

The explanatory role of Eustress and Distress in the relationship between Extraversion and Depression

A Cross-sectional Study

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Abstract

Objectives: This cross-sectional study investigated the mediating roles of eustress and distress in the association between the personality trait extraversion and depression. Eustress can be defined as a positive form of stress, in which the stressor is perceived by people as challenging but not as threatening. In contrast, distress describes the negative kind of stress, which results in adverse physical and mental pressure. Investigating interrelationships would help to analyze the impact of eustress and distress on people's mental health and might give a new perspective on the qualities of extraverts. It was hypothesized that 1) extraversion correlates positively with eustress and negatively with distress and that 2) eustress and distress mediate the relationship between extraversion and depression.

Methods: The sample consisted of 159 students of the University of Twente, predominantly female and German. They completed an online questionnaire involving the Perceived Stress Scale (PSS) measuring eustress and distress; the Center of Epidemiologic Studies Depression Scale (CES-D), which measured depressive symptoms; and the Big Five Inventory (BFI; only Extraversion scale) measuring levels of the personality trait extraversion. The data were analyzed by Pearson correlation and bootstrapping by Hayes' PROCESS SPSS macro.

Results: Correlation analyses demonstrated that 1) extraversion and eustress were positively related ($r = .21, p < .01$); extraversion and distress negatively ($r = -.26, p < .01$). Mediation analysis revealed that 2) eustress and distress were mediators of the relationship between extraversion and depression.

Conclusion: Eustress and distress display an explanatory role in the association between extraversion and depression. Further research on the matter is recommended considering extraverted people, working in a job and managing different stressors under different circumstances.

Keywords: stress, eustress, distress, personality, extraversion, depression, students, mental health

Introduction

Throughout the general public, stress is associated with negative and unavoidable demands, causing unpleasant mental pressure. Also, the literature predominantly focuses on the negative aspect, called distress, and the severe consequences it can have on people experiencing it. For instance, students who have to deal with many tasks at once, struggle with increased levels of stress and the resulting severe consequences, like depressive symptoms (Sawatzky et al., 2012). Very few studies have focused on the positive aspect of stress, called eustress, and its beneficial impact on individuals with regard to their well-being. (Hargrove, Nelson, & Cooper, 2013). However, personality plays an important role in the perception of stress (Penley & Tomaka, 2002). This means that it is dependent on the person's personality whether the stressor is perceived as positively challenging or threatening. The present study aims at answering the question of whether distress and eustress play explanatory roles in the relationship between extraversion and depressive symptoms. In addition, it deals with the assumption of whether extraverts have better mental health than people, who score low on this personality trait.

The Perception of Stress

The experience of stress can be divided into three parts: the stressor, the individual's perception, and the response of the person towards the stressor (Kozusznik, Rodríguez, & Peiró, 2015). These three parts constitute a process, which can be initiated by placing a physical or psychological demand on people, resulting in two possible responses toward the demand. This response is dependent on a person's perception of the stressor (Kilby & Sherman, 2016). Either, the individual perceives the demand as manageable and can handle the current task; or, one appraises an inability to overcome the demand, which leads to the fact that one feels stressed and not able to cope with the task (Kozusznik et al., 2015). Leading to a situation, in which a person feels threatened and inhibited in his or her action, which can turn in negative consequences for the person's emotional state. For instance, it can involve poor physical and psychological performance, as well as a decrease in well-being and in worst cases, result in diseases or death (Crum, Salovey, & Achor, 2013). The negative response toward the stressor's demands is called distress, which is termed as stress in most literature. Not only can stressful situations increase existing diseases but also cause depressive symptoms (Kim et al., 2016).

In contrast, if stress is experienced as challenging but manageable, it can have positive effects on an individual's progress and mood (Kilby & Sherman, 2016). This positive or good type of stress is termed eustress. Due to the fact that in the process of eustress the individual perceives the stressor as manageable and able to cope efficiently with it, levels of confidence and self-esteem are enhanced (Hargrove et al., 2013). In the experience of eustress, "positive psychological states" are present and people feel motivated to work on the challenge (Nelson & Simmons, 2011, p.59). For example, in workplaces people experience increased levels of concentration and well-being, which leads to profitable and engaged work performance (Hargrove et al., 2013). Another instance of this occurs in so-called "workflows", which describe the ability to put all of one's focus on the task at hand and to forget about time while working; leading to a good mood. Thus, in the process of eustress, a stressor results in a positive response and has positive consequences.

