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The Relationship Between Perceived Stress and Depressive Symptoms Among Dutch University Students

Moderated by Personality traits?

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Table of Contents

Abstract

Background. Perceived stress among students can be caused by different sources, such as academic factors, interpersonal stressors, time constraints or financial sources. The current study focused on the relationship between stress and depressive symptoms, and whether this relationship was moderated by the Big Five personality traits. **Methods.** In a cross-sectional design, 426 university students, including 320 women and 106 men, aged 18 or older (M = 21.62, SD = 2.85), completed the online questionnaires and were included in analyses. Beck's Depression Inventory-II, the Law Student Perceived Stress Scale and the Perceived Stress scale were used. **Results.** Results showed that according to the BDI-scores, 64.3% had minimal depression, and 15.5%, 13.4%, and 6.8% had mild, moderate and severe depression, respectively. Academic demands and study/life imbalance were found to be the strongest predictors of depressive symptoms. The unique variance explained by student stress was found to be 8.4% (p <.001). Moderation analysis showed that only conscientiousness moderated the relationship between academic demands and depressive symptoms: high conscientious students experience more depressive symptoms under high amounts stress from academic demands, than low conscientious students. **Conclusion.** These results show us that depressive symptoms are quite common among students, and especially the demanding academics and the difficulty to balance these responsibilities with other responsibilities are stressful for students, leading to depression more quickly. High conscientious students are more prone to depressive symptoms when perceiving high academic stress. These findings underline the importance of time- and stress management, and the possible role of universities regarding this.

1. Introduction

According to the Central Bureau of Statistics in the Netherlands, this year, 261.176 students attended university in the Netherlands, spread over nineteen different universities. Every year, this number grows. Between 2000 and 2010, the student population has grown with 46% (VSNU, 2012). Over the last years, the rules and requirements regarding studying are becoming stricter. For example, students are receiving a smaller scholarship. The governmental contribution per student has decreased with almost 5000 euro within ten years, from 19 thousand to 15 thousand, between 2000 and 2010 (VSNU, 2012). Thereby, since 2014, the scholarship is abolished for all Dutch students. Research found that higher student loans are associated with worse mental health (Walsemann, Gee and Gentile, 2015). This is alarming, given that it is expected that student loans in the Netherlands will increase even further in the future, because of the abolishment of the scholarships (OCW Studentenmonitor, 2015). Besides finances, the binding study advice (BSA) also puts extra pressure on students as well. Since three years, Dutch universities require from their students a certain amount of credits in order to be able to continue their study. This is an extra burden for students. About 40% of the students experience the study pressure to be high to very high, 50% experienced this pressure as normal, and 10% experienced the study pressure as being (too) low (OCW Studentenmonitor, 2015). This pressure comes from pressure to perform, meaning that students experience high expectations by themselves or others (ISO, 2015). This pressure can result in experiencing study stress, with symptoms as performance anxiety, worsened sleep patterns, deferral behavior or ruminating (Opinie UT, 2012). It is not surprising that students experience stress, when taking into account the binding study advice, the decreasing funding and the pressure to perform well.

It is also found in scientific literature that students experience stress. Stress is often described using the term perceived stress. Perceived stress is defined as the extent to which someone finds an event to be unpredictable, uncontrollable, or overloading (Cohen, 1983). In general, women seem to experience more stress than men do, which also applies to the student population (Bergin & Pakenham, 2014; Saleh, Camart, & Romo, 2017; Leppink et al., 2016). In research about stress among students, perceived stress was categorized in different ways. One study for example categorized stressors by subdividing them into stressors related to studying, examinations, transition to university, being in a different country, financial issues, students' responses to stress, and stress management (Robotham et al, 2008). Another study

used different themes, dividing stressors in the categories relationships, lack of resources, expectations, academics, environment, diversity, and transition (Hurst, Baranik & Daniel, 2013). Bergin and Pakenham (2014) brought it back to only four categories: academic demands, career pressure, social isolation, and study/life imbalance. Since all studies used a variety of categories, the results are difficult to compare.

Several studies attempted to examine the role of these stressors for students. Some studies found that academic-related stressors are most influential for students, meaning that this stressor was mentioned most as an extreme or moderate source of concern among the sample (Beiter et al., 2015). This stressor includes meeting grade requirements, taking tests, the amount of material to be studied and time-management. The second most important stressor in the study of Beiter and colleagues (2015) was pressure to succeed, followed by post-graduation plans and finances. This top four is directly related to college life. According to this study, that shows that for students, stressors linked to studying have a bigger impact on their stress levels than stressors related to relationships or health for example. This finding is underlined by different other studies. It was found that preparing for exams, having too much work, the desire to do well, and essays and projects are mentioned most as sources of stress (Abouserie, 1994). Another study also mentioned exams, classes, coursework and tests as important sources to elicit stress among students (Dusselier et al., 2010). According to Bergin and Pakenham (2014), who examined the sources of stress among law students, academic stress elicits the highest levels of stress as well. This type of stress includes the amount and difficulty of the material to be learned and having enough time to catch up with it. The above-mentioned studies seem to point out that academic-related factors, such as time-management, taking tests, having much work to do and difficult study material can be a major source of stress.

In contrast to those studies, some studies found interpersonal stressors instead of academic stressors to be most responsible for stress in students (Ross, Niebling and Heckert, 1999). Those stressors include changes in social activities or conflicts with roommates, parents or boyfriend/girlfriend. Second and third were intrapersonal stressors (changes in sleeping patterns and eating habits, gaining more responsibility, financial problems, etc.) and academic stressors (increased workload, future perspectives and graduation anticipation). In a qualitative research an overview of the most common stressors in college students was presented (Hurst, Baranik and Daniel, 2011). The theme ‘relationships’ turned out to be most mentioned, which includes stressors about family, romantic relationships, peers and faculty.

Students indicated that they were stressed about missing loved ones, worrying about their health, managing difficult relationships or feeling pressure from their family to succeed. This finding is more in line with the previous study (Ross, Niebling and Heckert, 1999). The second most important source of stress was found to be 'lack of resources', including lack of time, money, support, skills, technology and sleep. Students indicated having trouble with time-management, or work-life balance. Expectations about self or others was mentioned thirdly, since trying to meet those expectations could result in stress. Perfectionism was sometimes mentioned in this context. This stressor was followed by academics, specifically including general academics (coursework, or not further specified), exams, classes and studying. Environment, other (career, health), diversity and transitions (a new way of living, Levens, Elrahal, & Sagui, 2016) were also mentioned in this article.

Based on the literature, it is not easy to state which stressors are most common among students. Different types of stress were measured in different studies, and in addition, most studies used a study sample with medical, nursing or physical students. More important is to note that a lot of different types of stressors are present in students, which could have numerous negative consequences for students. For example, it is found that being stressed is associated with a lower Grade Point Average (Leppink et al., 2016; Struthers, Perry and Menec, 2000). Furthermore, perceived stress was related to poorer physical health (Leppink et al., 2016). This includes sickness, but also lesser activity and exercising. Students experiencing higher levels of stress were more involved in unhealthy behaviors, which means that they eat more junk-food, drink more soda, eat less fruit and vegetables (Hudd et al., 2000). Students reporting higher levels of perceived stress also reported poorer physical activity and health. Some studies also found that stressed students are more frequent alcohol users (Dusselier et al., 2010).

