The Mediating Effect of Eustress and Distress on the Relation between the Mindset Towards Stress and Health

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Abstract

This study examined the effect of eustress and distress on the relation between the mindset towards stress and health. It was hypothesized that a stress-is-enhancing mindset is associated with better health and this association can be explained though eustress and a stress-is-debilitating mindset is associated with worse health, which can be explained through distress. In a descriptive, cross-sectional study (N = 59), participants had to fill in three questionnaires regarding their mindset towards stress, the perception of stress, thus whether they experienced eustress and distress, and their general health. To analyze the associations, the MEDIATE File of Preacher and Hayes was implemented. To circumvent the power problem, the bootstrap sample was increased to 50,000. In sum, the findings supported the two hypotheses. The effect a stress-is-enhancing mindset had on health was mediated by eustress and the effect a stress-is-debilitating mindset had on health was mediated by distress. Thus the perception of stress was the main indicator of whether the mindset had a positive or negative relation with health. If the mindset resulted in eustress, it was associated with better health and if the mindset resulted in distress, it was associated with worse health.

Keywords: Mindset, Eustress, Distress, Health

Introduction

The most common way of researching stress was to look at the reaction towards stress after a specific stressor occurred. In 2013, Crum, Salovey and Achor changed this order. They found out that the mindset towards stress significantly influenced the experienced amount of stress and the reaction towards stress. Supplementary, they found a relationship with health (Crum, et al., 2013). This article was a considerable development in the stress research and another perspective was examined to find ways to improve people´s response to stress. Nevertheless, Crum et al. (2013) only focused on the direct relation between the mindset towards stress and health without examining how this relation emerged. During the current research it was suggested that the relation between the mindset and health could be explained through two different stress responses, eustress and distress. Eustress was the positive reaction towards stress and distress was the negative reaction. The focus was on a student population, because students experienced a vast amount of stress and not that much research has been conducted on the sources of eustress in students, compared to other focus groups (Gibbons, Dempster, & Moutray, 2008). The goal was to examine whether eustress and distress mediated the effect between the mindset towards stress and health.

Stress

One of the first to study stress was Hans Selye (1976). His definition said that "stress is the nonspecific response of the body to any demand" (Fink, 2010, p. 5). The response was always the same, no matter whether the situation was described as pleasant or unpleasant, stress was just the demand for readjustment. According to Selye (1976), it was not identical to emotional arousal or nervous tension. The difference was that stress cannot be avoided, because only trying to stay alive created some demand for life-maintaining energy (Fink, 2010). Nevertheless, there was a lot of criticism about Hans Selye´s stress definition including that it was too biological and ignored cognitive and psychological factors (Fink, 2010). Therefore, it was important to consider another definition. Lazarus (1966) defined stress as the relation between the person and the current environment. Stress occurred when the relation was perceived as personally significant and challenging the available resources for successful coping strategies (Folkman, 2013). Thus, not only biological, but also psychological and cognitive factors had an impact on the perception of stress.

Stress could be divided into two different types. The first and most researched form of stress was called distress (O´Sullivan, 2010). Next to this kind of stress, there existed a second concept, called eustress. Hans Selye (1976) was the first to describe this kind of stress and separated it from distress. His main argument was that stressors did not always have to be negative, but can also result in positive outcomes. Hereby it was important to mention that eustress and distress cannot be seen as two sides of one continuum. Rather, they had to be recognized as two separate constructs. They had the same underlying cause but were two different outcomes. Consequently, they did not exclude each other and could occur simultaneously (Simmons and Nelson, 2007).