The Influence of Personality on Stress

The perception of stressors and demands can be influenced by an individual's characteristics (Penley & Tomaka, 2002). In order to describe and explain people's characteristics, previous research used models of personality. One model, which is used persistently over time, is the Five-Factor Model (FFM) and contains the 'Big Five' personality traits: Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness (McCrae & John, 1992; Nordvik, 1996). The traits and characteristics are presumed to be consistent across different situations and over time. Consequently, people may be affected by their characteristics when encountering demands (Nordvik, 1996). By influencing a person's perception of a current stressor, personality may to some extent determine an individual's response and vulnerability towards distress; leading to the fact that some people are more or less prone to stress (Kim et al., 2016). For instance, extraversion has been found to be negatively related to distress (Pareira-Morales, Adan, & Forero, 2017). This particular personality trait is defined by high levels of activeness, talkativeness, and sociability (Penley & Tomaka, 2002). Moreover, people scoring high on this trait are likely to engage in contact with others and stay open-minded towards new situations. Consequently, extraverted people have the tendency to perceive and interpret stressful events as challenges and not as personal risks, which they should avoid. Instead of feeling inhibited by the stressor's demands, they are more likely to be able to act and solve the problem.

In workplaces, people who score high on extraversion have also a high probability of perceiving eustress (Saksvik & Hetland, 2011). Furthermore, extraverts tend to perceive stressful situations rather as a positive influence than as a threat (Kim et al., 2016). In other words, they experience eustress and feel motivated to find a solution to the challenge. For that reason, people scoring higher on extraversion may experience positive stress more often. Their level of energy is enhanced and they are willing to take action. As a consequence, extraverts tend to have the ability to cope efficiently with perceived stressors. In particular, they are able to use the stress to be more productive and to concentrate more extensively (Penley & Tomaka, 2002).

The Relationship between Personality and Depression

The capability of extraverts to use stress more beneficially might explain why they experience less depressive symptoms. The World Health Organization has characterized depression as one of the most disabling diseases in the world (Greden, 2001). Depression can be described as a downward spiral, in which the individual feels increasingly overwhelmed by the symptoms. These symptoms can be experienced as difficulties in concentrating, feelings of worthlessness, low levels of energy and lose the pleasure in activities (Teasdale, 1983). Affected individuals encounter a constant state of negative thinking, which can lead to negative perceptions as well as interpretations of the self and the world. This can result in the negative perception of stressors and can lead to a decrease in motivation for solving problems, leading to a more depressed mood. Thus, various stressors and following distress can work as predisposing factors for the development of depressive symptoms (Teasdale, 1983).

If depressive symptoms last over a long time, they have not only an impact on the daily life of an individual but on the future life with a disturbance of social or physical functioning (Greden, 2001). By viewing the big picture those disturbances also affect society (Thomas & Morris, 2003). In other words, increasing rates of depression lead to the development of more unemployment. Moreover, depression is considered as a risk of reducing the individual's chances of reemployment. Due to the fact that personal functioning is impaired, people cannot find the motivation and strength to search for a new job, which leads to a higher dependence on societal support. Thus, results of depression not only affect people on an individual basis but also on the societal one, which increases the need for efficient treatments (Thomas & Morris, 2003).

The onset of depression is dependent on people's sensitivity toward it, which is to a certain extent determined by personality (Chioqueta & Stiles, 2005). Existing differences in characteristics make some people less prone than others to experience depression. For instance, extraversion is negatively associated with depression and negative emotions. This might be explained by the fact that extraverts tend to be active, open-minded and outgoing. People scoring high on the trait are proactive toward activities and are willing to get in contact with other people. Therefore, they might be less likely to experience emotions of hopelessness and worthlessness. By coping efficiently with stressful situations, extraverts might not perceive distress in a threatening way and, therefore, may have a lower probability of experiencing an increase of depressive symptoms like negative thinking (Vollrath, 2001). Lower scores of extraversion have been described as a risk for symptoms of anxiety and depression. In contrast, higher scores of the trait increase the tendency toward stress-reducing behaviors and efficient coping styles (Kim et al., 2016).

Need for research

Despite the positive effects that eustress can have on people's well-being, distress has been the main field for research on stress (O'Sullivan, 2011). Thus, it is of great importance to investigate further in this area, as it is an insufficiently explored phenomenon. Studies indicated that eustress and extraversion are both negatively related to depressive symptoms (Chioqueta & Stiles, 2005; Saksvik & Hetland, 2011). Therefore, it is assumed in this study that higher levels of extraversion may promote a positive reactivity to stress, which decreases the susceptibility toward depression. Better knowledge about this association, together with qualities of extraverted people may help in promoting eustress in stress-management interventions; leading to a reduced prevalence of depression. A new treatment is not only necessary on the individual but also on the societal level, because society suffers from increasing rates of the inability to work, caused by depression (Thomas & Morris, 2003).

The aim of this study is to investigate whether the relationship between depression and extraversion can be explained by eustress and distress. The first hypothesis is that 1) extraversion is positively related to eustress and negatively related to distress. Based on the fact that extraverts tend to perceive demands rather as a manageable challenge than as a threat, it is assumed that they respond positively towards the stressor and use it to increase their productiveness.