Not only physical health is at stake among stressed students, stress also influences mental health. Students with more severe stress seem to experience more depressive symptoms (Leppink et al., 2016). It is suggested by Leppink and colleagues (2016) that students are at higher risk for depression, because they are exposed to prolonged stress. This implication is supported by the research on stressors experienced by students. The stressors named above are stressors that could exists throughout the whole academic year, which would mean that it is possible that students experience enduring stress. This could explain why students are indicative of higher levels of depression (Schofield et al., 2016). Depression among students appears to have a high prevalence. Prevalence rates of 30.6% among students were found,

based on self-report measures in 24 studies examining depression among university students in different countries (Ibrahim et al., 2012). There has not been much research in comparing students with their peers on this subject. Some studies conclude that students are at higher risk of depression than age-matched non-students (Royal College of Psychiatrists London, 2011), whereas other studies found no differences between those two groups (Blanco et al., 2008).

Positive associations has been found between perceived stress and levels of depression (Leppink et al., 2016; Saleh, Camart, & Romo, 2017). Reasonably, students differ in to what extent they are prone to develop depressive symptoms. For example, there seems to be an increase in depressive symptoms along study years (Siminc-Vukomanovic et al., 2016) and depression scores were almost twice at high at the end of a three-year study (Bewick et al., 2014). This could mean that students studying longer are at higher risk for depression (Simic-Vukomanovic et al., 2016). In addition, students with financial struggles reported more depressive symptoms (Eisenberg et al., 2007). Furthermore, demographic factors say something about the susceptibility for depression. Being a woman, having a younger age or a worse social-economic position, but also cognitive factors, such as little self-esteem or negative attributional styles could contribute to vulnerability (Hammen, 2007).

Developing depressive symptoms seems to be dependent of one's vulnerability. Dealing with stress ineffectively, seems to be a strong predictor of depression in students (Felsten, 2004). This finding is underlined by different studies (Avison & McAlpine, 1992; Mikolajczuk et al., 2008). This fits well with existing theories about stress and mental health. According to the vulnerability-stress model (or diathesis-stress model), a predisposition for a certain disorder exists within the individual, meaning that some individuals are more vulnerable to that disorder than others. This vulnerability could lead to that disorder in interaction with environmental factors, such as perceived stress (Zublin & Spring, 1977). This model was originally developed for schizophrenia, but nowadays applied to a wide range of psychopathological disorders, including depression. In the vulnerability-stress model, it is hypothesized that the appraisal of the stressful event define if and to what extent an individual experiences depressive symptoms (Hammen, 2007). The nature and intensity of the stressor is relatively insignificant, since it is determined by the amount of meaning one attaches to the stressor, whether or not depressive symptoms are triggered. Not only major life event stress, but also accumulated minor stressors or 'hassles', can lead to depression. Moreover, daily hassles seem to have greater impact on individuals than major life events. Most often,

students experience more minor stressors than major stressors, so according to this theory, they could be more predisposed for psychopathology (Kanner et al., 1981).

Another factor making someone more vulnerable for depression is personality. Personality is most often described based on the Big Five Model (McCrae & Costa, 1987), which includes five domains: neuroticism, extraversion, agreeableness, conscientiousness and openness to experience. Neurotic individuals can be characterized as worrying, nervous, emotional unstable, insecure, impatient and vulnerable. High neurotic individuals tend to be less agreeable (McCrae & Costa, 1987). Those who score high on agreeableness, can be described as helpful, sympathetic, trusting, forgiving, open-minded and flexible. Extraverted people are often sociable, friendly, spontaneous, talkative and passionate. Conscientious people are careful, reliable, well organized, disciplined and punctual, and people who are open to experience are original, imaginative, curious, daring and independent. Every individual has its own, unique personality, so they could differ in to what extent they are vulnerable to depression. There has been some research to this subject. Neuroticism seems to be strongly related to mood disorders (Kendler et al., 2006). Neuroticism predicts first onset of depression, but also later depressive episodes. A prospective study found that neuroticism increased the risk of becoming depressed threefold (Boyce et al., 1991). The proposed mechanism for this relationship is mainly cognitive (Martin, 1984). Depressed individuals display similar habits, usually distorted, in cognitive processing with neurotic individuals. Depressed people could suffer from cognitive biases about themselves, the world and the future. They see themselves as unreliable, the world as overwhelming and the future as pointless (Hammen, 2007). Besides, negative information is recalled faster and more often than positive information. Same results were found for high neurotic individuals (Chan et al., 2007), where biases such as weakened positive processing were present. This finding indicates why neurotic individuals are more prone to depression.

Low extraversion was positively correlated to depressive symptoms too (Kim et al., 2016). High extraversion is, in contrast to neuroticism, associated with positive emotions and amiability, which is known to reduce depressive feelings. Low levels of extraversion could mean low levels of positive affect, which is a characteristic aspect of depression (Spinhoven et al., 2014). Those studies confirm the idea that some people are more vulnerable to depression than others (Dunkley, Blankstein and Flett, 1997), which fits well in the vulnerability-stress model.

Personality does not only have a relationship with depression, but with stress too. Neuroticism was found to correlate positively with perceived stress. Extraversion, agreeableness and conscientiousness were negatively correlated. For openness to experiences, no significant results were found (Ebstrup et al., 2011; Saklofske et al., 2012). Various explanations for these differences in handling stress were found. Less emotionally stable individuals, a term for describing neurotics, tended to feel overwhelmed by stress, and were less able to engage in health practices (Korotkov, 2008). Extraverted people are often engaged in problem-focused coping and less in emotion-focused coping, which is known to be less effective. Being high conscientious was found to be associated with an active coping style. Conscientious people see themselves as capable enough to meet stressful situations (Penley & Tomaka, 2002). Besides, they tend to be engaged in more health behaviors for example (Korotkov, 2008). For agreeableness, fewer results were found, but it is proposed that agreeable people use problem solving coping styles, and seek social support when in stressful situations (Connor-Smith & Flachsbart, 2007).

Given that particular personality traits affect the way individuals evaluate stress, and may have an effect on depression too, personality is hypothesized to moderate the relationship between those two. This possible moderation has been examined before, and it was found that students with high levels of extraversion and conscientiousness, and low levels of neuroticism, had a higher resistance to stress, which meant that those students were less prone to stress-related conditions, such as depression (Bunevicius, Katkute & Bunevicius, 2008). This study proposed that extraverted students are often exposed to higher levels of stress, but they seem to have effective coping mechanisms, so stress leads less often to depression. It appears that neuroticism is the only personality trait, which makes someone more vulnerable to depression.