Selye (1976) defined eustress as an adaptation process. This approach was further examined by Kupriyanov and Zhadanov (2014). They linked the allostasis theory to eustress. This theory stated that "an organism maintains its internal environment within parameters necessary for survival by changing its state and its behavior" (Kupriyanov & Zhdanov, 2014, p. 182). Eustress could be regarded as an increase of the buffer zone, with the effect of improving health and decreasing morbidity and mortality. Thus it was the transition of the internal body system from a high level of allostatic load to a lower level of allostatic load. This process resulted in an increase of the bodies adaptive capabilities (Kupriyanov & Zhdanov, 2014). A second approach to eustress was the one of Lazarus (1993). According to him, eustress was more than an adaptation process. Eustress was the positive cognitive appraisal of the response to a stressor. It was experienced when the outcome was positive and when it preserved or enhanced well-being. Furthermore, it could be experienced when a challenge occurred, because this was defined as the potential for growth (Simmons & Nelson, 2001). As could be seen during the previous description of eustress, two separate theories about eustress existed. The one of Selye (1976) and the one of Lazarus (1993). Nevertheless, those two were combinable, because they did not contradict. First, the processes of responding adaptive to stress had to be included, and second, the positive appraisal of the outcomes of such a process were considered (O´Sullivan, 2010). Based on these two theories, eustress was defined as the adaptational response towards a stressor, which is perceived as positive by the individual.

Distress was the state of stress which resulted in a unpleasant emotional reaction (Ridner, 2004) and an unhealthy bodily response (Dyrbye et al., 2005). According to different

studies (Saleh et al., 2017; Nerdrum, Rustøen & Rønnestad, 2006), especially students reported high levels of perceived stress and psychological distress. The largest psychological study of distress was implemented by Adlaf et al. (2001). They reported that around 30% of sampled undergraduate students in Canada experienced elevated psychological distress. Furthermore, compared to the general population, the amount of distress in undergraduate students was higher (Nerdrum et al., 2006). Reasons for this high amount of stress were increased scholastic workload, concern for academic performance and also personal factors like finding a new peer group (Dyrbye, Thomas & Shanafelt, 2005).

Mindset

A mindset was defined as the mental frame or lens we use to organize and encode information. Every person had a unique way of responding to the environment (Dweck, 2008) and this significantly influenced psychological, behavioral and physiological outcomes. More specifically, the effects regarded judgements, evaluations, health, behavior and intelligence (Crum et al., 2013). Weiner (1986) linked this to stress. He said that the attitude an individual had towards stress and towards the environment significantly influenced the amount of stress perceived by the individual (Weiner, 1986). Additionally, Le Fevre, Matheny and Kolt (2003) found out that the individual was the main predictor whether a stressor caused eustress or distress. According to them, the “distressful or eustressful nature of any particular stimulus is governed by how one interprets it and chooses to react to it (Le Fevre et al., 2003, p. 729).

Based on these findings, Crum et al. (2013) presumed that the mindset would have a direct effect on the perception of stress. He found that the perception of stress was significantly influenced by the mindset a person had towards stress in general. They defined the stress mindset as the extent to which an individual had the opinion that stress can be enhancing or debilitating and which effects this had for outcomes as work performance, productivity, health and well-being. According to them the stress mindset was a distinct variable predicting the stress response. It had a significant impact not only on short-term effect like motivation, but also on long-term effects like overall life satisfaction. To improve the person´s response to stress, the mindset of that person had to be changed, because the mindset was related to the perceived amount of stress (Crum et al., 2013).

Health

Health was defined as "the desirability of the immediate level of physical and mental well-being and the probability that the condition will deteriorate, remain constant over time or improve over time" (Patrick, Bush, & Chen, 1973, p. 7). This definition included both subjective well-being, as experienced by the individual, and objective well-being, as measured by a physician. The mindset towards stress has been found to be correlated with health. A positive mindset towards stress, namely that stress is enhancing, was correlated with better health, while participants with a negative mindset towards stress reported more health related problems (Crum et al., 2013). Individuals who had a negative mindset towards stress were less likely to engage in activities that influence health positively, like eating well, physical exercising and visiting physicians regularly (Levy & Myers, 2004). Furthermore, when comparing them to people with a positive mindset, they most likely died sooner (Levy et al., 2002).

Eustress had a positive effect on health, both direct and indirect. In situations where eustress was experienced, the production of anabolic hormones was stimulated and when the balance of anabolic hormones was exceeding the one of catabolic hormones, physiological growth occurred. Thus, eustress enhanced the physical state directly. Additionally, eustress facilitated effort and the abilities which were needed to cope with stress effectively, and good coping strategies were known to reduce physiological damage. Nevertheless, the problem with these findings was that due to methodological issues, the results were not conclusive, but rather suggestive (Edwards & Cooper, 1988). Another study that examined the effects of eustress on the perception of self-reported health was conducted by Simmons and Nelson (2001). They researched which effect eustress had on the well-being of hospital nurses. They found evidence for the assumption that there was a positive relationship between eustress and health. When the nurses reported eustress, the estimation of their health was higher.