The second hypothesis is that 2) eustress and distress are mediators of the association between extraversion and depression. Hence, extraversion and eustress would be positively related but eustress and depression negatively (Chioqueta & Stiles, 2005; Penley & Tomaka, 2002). It is also assumed that extraversion is negatively associated with distress because extraverts tend to perceive stressors as feasible. Meaning, they are motivated to master the challenge and not to give up or lose the ability to cope. Therefore, they are not at direct risk to experience stress-induced depressive symptoms and extraversion is expected to be negatively associated with depression (Kim et al., 2016).

Methods

Participants

In total, one hundred and eighty-seven participants filled out the questionnaire, 23 responses have been deleted due to partial completion. Another five participants were not students and in order to make the sample more specific with only students as subjects, they were also deleted. This resulted in 159 participants (83% female and 17% male), who were included in the study. The age ranged from 18 to 27 year ($M = 20.85$; $SD = 2.01$). The sample consisted of 138 German, 16 with a Dutch origin and five, who had another nationality. The majority of the participants rated their English skills as ‘good’ (87; 54,7%), 63 considered it ‘very good’ (39,6%) and nine of them as ‘fair’ (5,7%).

Materials

Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983). The Perceived Stress Scale is a 10-item questionnaire that was developed to measure the experienced level of stress, according to the evaluation of one’s life situations. The items assess to which degree the individual perceived their daily life as unmanageable and unpredictable during the previous month. It consists of four positively formulated items and six negatively formulated ones. Hence, the positive ones represented the measurement of eustress and the negatively formulated questions served to measure distress. The two-factor solution is regarded as more favorable for this questionnaire than the one-factor solution (Yokokura et al., 2017). Participants had to indicate the number of feelings and thoughts they had during a certain time. For instance, one item for eustress stated, “In the last month, how often have you felt that things were going your way?” Next, an example item for distress was

“In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?” Answers could be given on a 5-point Likert scale, ranging from 1 = ‘never’ to 5 = ‘very often’. A reliability score ranging from .84 to .86 and test-retest reliability of .85 were found in a previous student sample, which indicates a good internal consistency of the items (Cohen et al., 1983). In addition, they also had adequate validity. In this study, the Cronbach’s alpha was .82 for the eustress scale and .84 for distress.

Center for Epidemiologic Studies- Depression Scale (CES-D, Radloff, 1977). The CES-D is a brief self-report scale with 20 items and measures depressive symptoms, which might have been experienced by participants during the past week. It assesses clinical symptoms in a general sample. The questions deal with depressed mood, feelings of worthlessness, loss of appetite, help- and hopelessness. For example, “I thought my life had been a failure.” Participants can score on a 4-point Likert scale ranging from 1 = ‘Rarely or none of the time (less than 1 day)’ to 4 = ‘Most or all of the time (5-7 days)’. It is proven to have a good internal consistency with a Cronbach’s alpha between .85 and .90 (Radloff, 1977). The Cronbach’s alpha for the current study was .93, resulting in a high internal consistency of the items.

Big Five Inventory (BFI; John & Srivastava, 1999). This self-report questionnaire involves 44 items that measure the Big Five dimensions of personality. For this study, only the extraversion scale was used, which consisted of eight items. For instance, “I see myself as someone who is full of energy.” Participants scored on a 5-point Likert scale, ranging from 1 = ‘strongly disagree’ to 5 = ‘strongly agree’. According to Alansari (2016), the Cronbach’s Alpha of this measurement has been between .74 and .92, therefore, it has an adequate internal consistency. Additionally, it is proved to provide satisfactory validity data. The alpha for the current study was .84.

Design & Procedure

The study design of the research was a cross-sectional online survey and the three questionnaires, which were adopted, were part of a bigger test battery (for the survey see Appendix A). Prior to the research, the BMS Ethics Committee (EC) approved the execution of the research regarding the whole study. The participants were approached by personal contact, via the social medium Facebook or the SONA system of the University of Twente. The SONA system is a test subject pool, in which students can gain credits (0.5 points for this

study) in return for participating in research studies, which they can choose themselves. The participants voluntarily signed up for filling it in, in the period from the 3rd of April until the 31st of April. In order to participate in the online questionnaire, participants needed to have an electric device with a functioning Internet connection. The program Qualtrics was used to create an online questionnaire, which consisted of 109 questions.

The questionnaire started with a welcome screen, explaining the subject and goal of the following research study. Participants, who decided to take part in the questionnaire agreed via mouse click with the fact that they had read the informed consent and they were willing to participate before they started. Afterward, they were asked about their demographic data in the following order: gender, age, nationality, occupation, marital status, and English skills. After that the participants filled out all of the following questionnaires: Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983), Center of Epidemiologic Studies Depression Scale (Radloff, 1977), Big Five Inventory but only the Extraversion scale (John & Srivastava, 1999), Pittsburg Sleep Quality Index (Buysse et al., 1989), Multidimensional Perfectionism Scale (Hewitt & Flett, 1990) and the Stress Mindset Measure (Crum et al., 2013). Each questionnaire provided a short introduction on how to fill it in correctly. They had the option to quit at any time, as also indicated in the informed consent. In total, it took around 20 minutes to conduct the survey.