To summarize, the relationship between perceived stress and depression exists among students, has become clear in several studies (Avison & McAlpine, 1992; Mikolajczuk et al., 2008). This stress can derive from a variety of sources, including academics, finances, interpersonal problems and transition to college life (Beiter et al., 2015; Ross, Niebling & Heckert 1999). High levels of neuroticism and low levels of extraversion and conscientiousness seem to make someone more vulnerable for depression and thus moderate this relationship, but there has not been much research on this subject. The first aim of the current study was to examine this relationship among Dutch students attending university and to examine which particular stressor predicts depressive symptoms the most. The first

hypothesis in this study was that students who experience more perceived student stress would show higher levels of depressive symptoms. Here it was expected that the stressors academic demands and career pressure have the highest association with depressive symptoms. The second aim was to examine the moderating role of personality within this relationship. It was hypothesized that particular personality traits will moderate the relationship between student perceived stress and depressive symptoms. The expectation was that neuroticism strengthens the relationship between those two variables, whereas agreeableness, extraversion and conscientiousness would be serving as protective factors and therefore diminish correlations between perceived stress and depressive symptoms. It is important to know which students are most vulnerable for developing a depression under stressful circumstances. Students who are at risk, can be offered help in earlier stages, when prevention is still possible. Examining the prevalence and causes of depressive symptoms in students, could give insight in the problems students have to deal with, and help universities to offer support programs or other forms of help. Lots of research in this area has been done with medical, nursing or dental students, but this study took into account a variety of studies, to give the best overview possible in the student population as a whole.

2. Methods

2.1 Design and participants

This study used a cross-sectional design in which perceived stress, perceived study stress, depressive symptoms and personality traits were measured in a Dutch student sample. Inclusion criteria were: attending university, being older than 18 years old and being able to understand and Dutch perfectly. Participation was deliberate. International students and part-time students were excluded from the sample, because they might have different stress sources in comparison with full-time students. Participants were recruited via personal network, University Facebook pages, Sona system (Leiden University Research Participation website), and by approaching students in buildings of Leiden University. Students from all studies were allowed to participate.

2.2 Measures

2.2.1 Perceived stress

Cohen's Perceived Stress Scale, Dutch version

The Perceived Stress Scale (PSS; Cohen, 1983) examines the perception of stress, to what degree someone perceives his or her life as unpredictable, uncontrollable and overloaded (Cohen, 1983). This scale consists of 10 items and each questions had to be answered on a 5-points Likert scale, ranging from "0 = never", to "4 = very often". The questions regard feelings and cognitions during the last month, for example "In the last month, how often have you felt that you were unable to control the important things in your life?". The English version of the PSS has a Chronbach's alpha of about .85, in a college-student sample, but there is no validated measure of the Dutch version of the scale.

2.2.2 Student Perceived Stress

Law Student Perceived Stress Scale

The Law Student Perceived Stress Scale (LSPSS; Bergin & Pakenham, 2014) measures academic demands, career pressure, social isolation and study/life imbalance. This scale was translated into Dutch and adjusted to all kinds of students, since it was designed for law students only. The procedure started with two independent translators, translating the questions to Dutch, where after they discussed this with a third, bilingual person. Ambiguity was removed, and the best translation was chosen. A fourth, independent translator translated the Dutch version back to English. At last, all involved checked whether the translation was sufficient, and the questionnaire was approved for the current sample. The questionnaire consists of 16 items. The instructions were as follows: 'The next 16 items are possible sources of stress, related to studying at a university. For each item, please indicate how stressful you find the item, if at all'. No particular time frame was given. Participants answered on a 5-point Likert scale, ranging from "1 = not at all stressful", to "5 = very stressful". This is not a validated questionnaire, but a factor analysis showed sufficient results (Bergin & Pakenham, 2014). Internal reliability was also found to be high (.86) in the law student population. Reliability analysis in this study also found a Chronbach's Alpha of .86.

2.2.3 Personality traits

Big Five Inventory, Dutch version (BFI)

The Big Five Inventory (BFI; Denissen et al., 2008) measures the Big Five factor structure of personality in individuals. In this study, we will use the Dutch version of the 44-item scale, which shows an internal consistency (measured by Cronbach's alpha) of 0.73 to 0.86 (Denissen et al., 2008). For each domain of the five factor model, there are eight to ten questions, each with a five points Likert scale "1 = strongly disagree", to "5 = agree strongly". For every question, the participants had to fill in, to what degree each statement applies to themselves. Examples of statements are 'worries a lot', 'is talkative', or 'is a reliable worker'.

2.2.4 Symptoms of depression

Beck's Depression Inventory II, Dutch version, Revised

The Beck's Depression Inventory II (BDI-II-R; Roelofs et al., 2013) consists of 21 items, and it measures the severity of depressive symptoms. Each item consists of four propositions, from which respondents had to choose which one fits best. The instruction participant received, was "this questionnaire measures symptoms of depression" . The list exists of 21 sets with four statements each. Read every set carefully. Choose within each set the statement which describes best how you felt last week, including today'. For example, they needed to choose between "(0) I do not feel sad, (1) I feel sad, (2) I am sad all the time and I can't snap out of it, or (3) I am so sad or unhappy that I can't stand it". The scale measures cognitive, affective, and somatic symptoms. The BDI indicates whether someone has a minimal (0-13), mild (14-19), moderate (20-28) or severe (29-63) depression. It is not a diagnostic instrument, but can only be used to assess depressive symptoms. The Dutch version of the questionnaire has a high internal consistency, with an alpha of .95 (Roelofs et al., 2013).

2.3 Procedure

Ethical approval was obtained through the ethical procedure at the Committee Ethics Psychology, and data was collected in Qualtrics (Qualtrics, 2017). The questionnaire consisted of around 110 questions. It started with an information letter informing participants about the goal, the content and the structure of the questionnaire. After that, they were asked to tick a box to sign consent. At first, demographic questions were asked, followed by the Perceived Stress Scale, the adjusted version of the Law Student Perceived Stress Scale, the Big five Inventory, The Utrechtse copinglijst, and finally, the Beck's Depression Inventory. It

took approximately twenty minutes to complete the whole questionnaire. At the end, participants were debriefed and could choose whether they wanted to leave their e-mail address to get a 1:25 chance to win one of the bol.com vouchers, worth 15 euros, or if they wanted to receive participants credits. First year students could receive one participant credit.

2.4 Statistical Analysis

All data was analyzed using SPSS statistics 23 (IBM Corp, 2014). Study categories were made. Those categories included mathematics and informatics, geoscience and nature, health and environmental studies, engineering and technology, medical and biomedical sciences, behavioral sciences and education, humanities, governance and global affairs, economics and business affairs, and law and criminology. Split half-reliability and Chronbach's alpha were calculated, to examine the reliability of the LSPSS in the current sample. An exploratory factor analysis was used to examine the structure of the LSPSS, and to examine whether it was in line with the findings of Bergin and Pakenham (2014). Principal axis factoring with oblique rotation was used, and the number factors was determined by eigenvalues greater than 1. Hierarchical regression analyses were executed to analyze the relationship between the independent variable LSPSS score, the dependent variable BDI-II score and the moderating personality traits. Assumptions were checked using scatter doth graphs. Separate analyses were executed for each LSPSS scale. The interaction effects indicated whether the personality traits neuroticism, conscientiousness, agreeableness and extraversion moderate the proposed relationship between perceived stress and depressive symptoms, with covariates taken into account. For personality, the scales agreeableness, conscientiousness, extraversion, neuroticism and openness to experience were computed from the 44 items questionnaire. The items were scaled according to the factor loadings of the Dutch translation of the Big Five Inventory (Denissen et al., 2008). The significant limit was set at $p < .05$, for all statistical tests. 3. Results

3.1 Demographics

The sample consisted of 426 participants after excluding participants who did not meet the criteria and/or dropped out, see Figure 1. In this sample, 320 were female (75.1%), and 106 were male (24.9%). The mean age was 21.62 (SD = 2.85), ranging from 18 to 43 years old. More demographic characteristics can be found in Table 1.

