL.pdf

Galanakis, M. J., Palaiologou, A., Patsi, G., Velegraki, I. M., & Darviri, C. (2016). A literature review on the connection between stress and self-esteem. *Psychology, 7*(5), 687-694. https://doi.org/10.4236/psych.2016.75071

Gungor, A. (2019). Investigating the relationship between social support and school burnout in Turkish middle school students: the mediating role of hope. S*chool Psychology International, 40*(6), 581-597. https://doi.org/10.1177/0143034319866492

Harpell, J. V., & Andrews, J. J. (2013). Relationship between school based stress and test anxiety. *International Journal of Psychological Studies, 5*(2), 74-84. http://doi.org/10.5539/ijps.v5n2p74

Hirvonen, R., Yli-Kivistö, L., Putwain, D. W., Ahonen, T., & Kiuru, N. (2019). School-related stress among sixth-grade students–associations with academic buoyancy and temperament. *Learning and Individual Differences, 70*, 100-108. https://doi.org/10.1016/j.lindif.2019.01.012

Kleinjan, M., Bolier, l., Onrust, s., & Monshouwe, K. (2016). *Factscheet: mentale weerbaarheid en mentaal welbevinden in de schoolsetting.* Trimbos. https://www.trimbos.nl/wp-content/uploads/sites/31/2021/09/af1439-mentale-weerbaarheid-en-mentaal-welbevinden-in-de-schoolsetting.pdf

Kleinjan, M., Pieper, I., Stevens, G., Van de Klundert, N., Rombouts, M., Boer, M., Lammers, J. (2020). *Geluk onder druk? onderzoek naar het mentaal welbevinden van jongeren in Nederland.* Unicef. https://www.trimbos.nl/wp-content/uploads/sites/31/2021/09/af1785-geluk-onder-druk.pdf

Lammers, J. (2016). *Bevorderen van het psychisch welbevinden op school: wat werkt?*. Trimbos. https://www.trimbos.nl/docs/b8519d34-fe56-4c99-9c3b-b666d34ece29.pdf

Leonard, N. R., Gwadz, M. V., Ritchie, A., Linick, J. L., Cleland, C. M., Elliott, L., & Grethel, M. (2015). A multi-method exploratory study of stress, coping, and substance use among high school youth in private schools. *Frontiers in psychology, 6*(1028), 1-16. https://doi.org/10.3389/fpsyg.2015.01028

Luthar, S. S. , Kumar, N. L. & Zillmer, N. (2020). High-Achieving schools connote risks for adolescents: problems documented, processes implicated, and directions for interventions. *American Psychologist, 75*(7), 983–995. https://doi.org/10.1037/amp0000556

Lyubomirsky, S. , King, L. & Diener, E. (2005). The benefits of frequent positive affect: does happiness lead to success? *Psychological Bulletin, 131*(6), 803–855. https://doi.org/10.1037/0033-2909.131.6.803

Martin, A. J. (2013). Academic buoyancy and academic resilience: exploring ‘everyday’and ‘classic’resilience in the face of academic adversity. *School Psychology International, 34*(5), 488-500. https://doi.org/10.1177/0143034312472759

Morales, E. E. (2000). A contextual understanding of the process of educational resilience: high achieving dominican american students and the “resilience cycle”. *Innovative Higher Education, 25*(1), 7-22. https://doi.org/10.1023/A:1007580217973

Östberg, V., Plenty, S., Låftman, S. B., Modin, B., & Lindfors, P. (2018). School demands and coping resources: associations with multiple measures of stress in mid-adolescent girls and boys. *International journal of environmental research and public health, 15*(10), 2143. https://doi.org/10.3390/ijerph15102143

Oxford references. (n.d.). *Overview self-confidence.* https://www-oxfordreference-com.proxy.library.uu.nl/view/10.1093/oi/authority.20110803100453192

Putwain, D. W. (2009). Assessment and examination stress in key stage 4. *British Educational Research Journal, 35*(3), 391-411. https://doi.org/10.1080/01411920802044404

Robins, R. W., Hendin, H. M., & Trzesniewski, K. H. (2001). Measuring global self-esteem: construct validation of a single-item measure and the Rosenberg self-esteem scale. *Personality and Social Psychology Bulletin, 27*(2), 151-161. https://doi.org/10.1177/0146167201272002