Data analysis

The data gathered with Qualtrics was converted into the program IBM SPSS 24. Descriptive statistics and frequencies were calculated. Thereafter, mediation was tested. In order to test mediation, bootstrapping was used with the latest PROCESS 3.2 macro for SPSS by Hayes (2012). This procedure is up-to-date and has shown to be more powerful than other approaches in testing mediation (MacKinnon, Lockwood, & Williams, 2004). The Bootstrap samples were set to be 1,000 and the fourth bootstrap model with 95-% bootstrap confidence intervals (CI) was used (Hayes, 2012). If the CI of the indirect effect does not cross zero, the effect can be assumed to be significant. In this study, eustress and distress are used as mediators (M) of the association between the independent variable, extraversion (X), and the dependent variable depression (Y).

Results

Correlation analyses

Descriptive statistics of the variables eustress, distress, depression and extraversion were calculated. The hypothesis that extraverts more eustress and less distress was examined with Pearson correlations. As expected, extraversion and eustress were positively correlated and extraversion and distress negatively. Thus, the first hypothesis can be accepted. All correlations were significant and also turned out as expected (Table 1).

Table 1. *Descriptive Statistics and Pearson Correlation of Eustress, Distress, Depression and Extraversion (N=159)*

	M (SD)	1	2	3	4
1 Eustress	3.08 (0.79)	-			
2 Distress	3.32 (0.7)	-.65**	-		
3 Depression	1.93 (0.59)	-.67**	.72**	-	
4 Extraversion	3.42 (0.77)	.21**	-.26**	-.26**	-

Note. M= mean, SD= standard deviation, ** $p < .01$

Mediation analysis

Bootstrapping revealed that eustress and distress were mediators in the relationship between extraversion and depression. First, it was demonstrated that the IV extraversion significantly affected the mediator eustress positively ($b = 0.09$, $t(157) = 2.64$, $p < .01$) and distress negatively ($b = -.20$, $t(157) = -3.39$, $p < .001$). Second, the significant effect of extraversion on depression was decreased by adding eustress and distress to the model (total effect: $b = -.49$, $t(157) = -3.31$, $p < .01$). The relationship between extraversion and depression was not significant when controlling for the indirect effect (“direct effect”: $b = -.11$, $t(155) = -1.10$, $p = .27$). In fact, it can be said that the mediators are very strong in the relationship between IV and DV ($R^2 = .59$). Additionally, the mediators eustress and distress had a significant effect on the DV depression (“indirect effect”: $b = -1.42$, $t(155) = -5.03$, $p < .001$; $b = 1.21$, $t(155) = 7.09$, $p < .001$). The confidence intervals also proved the significant effect of both mediators: for eustress 95%- CI [-1.98; -.86] and for distress 95% CI [.87; 1.54].

The figure below shows the mediation model visualized, the betas indicate the strengths of relationships.