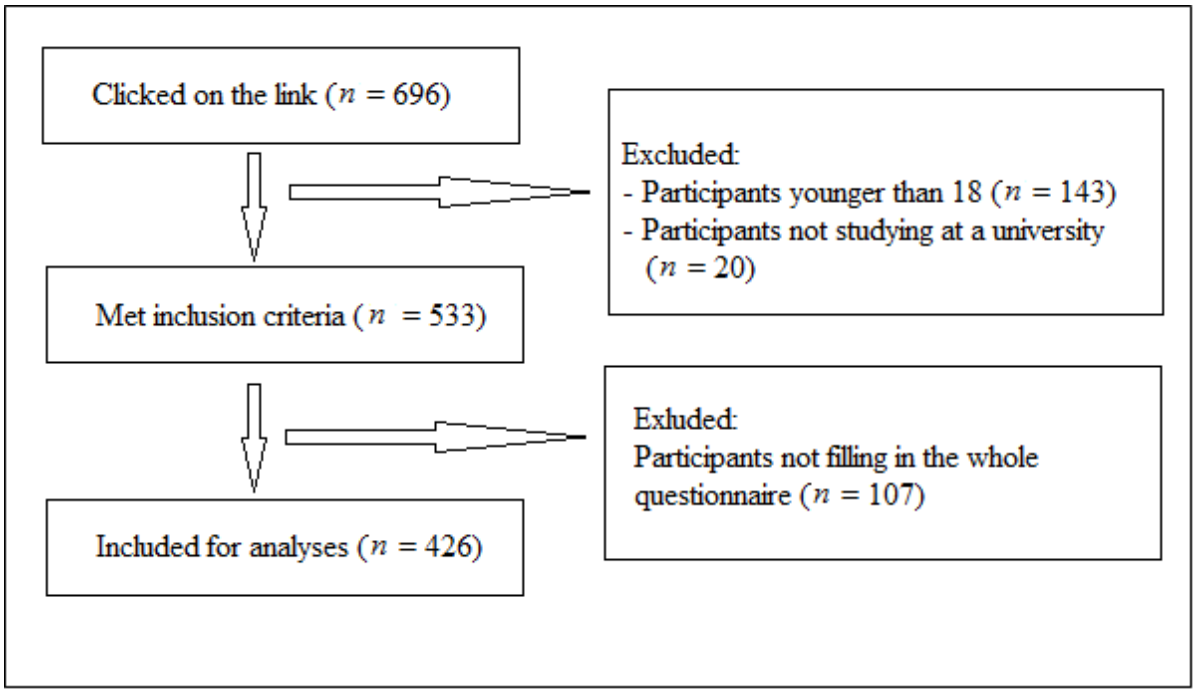

Figure 1. Participant flow

3.2 Factor Analysis

Internal reliability for the LSPSS was r = .87, which was in line with the results of Bergin and Pakenham (2014). Before executing a factor analysis, the assumptions were tested. Firstly, most of the items had a correlation of at least .3 with at least one or more other items. Secondly, the Kaiser-Meyer-Olkin measure of sampling adequacy was .833, where the recommended value is .6, so this is sufficient. Bartlett's test of sphericity was found to be significant (χ^2 (120) = 2612.48, p = .000). Finally, communalities were all above .45 (see Table 2), confirming that all items had some shared variance with other items.

A principle component analysis was executed on the sixteen items of the LSPSS, using oblique rotation and based on eigenvalues > 1 and scree plot criteria. There were no items which did not load .40 or higher on any factor, so no items were excluded. Here, five components had eigenvalues > 1 and met scree plot criteria. The first factor explained 33% of the variance, the second factor 11%, and the third, fourth and fifth factors explained 10%, 7% and 7% of the variance respectively. Together, those five factors explained 68% of the variance. Table 2 displays the factor loadings and communalities for each item.

Table 1. Demographic characteristics of the sample (N = 426)

Variable	Male (N = 106)	Female (N = 320)	Bachelor (N = 290)	Master (N = 136)	Total (N = 426)
Age M (SD)	21.8 (3.6)	21.6 (2.5)	20.6 (2.5)	23.7 (2.3)	21.62 (2.85)
Hours working M (SD)	2.68 (1.9)	2.59 (1.9)	2.51 (1.78)	2.83 (2.20)	2.62 (1.93)
Living Situation N (%)					
Together with students	43 (40.6)	178 (55.6)	159 (54.8)	62 (45.6)	221 (51.9)
With partner	7 (6.6)	30 (9.4)	12 (4.1)	25 (18.4)	37 (8.7)
With parents	36 (34.0)	55 (17.2)	74 (25.5)	17 (12.5)	91 (21.4)
Alone	19 (17.9)	52 (16.3)	42 (14.5)	29 (21.3)	71 (16.7)
Other	1 (.9)	5 (1.6)	3 (1.0)	3 (2.2)	6 (1.4)
Study phase N (%)					
Bachelor	76 (71.7)	214 (66.9)			290 (68.1)
Master	30 (28.3)	106 (33.1)			136 (31.9)
How long studying M (SD)	3.09 (2.07)	3.23 (1.82)	2.3 (1.2)	5.2 (1.6)	3.20 (1.89)
Study Category N (%)					
Mathematics and Informatics	23 (21.7)	17 (5.3)	40 (13.8)	0 (0.0)	40 (9.4)
Geoscience and Nature	1 (.9)	24 (7.5)	20 (7.9)	5 (3.7)	25 (5.9)
Health and Environmental Studies	8 (7.5)	31 (9.7)	28 (9.7)	11 (8.1)	39 (9.2)
Engineering and Technology	15 (14.2)	17 (5.3)	20 (6.9)	12 (8.8)	32 (7.5)
Medical and Biomedical Sciences	5 (4.7)	47 (14.7)	29 (10.0)	23 (6.9)	52 (12.2)
Behavioral Sciences and Education	11 (10.4)	64 (20.0)	53 (18.3)	22 (16.2)	75 (17.6)
Humanities	8 (7.5)	35 (10.9)	30 (10.3)	13 (9.6)	43 (10.1)
Governance and Global Affairs	8 (7.5)	16 (5.9)	17 (6.9)	10 (7.4)	27 (6.3)
Economics and Business Affairs	15 (14.2)	20 (9.1)	33 (11.4)	11 (8.1)	44 (10.3)
Law and Criminology	12 (11.3)	37 (11.6)	20 (6.9)	29 (21.3)	49 (11.5)

Table 2. Pattern matrix of the 16-item exploratory factor analysis for the LSPSS (N = 426)