Rossouw, P. J., & Rossouw, J. G. (2016). The predictive 6-factor resilience scale: neurobiological fundamentals and organizational application. *International journal of neuropsychotherapy, 4*(1), 31-45. https://doi.org/10.12744/ijnpt.2016.0031-0045

Salmela‐Aro, K., & Upadyaya, K. (2014). School burnout and engagement in the context of demands-resources model. *British journal of educational psychology, 84*(1), 137-151. https://doi.org/10.1111/bjep.12018

Schoemaker, C., Kleinjan, M., van der Borg, w., Busch, M., Muntinga, M., Nuijen, J., & Dedding, C. (2019). *Mentale gezondheid van jongeren: enkele cijfers en ervaringen.* Rijksinstituut voor Volksgezondheid en Milieu. https://www.rivm.nl/sites/default/files/2019-05/011281_120429_RIVM%20Brochure%20Mentale%20Gezondheid_V7_TG.pdf

Schraml, K., Perski, A., Grossi, G., & Simonsson-Sarnecki, M. (2011). Stress symptoms among adolescents: The role of subjective psychosocial conditions, lifestyle, and self-esteem. *Journal of adolescence, 34*(5), 987-996. https://doi.org/10.1016/j.adolescence.2010.11.010

Shiffman, S., Stone, A. A., Hufford, M. R. (2008). Ecological momentary assessment. *Annual Review of Clinical Psychology, 4*, 1-32. https://doi.org/10.1146/annurev.clinpsy.3.022806.091415

Smith, B. W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. (2008). The brief resilience scale: assessing the ability to bounce back. *International journal of behavioral medicine, 15*, 194-200. https://doi.org/10.1080/10705500802222972

Stevens, G., van Dorsselaer, S., Boer, M., de Roos, S., Duinhof, E., ter Bogt, T., van den Eijnden, R., Kuyper, L., Visser, D., Vollebergh W. & de Looze, M. (2018). *HBSC 2017: gezondheid en welzijn van jongeren in Nederland.* Trimbos. https://www.trimbos.nl/docs/9908351a-4e5e-4d80-b343-55e69086a1fb.pdf

Tan, C., & Tan, L. S. (2014). The role of optimism, self-esteem, academic self-efficacy and gender in high-ability students. *The Asia-Pacific Education Researcher, 23*(3), 621-633. https://doi.org/10.1007/s40299-013-0134-5

Walburg, V. (2014). Burnout among high school students: a literature review. *Children and Youth Services Review, 42*, 28-33. https://doi.org/10.1016/j.childyouth.2014.03.020

Wuthrich, V.M., Jagiello, T. & Azzi, V. (2020). Academic stress in the final years of school: a systematic literature review. *Child Psychiatry & Human Development, 51*(6), 986–1015. https://doi.org/10.1007/s10578-020-00981-y

Appendix A: Interdisciplinarity

Stress in general, but school stress specifically can be a complex problem that can't be merely explained by one discipline if one wants to gain a complete understanding. Interdisciplinarity, which is the combining of two or more disciplines of an academic field (Merriam-Webster, n.d.), can increase the understanding of school stress and the effect that variables such as self-confidence and gender might have on it, by looking at it from multiple angles. This will increase the likelihood that the developed model explains school stress in the real world and therefore increase the effectiveness of possible interventions built on this model.

The moderating effect of gender can be explained by psychology and sociology. They both explain human behaviour, but psychology focuses more on the personal and parental explanations for human behaviour and processes (Sameroff, 2009). While psychology makes use of more interactive models (Samerof, 2010), sociology uses more transactive or multilevel dynamic systems models. In other words, sociology focuses more on group dynamics in relation to an individual to explain human behaviour. Furthermore, psychology often explains human behaviour more on a micro-level, while sociology uses the interaction between the macro- and micro-level to explain (changes in) behaviour on a macro level. Because these disciplines focus on different aspects and levels to explain behaviour, both can add and build on one another to create a more thorough understanding of school stress. By using sociology insights on a macro level, psychology insights might become more accurate on a micro level which in turn might increase the accuracy of the macro-level outcomes of sociology (see Coleman's (1990) diagram). Resilience and self-confidence are both concepts that can be explained by psychology.