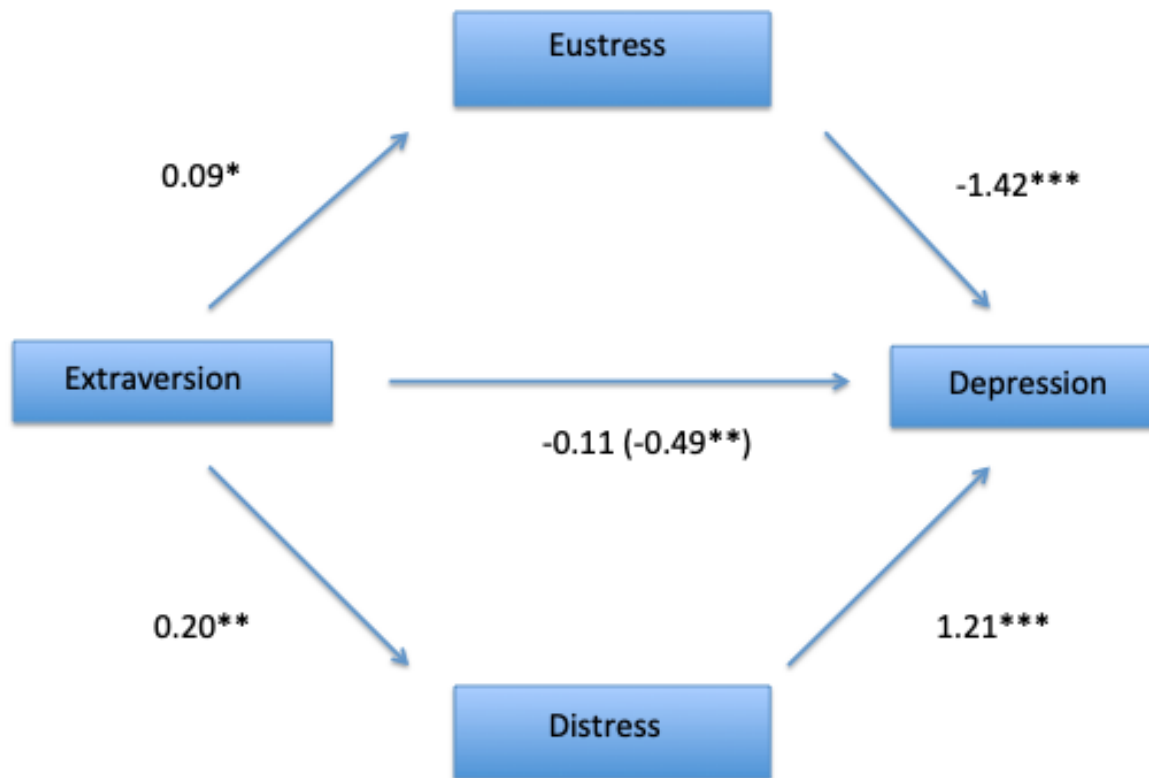


Figure 1. Mediation Model with Extraversion as the independent variable (X), Depression as the dependent variable (Y) and Eustress and Distress as mediators (M).

Note 1. ** $p < .01$, *** $p < .001$

Note 2. c = direct effect, (c') = total effect

Discussion

The aim of this study was to examine how extraverts experience stress and whether this could explain why they experience in general less depressive symptoms. Due to previous research from Kim et al. (2016) and Saksvik and Hetland (2011), it was expected that extraversion is positively related to eustress, because extraverts perceive the stressors as manageable and as a result experience eustress. In this study, it was also demonstrated by the correlation- as well as mediation analyses, the personality trait extraversion had a positive influence on eustress and a negative one on distress. Thus, the first hypothesis was accepted. The effect of extraversion on eustress was small but still significantly positive. Previous

research suggests that the association between extraversion and eustress is to some extent dependent on the current situation and the stressor (Saksvik & Hetland, 2011). Hence, some stressors might have a stronger triggering effect than others on extraverts to experience eustress and to perceive the problem as manageable. The first hypothesis can, therefore, be accepted.

The second hypothesis can be accepted due to the fact that the relationship between extraversion and depression was only significant when the mediators were present. The findings suggest that people who score high on extraversion have a tendency to experience eustress and at the same time are less likely to experience distress (Saksvik & Hetland, 2011). In addition, it was demonstrated that eustress was negatively related to depression and distress positively. Previous research by Sawatzky et al. (2012) described similar findings in regard to a negative correlation between eustress and depressive symptoms. Meaning, by experiencing more eustress extraverts are less vulnerable toward being affected by distress, which can turn into depressive symptoms. Research demonstrated that during distress, the individual experiences a negative state of mind, which leads to a higher susceptibility toward depressive symptoms (Teasdale, 1983). Due to the fact that extraverts are less likely to perceive a stressors as demanding and distressing, they are also do not tend to experience this negative states of mind; leading to a lower susceptibility toward depression.

Due to convenience sampling, the sample of this study only consisted of students, who perceive quite different stressors under different circumstances than people who work in a job (Britt, Crane, Hodson, & Adler, 2016). If students perceive the ability to manage their daily stress, they are less likely to experience distress and thus were less prone to depressive symptoms (Sawatzky et al, 2012). Nevertheless, students have to manage many different tasks at once, for instance, next to their studies they have to adjust to the new environment and socialize with new people. But by receiving a lot of autonomy in managing all these different challenges, they might be less likely to suffer from the perceived stress and to get susceptible to depressive symptoms (Britt et al., 2016). In contrast, young adults who decide against an academic career and start to work in a job perceive different stressors with less autonomy to handle them. It is a possibility that in their position, being more active and motivated to change the situation might not help when encountering unavoidable stressors. Rather, it might increase distress levels, which in the long run will have an impact on an individual's mental health (Britt et al., 2016). On the contrary to this view are some reasons why extraverts might be able to deal with various stressors in various situations. For instance, by mainly drawing

from their past experiences, extraverts have more sources or solutions available at a certain moment, thus, they can be flexible and able to change to another solution if one is not working adequately (Brebner, 2001). In addition, they need a shorter time to react toward the stress-inducing stimuli, which would give them less time to worry and feel stressed. Resulting in the fact that even though stressors differ in various circumstances, extraverts might be motivated to deal with them, because they are sensitive toward rewards or solutions (Rodell, & Judge, 2009). In other words, it might not be dependent on the situation or the stressor and extraverts tend to be eager to deal with the stressor in order to gain the reward; leading to the favorable outcome that they experience less distressing depressive feelings.