	Loadings					
LSPSS items	Factor 1: Study/Life Imbalance	Factor 2: Academic Demands	Factor 3: Career Pressure	Factor 4: Pressure to Perform	Factor 5: Social Isolation	Communalities
2. The balance between study and other responsibilities	**.729**	-.055	.168	.018	-.169	.590
5. Missing personal or social activities due to study requirements	**.774**	-.014	-.182	.044	.143	.665
8. Maintaining personal relationships outside of the university	**.673**	.064	-.104	.076	.320	.659
12. Have little free time to do things I like	**.649**	-.063	.123	.137	.022	.576
1. Exams that are worth a lot of credits	-.112	**-.759**	.024	.154	-.048	.616
3. The amount of time needed to complete everything that is expected of me	.384	**-.578**	.161	-.143	-.061	.611
4. Fear of falling behind in study work and not being able to catch up	.127	**-.530**	-.034	.045	.263	.498
6. The amount of information that needs to be learned	.096	**-.788**	.116	-.069	-.021	.562
9. The difficulty level of the study load	-.018	**-.758**	-.078	-.032	.049	.562
11. Finding a full-time job after my study	-.031	.042	**.910**	.071	.087	.868
16. Worries about my future career	-.006	-.057	**.877**	.054	.128	.868
7. Receiving low grades	-.140	-.519	-.092	**.531**	.084	.669
13. The mutual competition to get good grades	.108	.151	.124	**.837**	-.035	.738
14. The pressure to do well in my study	.140	-.142	.062	**.744**	.014	.734
15. The lack of social connections with other students	-.065	-.017	.140	.045	**.861**	.789
10. Feeling socially isolated whilst being surrounded by other students	.148	-.038	.092	-.071	**.786**	.742

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

Table 3. Psychometric data for the LSPSS: bivariate correlations and internal consistency

	1	2	3	4	5
1. Study-Life Imbalance	(.766)				
2. Academic Demands	.441**	(.788)			
3. Career Pressure	.316**	.263**	(.882)		
4. Pressure to Perform	.353**	.474**	.370**	(.703)	
5. Social Isolation	.467**	.354**	.343**	.311**	(.745)

** $p < .001$ Chronbach's alpha coefficients are in parentheses along the main diagonal.

Bergin and Pakenham (2014) found only four factors: academic demands, career pressure, social isolation, and study/life imbalance. In this study, we found five factors. Career pressure now only contains two questions, referring to employment and career. The other, new factor, refers to pressure and competition. Given that the factor 'career pressure' now only contains questions about career, the new factor will be given the name 'pressure to perform'. In this sample, it does not seem possible to work with the four factors from Bergin and Pakenham (2014). When only including the four items referring to career pressure in the main questionnaire, also two factors were found. Also, when giving four fixed numbers to distract, those items do not load on the same factor. Therefore, I chose to work with five factors, instead of four, with the new variable 'Pressure to Perform', containing the items 'Getting good grades', 'Pressure to do well on school', and 'competition to achieve good grades'. The item "Receiving low grades" loaded on two factors. It had a higher loading on pressure to perform, so it was chosen to accommodate the item in that scale. Executing the factor analysis on the original data set ($N = 696$), also shows five factors and communalities al above .45. For each subscale, good reliability was found, see Table 3. Convergent validity was found in the correlations between the LSPSS and the PSS, which were all moderate (Table 4).

An independent sample t-test showed that on all scales of the LSPSS, except Social Isolation, differences in gender were found. Women report more stress on the scales academic demands ($t(424) = -3.281$, $p = .001$), study/life imbalance ($t(424) = -2.127$, $p = .034$), career pressure ($t(424) = -4.125$, $p < .001$), and pressure to perform ($t(424) = -2.281$, $p = .023$). For study phase, significant differences were found too. Bachelor students reported greater stress by academic demands than master students ($t(424) = 3.062$, $p = .002$), but master students reported more stress on the scale career pressure ($t(424) = -5.329$, $p < .001$) and pressure to

perform ($t(424) = -2.275$, $p = .024$). Moreover, Pearson correlation showed that career pressure was significantly related to age ($r = .203$, $p < .001$), so older participants reported stress by career pressure more frequently than younger participants. Table 4 shows correlations of the LSPSS with the PSS and the BDI. All subscales of the LSPSS showed significant correlations with PSS and BDI scores.

Table 4. Means and standard deviations of the LSPSS subscales, and correlations with the PSS and BDI[a]

			PSS	BDI
	M	*SD*	*r*	*r* [b]
Study-Life Imbalance	3.073	0.818	.437**	.423**
Academic Demands	3.412	0.784	.341**	.393**
Career Pressure	3.092	1.279	.187**	.271**
Pressure to Perform	3.288	0.898	.231**	.292**
Social Isolation	2.551	1.022	.264**	.376**
LSPSS total	3.156	0.644	.428**	.500**

**$p < .001$. [a] PSS = Perceived Stress Scale; BDI = Beck's Depression Inventory. [b] Spearman correlation

Analysis on BDI scores revealed that 64.3% had minimal depression, and 15.5%, 13.4%, and 6.8% had mild, moderate and severe depression respectively. It was found that BDI scores were not normally distributed (skewness = 1.061, SE = .118), a histogram shows that the scores are skewed right. Skewness values around 0 indicate that scores are normally distributed (Field, 2013) As a result, the data were log transformed, which improved homoscedasticity and normal distribution (skewness = -0.768, SE = .118). An independent t-test with the transformed BDI scores showed that there was no difference in BDI scores for gender ($t(424) = -1.576$, $p = .116$), and neither for study phase ($t(424) = 0.848$, $p = .397$). There were no notable differences in depression scores among study categories, and no significant correlations with years studying.

3.3 Student stress and depression

For testing the hypothesis that higher levels of student stress, predicts higher levels of depression, several assumptions were checked. The first one was that all variables must be interval or ratio, which was true in our sample. The second assumption required that there must be a theoretical, causal relation between the two variables, which was found in the

literature on this topic. Third, the model must be linear. After computing a scatter dot graph, a linear function between LSPSS and BDI scores was shown, so this assumption was also met. Fourth, the model must be homoscedastic. Scatter dot, however, showed a relatively heteroscedastic plot. It could not be stated that the model is homoscedastic. As described before, the BDI scores were not normally distributed. The log transformation of the scores showed a more normal distribution and was more homoscedastic. Regression analysis on this data for the PSS and the subscales of the LSPSS was executed, using forced entry method. In Table 5, the outcomes of the regression analysis are shown. Only academic demands, study/life imbalance and social isolation were significant predictors of higher scores on the BDI. The variance explained by this model, was found to be 23.5%, being a medium effect (Field, 2013).

Table 5. Regression analysis with dependent variable BDI scores (log transformed)

Predictor	β	SE	*t*
Constant	.111	.083	1.340
Academic Demands	.099	.025	3.948**
Study/Life Imbalance	.096	.024	3.998**
Career Pressure	.026	.014	1.836
Pressure to Perform	.011	.022	0.495
Social Isolation	.049	.019	2.627*

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

When the Perceived Stress scale was entered into this model, only academic demands and study/life imbalance were significant predictors. The new model explained 34.4% of the variance of depression scores. This indicated that some of the variance explained by academic stress and study/life imbalance, overlapped with perceived stress. The unique variance explained by student stress only was 8.4% ($F(5,419) = 10.749$, $p < .001$). Given the significance of this finding, the first hypothesis was accepted.