All the factors in this paper are on an individual level. However, the moderating effect of gender is (partly) due to effects on a family and cultural level. Through these moderating factors, the different social contexts interact with each other, by influencing the associations between resilience and self-esteem on the one hand, and school stress, on the other hand. The model presented in this research is on an interdisciplinary level due to its use of different social disciplines and the layers of Sameroff's (2009) model of development. However, because the model uses more individual and micro-level variables and explanations, psychology is the dominant social discipline used in this study. Therefore it could have been more interdisciplinary if it included factors that are by themselves from different levels, like parental support.

References:

Coleman, J. S. (1990). *Foundations of Social Theory*. Cambridge, MA: The Belknap Press.

Merriam-Webster. (n.d.). *Interdisciplinary.* https://www.merriam-webster.com/dictionary/interdisciplinary

Sameroff, A. (2010). A unified theory of development: a dialectic integration of nature and nurture. *Child Development, 81*(1), 6-22. https://doi-org.proxy.library.uu.nl/10.1111/j.1467-8624.2009.01378.x

Sameroff, A. (2009). *The transactional model*. American Psychological Association.

Appendix B: Contract data-use TED track

Utrecht, 2022

This letter constitutes formal confirmation of the fact that the data from the Trimbos Institute 'Peilstationsonderzoek Scholieren 2019' have been made available to Jolijn Hutjes of Utrecht University. These data will not be made available to others, and the data may be used only for analysis and reporting on topics for the thesis, about which agreement has been reached with Prof. dr. Marloes Kleinjan. Jolijn Hutjes will receive access to the data from the dataset in order to answer the following research questions within the framework of the thesis:

Research question: Are resilience and self-esteem protective factors for school stress and are the associations between resilience and self-esteem on the one hand, and school stress, on the other hand, moderated by gender and education level?

The following variables will be used:
Dependent variable: school stress (Q16)
Independent variables: Self-esteem (Q82), Resilience (Q83)
Other variables: Gender (Q2), Education level (Q*), Age (Q1)

No report based on the data from the project Peilstationsonderzoek Scholieren/ESPAD will be made public, unless permission has been obtained in advance from the Project Coordinator for the Prof. dr. Marloes Kleinjan. After the expiration of this contract, dated 30 August, 2022, Jolijn Hutjes shall delete the Peilstationsonderzoek Scholieren/ESPAD data.

Dates and signature:

13/01/2022

Name of student: Jolijn Hutjes

17/01/2022

Name of Project Coordinator: Prof. dr. Marloes Kleinjan

Appendix C: Original questions used from the Peilstation-onderzoek

Q16. Ik voel me gestrest door…..

school of huiswerk

- Nooit
- Een enkele keer
- Soms
- Vaak
- Altijd

Q83. Hoe goed passen de volgende uitspraken bij jou?

Na een moeilijke periode herstel ik meestal weer snel

- Helemaal niet mee eens
- Niet mee eens
- Niet eens/niet oneens
- Eens
- Helemaal mee eens

Ik vind het moeilijk om stressvolle gebeurtenissen te doorstaan

- Helemaal niet mee eens
- Niet mee eens
- Niet eens/niet oneens
- Eens
- Helemaal mee eens

Q82. Hoe goed passen de volgende uitspraken bij jou?

Ik heb veel zelfvertrouwen

- Niet waar
- Beetje waar
- Zeker waar

2. Ben je een jongen of een meisje?

Pop-up: vul het geslacht in dat in je paspoort of identiteitskaart staat

- Jongen

- Meisje

Q* Vul hier in

Schooltype

- VMBO- beroepsgericht (kader/basis)
- VMBO-theoretisch/gemengd/MAVO
- HAVO
- VWO

Q1. Wanneer ben je geboren?

JAAR

• 2009	• 2005	• 2001
• 2008	• 2004	• 2000
• 2007	• 2003	• 1999
• 2006	• 2002	• Anders, namelijk••••

MAAND

• Januari	• Mei	• September
• Februari	• Juni	• Oktober
• Maart	• Juli	• November
• April	• August	• December