Limitations and Strengths

The research faced some limitations, which have to be improved in future investigations. First, in research mediation in a cross-sectional survey study, a picture of one moment in time is created and temporal precedence cannot be established. This means that a cross-sectional study cannot say which variable precedes the other and whether the cause takes place before the effect. However, this is key in a standard mediation model. Therefore, a longitudinal research approach with an additional pilot test would give a more reliable picture and would reveal more about how the concepts are interrelated (Maxwell & Cole, 2007). Second, although no participant rated their English skills as 'very poor', the fact that the questionnaires were not provided in their native language can be considered as a limitation. Consequently, a language barrier could have affected the survey to at least some extent. Third, through convenience sampling the sample only consisted of students; and therefore, the results are not generalizable to the population. In contrast, other studies, which investigated depression and personality or stress and personality, included a wider age range. But due to the fact that similar results could be obtained in this study, it might be acknowledged as a rather small limitation (Kim et al., 2016; Pereira-Morales et al., 2017).

Nevertheless, this study also provides some strengths. Previous research established relationships between all 4 concepts: eustress, distress, extraversion and depression. This study contributed to this effort by bringing them together in a model and to demonstrate mediating roles of eustress and distress. Furthermore, one mechanism why extraverts might have better mental health was explained. Next, the Perceived Stress Scale was used in a two-factor way, which enables the measurement of both stress scales, eustress and distress, in more detail and separately from each other. In addition, the CES-D has been demonstrated to

be an inefficient measurement with regard to major or clinical depression (Radloff, 1977). But as the sample consisted of university students, who were more likely to experience milder forms of depressive symptoms, the scale could be considered a sufficient measurement for this study.

Practical Implications & Future Research

The mediation model demonstrated that by researching the influence of personality in regard to depressive symptoms, eustress and distress have to be kept in mind. Furthermore, if new training or interventions are considered for people suffering from depression, it is of great importance to investigate the amount of stress that is experienced by the affected individuals. Another important variable, which should be considered, is the duration of time, in which students experienced stress. If stress is constantly experienced, it can develop into chronic stress (Schraml, Perski, Grossi, & Makower, 2012). Consequently, this would pose a higher risk and prevalence of depressive symptoms. Thus, it is important to examine in future research whether the duration of time has an influence on extraverts' perception. Meaning, that the question remains of whether extraverted people are still able to experience more eustress and less distress when they encounter a long period of permanent stress. Next to this, students receive a high level of autonomy during their studies in managing their workload, jobs with lower autonomy and unavoidable demands might pose a higher level of stress on a person (Britt et al., 2016). As this study sample was rather homogenous, it is relevant to examine people in different situations, experiencing stressors in different circumstances. In addition, this investigation could be conducted with a field research approach in order to gain more certainty about the current results. An additional qualitative approach is relevant, because it can give more insight in real-life situations and actual behavior patterns in regard of eustress and distress.

Apart from the positive qualities like activeness and sociability, which make extraverts less likely to experience depressive symptoms, high extraversion has been associated with manic disorder (Quilty, Sellbom, Tackett, & Bagby, 2009). During a manic episode, high levels of concentration and energy increase even more. Extraverted people might perceive stressful situations rather when they have the feeling to lose this high. Meaning, they could feel distressed when they are in need of high stimulus situations in order to use their high amount of energy. But it could also be assumed that extraverts are able to handle any kind of stressor without the risk of severe consequences for their well-being. Further research is

necessary in order to investigate whether eustress and distress also have mediating roles in the association between extraversion and mania.

Conclusion

This study indicated that eustress as well as distress play an explanatory role in the relationship between the personality trait extraversion and depression. The quality to experience eustress rather than distress when perceiving stressors enhances a person's mental health. This is the reason why people who score high on extraversion are less prone to depressive symptoms. In the future, it will be important to test whether the created theory is present in real-life and observable in behaviors. If so, people's perception of stressors should be improved to reduce distressing feelings and to decrease the prevalence of depressive symptoms. By implementing the theoretical results in practice, adjustments in stress managing strategies could be made in order to treat depressive symptoms from a non-medical approach.

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7. Appendix

Appendix A

Survey

Start of Block: Informed Consent



Q76 You are being invited to participate in a research study titled "The relationship between stress, mindset and depression". This study is being done by Dennis Gawlick, Elena Matejek, Marlon Rouw and Julia Slusarek from the Faculty of Behavioural, Management and Social Sciences at the University of Twente.

This research study is about the association between stress and depression, whereby different factors like stress mindset, sleep, personality and perfectionism might play an important role. In this study not only the negative aspect of stress (distress) is considered but also the positive, motivating kind of it (eustress). This will take you approximately 20 minutes to complete. The data will be used for our Bachelor Thesis.

We believe there are no known risks associated with this research study; however, as with any online related activity the risk of a breach is always possible. To the best of our ability your answers in this study will remain confidential. We will minimize any risks by making sure that your data will be anonymized and only the researchers will use the data for their thesis.