3.4 Moderation analysis

The second hypothesis expected that the Big Five personality traits agreeableness, conscientiousness, extraversion and neuroticism moderated the relationship between student stress and depressive symptoms. In Table 6, the means and standard deviations for those personality traits can be found. Women scored significantly higher on the scales neuroticism ($t(424) = -5.640$, $p < .001$), conscientiousness ($t(424) = -.2.553$, $p = .001$) and agreeableness

($t(424) = -2.977$, $p = .003$). For extraversion and openness to experience, no gender differences were found.

Table 6. Means, standard deviations and differences in gender for personality traits

Personality traits M (SD)	Total	Man	Women	*t*
Agreeableness	32.35 (4.75)	31.17 (4.39)	32.74 (4.81)	-2.977*
Conscientiousness	30.72 (5.93)	29.45 (5.48)	31.14 (6.02)	-2.553*
Extraversion	25.83 (5.1)	25.96 (5.31)	25.78 (5.72)	.287
Neuroticism	26.27 (6.20)	23.43 (6.18)	27.22 (5.91)	-5.640**
Openness to Experience	34.71 (5.72)	34.97 (5.87)	34.63 (5.67)	.535

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

A significant positive correlation with depressive symptoms was found for neuroticism ($r = .617$, $p < .001$). Significant negative correlations with depressive symptoms were found for agreeableness ($r = -.172$, $p < .001$), conscientiousness ($r = -.151$, $p = .002$) and extraversion ($r = -.244$, $p < .001$). No significant correlation was found for openness to experience and depressive symptoms. The highest mutual correlation was found for extraversion and neuroticism, with values $r = -.309$, and $p < .001$. This negative correlation indicated that students who scored high on extraversion, in most cases, did not score high on neuroticism. And vice versa, neurotic students are not likely to report extraversion. No other notable combinations were found between the subscales of the BFI.

Academic demands and study/life imbalance were the only significant predictors of depressive symptoms. The unique variance explained by those factors was 8.4% ($F(5,419) = 10.749$, $p < .001$). Therefore, they were included in the analysis as independent variables. Firstly, all independent variables were centered. Secondly, interaction variables were computed. For there were several differences found between men and women and master and bachelor students on personality and perceived study stress, gender and study phase were taken into the analysis as covariates. In Table 7, the outcomes of the hierarchical regression analysis with the moderator conscientiousness can be observed. Conscientiousness negatively predicted depressive symptoms, meaning that high scores on the conscientiousness scale represent lower scores on the depressive symptoms scale. In contrast, the interaction effect with academic demands was positive. Students who scored high on conscientiousness, scored higher on depressive symptoms when scores on the academic demands scale were high. Students with lower scores on conscientiousness, had lower scores on the depressive

symptoms scale when under high amount of academic demands in comparison with the high conscientious students. Thus, it positively moderated the relationship between academic demands and BDI scores. This was the only significant moderator. Figure 2 shows the interactions graph for this finding. For neuroticism, agreeableness and extraversion, hierarchical regression analyses were executed too. Those results can be found in Table 8,9 and 10. None of these traits moderated the relationship with academic demands or study/life imbalance. Therefore, the second hypothesis can only be partly accepted.

Table 7. Hierarchical regression with moderator conscientiousness

	Academic demands				Study/Life imbalance			
	B	SE	β	R^2 Change	*B*	SE	β	R^2 Change
Step 1								
LSPSS subscale	.182	.022	.378**	.143**	.183	.021	.397**	.157**
Step 2								
Student stress subscale	.172	.023	.357**	.013	.178	.021	.385**	.027*
Conscientiousness	-.007	.003	-.114*		-.009	.003	-.145*	
Gender	.029	.040	.033		.050	.039	.057	
Study Phase	.019	.037	.023		-.045	.036	-.056	
Step 3								
Student stress subscale	.167	.023	.348**	.009*	.178	.021	.385**	.000
Conscientiousness	-.008	.003	-.123*		-.009	.003	-.146*	
Gender	.031	.040	.036		.050	.039	.057	
Study Phase	.020	.037	.025		-.046	.036	-.056	
Student stress subscale x Conscientiousness	.007	.003	.096*		.001	.003	.007	

* p <.05, ** p < .001 Dependent variable: BDI score.

Table 8. Hierarchical regression analyses with moderator neuroticism

	Academic demands				Study/Life imbalance			
	B	SE	β	R^2 Change	*B*	SE	β	R^2 Change
Step 1								
LSPSS stress subscale	.182	.022	.378**	.143**	.183	.021	.397**	.157**
Step 2								
Student stress subscale	.060	.021	.125*	.250**	.085	.019	.185**	.252**
Neuroticism	.036	.003	.585**		.034	.003	.566**	
Gender	-.088	.035	-.101*		-.082	.034	-.094*	
Study Phase	.053	.031	.065		.025	.031	.030	
Step 3								
Student stress subscale	.062	.021	.128*	.003	.085	.019	.185**	.000
Neuroticism	.036	.003	.592**		.034	.003	.565**	
Gender	-.086	.035	-.099*		-.082	.034	-.094*	
Study Phase	.054	.031	.067		.024	.031	.030	
Student stress subscale x neuroticism	.003	.003	.051		.000	.003	-.004	

* p <.05, ** p < .001 Dependent variable: BDI score.

Table 9 Hierarchical regression analyses with moderator agreeableness

	Academic demands				Study/Life imbalance			
	B	SE	β	R^2 Change	*B*	SE	β	R^2 Change
Step 1								
LSPSS stress subscale	.182	.022	.378**	.143**	.183	.021	.397**	.157**
Step 2								
Student stress subscale	.179	.022	.372**	.027*	.182	.020	.394**	.034*
Agreeableness	-.013	.004	-.164**		-.013	.004	-.168**	
Gender	.036	.040	.041		.055	.039	.063	
Study Phase	.005	.036	.007		-.064	.036	-.079	
Step 3								
Student stress subscale	.179	.022	.372**	.000	.182	.020	.394**	.000
Agreeableness	-.013	.004	-.164**		-.013	.004	-.169**	
Gender	.036	.040	.041		.056	.039	.064	
Study Phase	.006	.037	.007		-.063	.036	-.078	
Student stress subscale x Agreeableness	.001	.004	.007		.001	.004	.009	

* p <.05, ** p < .001 Dependent variable: BDI score.

Table 10 Hierarchical regression analyses with moderator extraversion

	Academic demands				Study/Life imbalance			
	B	SE	β	R^2 Change	*B*	SE	β	R^2 Change
Step 1								
LSPSS stress subscale	.182	.022	.378**	.143**	.183	.021	.397**	.157**
Step 2								
Student stress subscale	.175	.022	.364**	.051**	.180	.020	.391**	.061**
Extraversion	-.015	.003	-.226**		-.016	.003	-.236**	
Gender	.013	.039	.014		.031	.038	.035	
Study Phase	.028	.036	.035		-.039	.035	-.048	
Step 3								
Student stress subscale	.175	.022	.364**	.000	.182	.020	.394**	.003
Extraversion	-.015	.003	-.226**		-.016	.003	-.234**	
Gender	.013	.039	.014		.031	.038	.035	
Study Phase	.028	.036	.035		-.044	.035	-.054	
Student stress subscale x Extraversion	.000	.004	.003		-.005	.004	-.059	

* p <.05, ** p < .001 Dependent variable: BDI score.