Your participation in this study is entirely voluntary and you can withdraw at any time, for any reason, and without any prejudice. You are free to omit any question. This questionnaire is conducted as a research project by four third-year psychology students at the University of Twente. If you would like to contact a researcher from the study to discuss this research, please e-mail Elena Matejek (e.t.matejek@student.utwente.nl) or Julia Slusarek (j.slusarek@student.utwente.nl).

To participate in this study, please tick both boxes.

I understand the above given information. (4)

I am willing to participate in the study. (5)

End of Block: Informed Consent

Start of Block: Demographics

Q1 What is your gender?

- Male (1)
- Female (2)
- Other (3)

Q2 How old are you?

18192021212223242526272829303132333435363738394041424344454647484950

50	
----	--

Q3 What is your nationality?

- Dutch (4)
- German (5)
- Other (6) _____

Q4 What is your occupation?

- Student (4)
- Apprenticeship (5)
- Occupied (6)
- Unoccupied (7)

Q5 What is your marital status?

- Single (1)
 - In a relationship (2)
 - Married (3)
-

Q6 How good are your English skills?

- Very poor (1)
- Poor (2)
- Fair (3)
- Good (4)
- Very good (5)

End of Block: Demographics

Start of Block: Perceived Stress Scale

Q7 The following questions will ask you about your feelings and thoughts **during the last month**. For each question, please indicate *how often* you felt or thought a certain way.

	Never (1)	Almost Never (2)	Sometimes (3)	Fairly Often (4)	Very Often (5)
In the last month, how often have you been upset because of something that happened unexpectedly? (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the last month, how often have you felt that you were unable to control the important things in your life? (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the last month, how often have you felt nervous and "stressed"? (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the last month, how often have you felt confident about your ability to handle your personal problems? (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the last month, how often have you felt that things were going your way? (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the last month, how often have you found that you could not cope with all the things that you had to do? (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the last month, how often have you been able to control irritations in	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

your life? (7)

In the last month, how often have you felt that you were on top of things? (8)

In the last month, how often have you been angered because of things that were outside of your control? (9)

In the last month, how often have you felt difficulties were piling up so high that you could not overcome them? (10)

End of Block: Perceived Stress Scale

Start of Block: Center for Epidemiologic Studies Depression Scale (CES-D)

Q8 Below is a list of the ways you might have felt or behaved. Please tell me how often you have felt this way during the past week.

	Rarely or none of the time (less than 1 day) (1)	Some or a little of the time (1-2 days) (2)	Occasionally or a moderate amount of time (3-4 days) (3)	Most or all of the time (5-7 days) (4)
I was bothered by things that usually don't bother me. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I did not feel like eating; my appetite was poor. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt that I could not shake off the blues even with help from my family or friends. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt I was just as good as other people. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I had trouble keeping my mind on what I was doing. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt depressed. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt that everything I did was an effort. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt hopeful about the future. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I thought my life had been a failure. (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt fearful. (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My sleep was restless. (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I was happy. (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I talked less than usual. (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt lonely. (14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

People were unfriendly. (15)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I enjoyed life. (16)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I had crying spells. (17)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt sad. (18)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt that people dislike me. (19)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I could not get "going." (20)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: Center for Epidemiologic Studies Depression Scale (CES-D)

Start of Block: Big Five Inventory (only Extraversion)

Q9 Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Rate the extent to which you agree or disagree to the following statements.

I see myself as someone who ...

	Strongly disagree (1)	Disagree a little (2)	Neither disagree nor agree (3)	Agree a little (4)	Strongly agree (5)
is talkative. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
is reserved. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
is full of energy. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
generates a lot of enthusiasm. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
tends to be quiet. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
has an assertive personality. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
is sometimes shy, inhibited (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
is outgoing, sociable. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: Big Five Inventory (only Extraversion)

Start of Block: PSQI

Q66 The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights **in the past month.**

Q67 When have you usually gone to bed?

- Before 21.00 (4)
 - 21.00 - 22.00 (5)
 - 22.00 - 23.00 (6)
 - 23.00 - 00.00 (7)
 - 00.00 - 01.00 (8)
 - After 01.00 (9)
-

Q68 How long (in minutes) has it taken you to fall asleep each night?

- 0 - 30 (4)
 - 30 - 60 (5)
 - 60 - 90 (6)
 - 90 - 120 (7)
 - 120 - 150 (8)
 - More than 150 (9)
-

Q69 What time have you usually gotten up in the morning?

- Before 6.00 (4)
 - 6.00 - 7.00 (5)
 - 7.00 - 8.00 (6)
 - 8.00 - 9.00 (7)
 - 9.00 - 10.00 (8)
 - After 10.00 (9)
-

Q70 How many hours of actual sleep did you get at night?

- 5 or less (4)
 - 6 (5)
 - 7 (6)
 - 8 (9)
 - 9 (10)
 - 10 or more (11)
-

Q71 How many hours were you in bed?

- 5 or less (4)
 - 6 (5)
 - 7 (6)
 - 8 (7)
 - 9 (8)
 - 10 or more (9)
-

Page Break

Q72 During the past month, how often have you had trouble sleeping because you

	Not during the past month (1)	Less than once a week (2)	Once or twice a week (3)	Three or more times a week (4)
Cannot get to sleep within 30 minutes (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wake up in the middle of the night or early morning (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Have to get up to use the bathroom (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cannot breathe comfortably (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cough or snore loudly (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feel too cold (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feel too hot (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Have bad dreams (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Have pain (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q73 Other reason (s), please describe

Skip To: Q80 If Other reason (s), please describe Is Not Empty

Q80 How often did you have trouble sleeping because of that reason?

- Not during the past month (1)
- Less than one time a week (2)
- Once or twice a week (3)
- Three or more times a week (4)

Page Break

Q74 During the **past month**,

	Not during the past month (1)	Less than once a week (2)	Once or twice a week (3)	Three or more times a week (4)
How often have you taken medicine (prescribed or “over the counter”) to help you sleep? (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often have you had trouble staying awake while driving, eating meals, or engaging in social activity (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q83 How much of a problem has it been for you to keep up enthusiasm to get things done?

- Not at all (1)
- Not much of a problem (2)
- Somewhat of a problem (3)
- Very much of problem (4)

Q75 **During the past month**, how would you rate your sleep quality overall?

- Very good (1)
- Fairly good (2)
- Fairly bad (3)
- Very bad (4)

End of Block: PSQI

Start of Block: Multidimensional Perfectionism Scale

Q77 In the following, a number of statements concerning personal characteristics and traits will be shown. Please, read each item and decide whether you agree or disagree and to what extent you do so.

Q10

	Disagree strongly (1)	Disagree (2)	Somewhat disagree (3)	Neither disagree nor agree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
When I am working on something, I cannot relax until it is perfect. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am not likely to criticize someone for giving up too easily. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is not important that people I am close to are successful. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I seldom criticize my friends for accepting second best. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find it difficult to meet others' expectations of me. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
One of my goals is to be perfect in everything I do. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Everything that others do must be of top-notch quality. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I never aim for perfection on my work. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Those around me readily	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

accept that I
can make
mistakes too.
(9)

It doesn't
matter when
someone
close to me
does not do
their absolute
best. (10)

The better I
do, the better
I am expected
to do. (11)

I seldom feel
the need to be
perfect. (12)

Anything that
I do that is
less than
excellent will
be seen as
poor work by
those around
me. (13)

I strive to be
as perfect as I
can be. (14)

It is very
important that
I am perfect
in everything
I attempt.
(15)

I have high
expectations
for the people
who are
important to
me. (16)

I strive to be
the best at
everything I
do. (17)

The people
around me
expect me to
succeed at
everything I
do. (18)

I do not have very high standards for those around me. (19)

I demand nothing less than perfection of myself. (20)

Others will like me even if I don't excel at everything. (21)

I can't be bothered with people who won't strive to better themselves. (22)

It makes me uneasy to see an error in my work. (23)

I do not expect a lot from my friends. (24)

Success means that I must work even harder to please others. (25)

If I ask someone to do something, I expect it to be done flawlessly. (26)

I cannot stand to see people close to me make mistakes. (27)

I am perfectionistic in setting my

goals. (28)

The people who matter to me should never let me down. (29)

Others think I am okay, even when I do not succeed. (30)

I feel that people are too demanding of me. (31)

I must work to my full potential at all times. (32)

Although they may not say it, other people get very upset with me when I slip up. (33)

I do not have to be the best at whatever I am doing. (34)

My family expects me to be perfect. (35)

I do not have very high goals for myself. (36)

My parent rarely expected me to excel in all aspects of my life. (37)

I respect people who are average. (38)

People expect nothing less than perfection from me. (39)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I set very high standards for myself. (40)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People expect more from me than I am capable of giving. (41)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I must always be successful at school or work. (42)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It does not matter to me when a close friend does not try their hardest. (43)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People around me think I am still competent even if I make a mistake. (44)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I seldom expect others to excel at whatever they do. (45)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: Multidimensional Perfectionism Scale

Start of Block: Stress Mindset Measure

Q19 Rate the extent to which you agree or disagree with the following questions:

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
The effects of stress are negative and should be avoided. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Experiencing stress facilitates my learning and growth. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Experiencing stress depletes my health and vitality. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Experiencing stress enhances my performance and productivity. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Experiencing stress inhibits my learning and growth. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Experiencing stress improves my health and vitality. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Experiencing stress debilitates my performance and productivity. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The effects of stress are positive and should be utilized. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: Stress Mindset Measure

Start of Block: Block 9

Q78 Thank you very much for taking part in this study!

In case any questions came up while filling out the questionnaire, please feel free to contact Dennis Gawlick (d.gawlick@student.utwente.nl), Elena Matejek (e.t.matejek@student.utwente.nl) or Julia Slusarek (j.slusarek@student.utwente.nl).

End of Block: Block 9