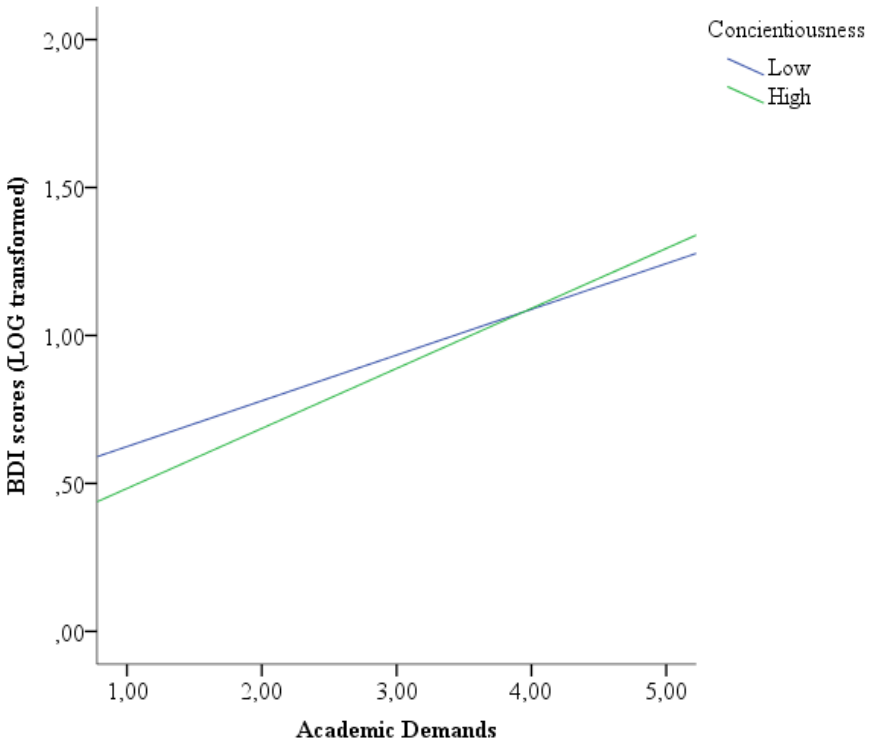

Figure 2. Interaction graph of academic demands and conscientiousness

4. Discussion

The purpose of this study was to examine the relationship between study stress and depressive symptoms, and the possible moderating effect of several of the Big Five personality traits. The first hypothesis, which stated that study stress was of predicting value for depressive symptoms, was supported. The second hypothesis predicted moderating effects of agreeableness, conscientiousness, neuroticism and extraversion. This hypothesis was only partly accepted, since only conscientiousness appeared to have a moderating effect on the relationship between academic demands and depressive symptoms.

As described in the introduction, it appears that there is a considerable pressure on students: the governmental contribution diminished over the last years, and a binding study advice was introduced (OCW Studentenmonitor, 2015; VSNU, 2012). Subsequently, students could experience stress. The current study confirmed the presence of perceived stress among students. Academic demands, study/life imbalance, career pressure, pressure to perform and social isolation were all associated with perceived stress, meaning that those factors are stressful for students. Academic demands and study/life imbalance were most strongly associated to perceived stress, meaning those are most stressful. A possible consequence of this perceived study stress is experiencing depressive symptoms (Leppink et al., 2016), which is confirmed in the current study. Academic demands and study/life imbalance were the strongest predictors of depression scores. Previous research found a negative association between time management and perceived academic stress (Misra and McKean, 2000), which could partly explain the finding that those scales are the strongest predictors. Students who perceive their time as uncontrollable, or unmanageable, experience more stress and therefore more depressive symptoms (Cohen, 1983). Hence, both academic demands and balancing studying and life require time-management, which could lead to more stress and therefore possibly more depressive symptoms. Another possible explanation is the suggestion that one is at risk for depression when exposed to prolonged stress (Schofield et al., 2016). Both academic demands and study/life imbalance contain items which could be stressful through the whole academic year. In contrast, social connectedness and career pressure are possibly stressors which play part at particular points in an academic study, meaning that it does not fall in the category prolonged stress. Additionally, another possible explanation for the finding that academic demands and study/life imbalance are the strongest predictors, is that depressive symptoms could emerge when an individual experiences the stressor as meaningful

and important (Hammen, 2007). This could explain why academic demands and study/life imbalance are associated with depression. For students, their study is one of the most important responsibilities they have to deal with at that moment. Getting good grades, keeping up with course work and having enough time to study for tests, are of great importance for students. Perceiving stress in those areas, when appraising it as highly meaningful, could lead to depressive symptoms more rapidly.

In the current study, 35% had at least minimal depression, and only 20.2% had moderate or severe depression, which was in line with previous research (Ibrahim et al., 2013; Sarokhani et al., 2013; Schofield et al., 2016). Most studies found prevalence rates between 30% and 40%. There appear to be no differences between men and women for depression scores. This is unusual, for depression is usually more common in women than in men (Ayoso-Mateos, 2001). Likewise, the majority of the studies in the student population to depression, indicate higher prevalence rates for female students, in comparison to male students (Ibrahim et al., 2013). A minority of the studies found no differences in gender in this particular population, where it was argued that this gender difference does not exists in student populations (Eisenberg et al., 2007). The current study agrees with the latter finding, however more research is needed to examine possible differences in gender in depressive symptoms among students.

The relationship between stress and depression could possibly be moderated by personality traits. The current study found that high conscientious students were more prone to experience depressive symptoms under high levels of stress from academic demands, than low conscientious students. This seems to be in contrast with earlier research, which found that students with higher levels of conscientiousness, were more resistant to stress and therefore less prone to depression (Bunevicius, Katkute and Bunevicius, 2008). However, in this study, depressive symptoms and personality traits were measured otherwise which makes it difficult to compare. It has been found that conscientious individuals often have active coping abilities, and see themselves as competent to encounter situational demands (Penley and Tomaka, 2002). In the current study, conscientious students handled academic demands not as good as less conscientious students. This finding could give us more insight in how conscientious students react on stressful situations, however more research is needed to confirm this.

Neuroticism did not influence the relationship between student stress and depressive symptoms. Neuroticism itself is a very strong predictor of both perceived study stress and depression scores. The high correlations indicate high overlap between those variables. It appeared that the relationship between perceived stress, depressive symptoms and neuroticism is a difficult one. According to the questionnaire, high neurotic students are more likely to feel depressed or tensed, worry a lot, be moody and get nervous easily. Neurotic students do not handle stress well, nor are they emotionally stable or calm in tense situations. Scoring high on the perceived stress questionnaire means feeling overwhelmed, feeling tensed and nervous and lacking the control to handle the stressful situation. This could explain why no interaction effects were found, for both the neuroticism items and the perceived stress items measured more or less the same. Besides overlap with perceived stress, there is also evidence found for high overlap between neuroticism and depression. The following models attempt to explain this overlap. The common cause model states that shared determining factors account for the relationship between neuroticism and common mental disorders (CMD), such as depression. The spectrum model implies that neuroticism and common mental disorders (especially internalizing mental disorders) are other manifestations of similar processes, which reflects that high levels of neuroticism is equivalent to, for example, depressive symptoms. (Ormel et al., 2013). The current study found strong associations between neuroticism and depressive symptoms, which indicates overlap. This may explain why neuroticism does not moderate the relationship, because nearly similar factors are measured. Yet, earlier research did found moderating effects of neuroticism (Bunevicius, Katkute and Bunevicius, 2008). In their study, another questionnaire measuring stress was used, i.e., the Vulnerability to Stress scale, which focuses more on the ability to weather stress, rather than feeling stressed. This could possibly explain the inconclusiveness of those results.

Neither agreeableness nor extraversion affected the relationship between stress and depressive symptoms. Both traits were negative predictors of depressive symptoms, but not in interaction with academic demands or study/life imbalance. For both high and low extravert and agreeable students, dealing with student stress could lead to symptoms of depression in a comparable degree. Previous research on this subject is somewhat inconclusive. One study found that extraversion did not have a significant association with depression, which meant that it was not possible that moderation took place (Uliaszek et al., 2009). In contrast, other studies did find associations with both perceived stress (Vollrath, 2001) and depression (Chien, Ko & Wu, 2007). Low extraversion and low agreeableness were associated with

higher perceived stress levels and more depressive symptoms. Very little is known about the possible moderation of those traits between perceived stress and depressive symptoms. There is some research about the influence of agreeableness and extraversion on stress appraisal. Extraversion was found to have significant positive correlations with healthy stress appraisal, i.e., challenge appraisal (Gallagher, 1990). This means extraverted people tend to see stressful situations as challenging and a change to learn something, whether less extraverted people see stressful situations as threatening. Agreeableness is associated with healthy coping too (Connor-Smith & Flachsbart, 2017). Therefore, it could be the case that personality traits do influence stress appraisal, meaning that perceived stress is not influenced by personality stress directly, only indirectly through appraisal. Thereby, there is still a debate going on whether personality traits are stable, even under depressive episodes (McCrae and Costa, 2008). If personality traits appear to be unstable during depression, it is harder to find moderation effects in a cross-sectional study. Given that this study only measured personality at one point, nothing can be said about personality traits before a student began to experience depressive symptoms. This could explain why very little results were found in the current study. Implications for further research would include conducting a cohort or other longitudinal study with multiple measuring points could control for this. Thereby, causal inferences can be made in such design.

The current study had some limitations. To begin with, the cross-sectional design does not allow for interpreting direction of effects. Saleh, Camart and Romo (2017) found that psychological distress, such as depression, contributed the most to the variance of perceived stress. This could mean that the effects may operate in the opposite direction. To investigate directions of the effects, a longitudinal study would be best suited. Secondly, because of this study design, we only got information about the time-frame we conducted the research in. Results may be different when carrying out the questionnaires at another time point. For example, we did not control for exam periods, so we do not know whether the students participating in this study were possibly more stressed because of examinations. The amount of perceived study stress could fluctuate through the academic year. Thereby, in this particular design, it was not possible to compare the existence of depressive symptoms in students with age-matched non-students. To evaluate how problematic depression truly is for the student population, future research should compare prevalence rates with the prevalence rates of a non-student sample. Thirdly, biases such as social desirability, acquiescence and extreme or midpoint response style could have influenced these results (Dodd-McCue and Tartaglia,

2010). These issues were partly alleviated by the anonymity of the survey and by the reversing of some of the questions in the questionnaires. Moreover, selection bias could play a role in the current study. Given that the study was about stress and depressive symptoms, it could be the case that students who are feeling stressed or depressed are more rapidly attended to the posters or Facebook posts, than students who do not have such feelings. This could lead to overestimation of the presence of stress and depressive symptoms among students in the current sample. Fourthly, the use of a non-validated questionnaire could also be mentioned as a study limitation. The LSPSS was translated to Dutch, but there was no pilot done with this questionnaire. For now, it remains unknown whether the participants fully understood the nature of the questions, which could have influenced the results. Nonetheless, the internal and convergent validity in this sample were sufficient. More research is needed to confirm this validity, and the reliability and comprehension among students. Besides, it could be the case that this questionnaire is not exhaustive enough. More types of stressors apart from the items in the LSPSS, may possibly contribute to student stress and depressive symptoms. Therefore, this questionnaire should not be seen as leading in this field, but may need to be enhanced after more research. At last, the sample used in this study was relatively heterogenic, which made it harder to find results. Subgroups were not large enough for separate analyses, so it is difficult to distinguish where possible effects are found and which confounders or covariates play a role in the relationship between perceived study stress and depressive symptoms.

However, the heterogeneity is also a strong point of this study. Much of previous research focused solely on medical or nursing students, this study examined a wide range of studies. This means the results are generalizable to the whole student population, and not only to medical students. Moreover, the study was conducted at different universities, which also contributes strongly to the generalizability of this study. Another strong point is the relatively high sample size. A third strong point is the questionnaires used in this study. The Big Five Inventory, the Perceived Stress Scale and Beck's Depression Inventory are all validated and reliable scales (Cohen, 1983; Denissen et al., 2008; Roelofs et al., 2013).

4.1 Conclusion and implications

To conclude, it was found that perceived study stress was associated with depressive symptoms. Academic stress and study/life imbalance were the most severe stressors. The expectation was that personality traits moderated this relationship, but only conscientiousness

was found to increase the chance to develop depressive symptoms under high amounts of academic demands.

Apart from the need for more research on this subject, several implications can already be done. To our knowledge, this is the first study on this subject among the Dutch student population. This study gave a good insight in the students issues related to stress and depression, which has some practical implications. This study and earlier research made clear that depressive symptoms are of serious concern among students. Even though this study only took depressive symptoms into account, previous research found numerous negative effects of stress, such as poorer physical health or worse academic outcomes (Leppink et al., 2016; Struthers, Perry and Menec, 2000). It seems like academic success – and career perspectives - partly rely on a healthy mental state, which points out the importance of attention for problems in this area. To begin with, students counselors could be of big difference for those students who need psychological help. There seems to be an increase of help-seeking behavior among students, however it is not clear whether that is due to a true increase in psychological problems among students, or a more general increase in help-seeking (Hunt and Eisenberg, 2010). In the Netherlands, it appeared that students are satisfied with the help offered, but improvements are needed in the facilitation and availability of student counselors (Interstedelijk Studenten Overleg, 2016). The findings on personality traits moderating the relation between stress and depression, have some theoretical implications. More research is needed on this subject, but this study gives more insight in what aspects of personality can work as a protective factors, and what traits have a negative impact on the relation. Combinations of personality traits and the effects were not examined, so further research is needed to find out which combination of traits influence development of depression in a protective or threatening manner.

Given that dealing with stress ineffectively seems to be a strong predictor of depressive symptoms (Felsten, 2004), it appears that students will benefit most from learning how to handle study stressors, or finding ways to reduce this stress. Universities could offer programs to help students weathering stress. Trainings focusing on time- and stress management and effective studying could help students reduce stress and therefore diminish the chance of developing depressive symptoms and other negative effects of stress.

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