The effects of distress on health were significant. The experience of distress resulted in poor self-care, for example a lack of exercise, a poor diet or substance abuse and this resulted in a decline of general physical health (Dyrbye et al., 2005). Furthermore, extensive evidence showed that distress enhanced the development of degenerative diseases and resulted in premature death (Edwards & Cooper, 1988). Another consequence distress had was directly related with death. It has been linked to the six most common causes of death:

heart diseases, accidents, cancer, liver disease, lung ailments and suicide (Crum et al., 2013). These results were supported by Fehrmann et al. (2017), who found that people who experienced more distress reported a worse health condition and were more likely to experience health related problems. Additionally, it had negative effects on the mental health of students. Saleh et al. (2017) found that 86.3% of their sample student population experienced anxiety and 72.9% experienced psychological distress. Furthermore, 79.3% reported depression and more than half of the population reported a low self-esteem. Another problem were sleeping disorders which caused fatigue, resulting in lower performances during the study (Saleh et al., 2017).

Current Research

Based on this literature review, the following research question was developed: How does the mindset towards stress influence the students judgement of the amount of eustress and distress they experience and how is this related to health outcomes? The aim was to examine whether eustress and distress mediate the relation between the mindset towards stress and health. The conceptual model can be found in Figure 1.

The following hypotheses have been formulated.

H1: A positive mindset towards stress is associated with good health and this association is mediated by eustress.

H2: A negative mindset towards stress is associated with bad health and this association is mediated by distress.

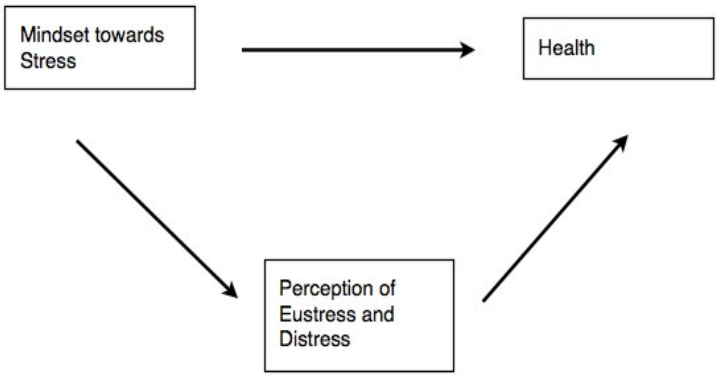

Figure 1. Conceptual model for the study

Method

Participants

From the 59 responses, 19 were male (32.2%) and 40 were female (67.8%). Their age was ranging from 18 to 33, with a mean of 22.41 years (*SD* = 2.96). All participants were students, with 37 (62.7%) having as highest educational qualification the secondary school degree, one participant (1.7%) finished vocational education, 16 (27.1%) had their Bachelor degree and five participants (8.5%) already obtained their Master degree. All the participants were reached via social media and emails and they took part in the study voluntarily. They did not receive any reward for the participation in the study.

Measuring instruments

Four questionnaires were used to answer the research question. First, the participants were asked about demographics including gender, age, highest educational qualification, whether they are currently treated for a mental disorder and the level of their english fluency.

The second questionnaire was the Stress Mindset Measure, developed by Crum et al. (2013). The questionnaire consisted of eight items asking about the way stress is experienced by the individual and their opinion about stress in general. The questionnaire included four negatively and four positively formulated items. An example item for the negative formulated statements would be “The effects of stress are negative and should be avoided“. These items were used to measure the stress-is-debilitating mindset of the participants. An example for the positive formulated items would be “Experiencing stress facilitates my learning and growth“. These were used to measure the stress-is-enhancing mindset. The participants had to state how much they agree to the statements using a 5-point-Likert-scale (0 = *Strongly Disagree;* 4 = *Strongly Agree*). A Cronbach´s alpha of .86 was found, which showed that the scale had a high internal consistency (Crum et al., 2013). Nevertheless, during this study, it was chosen to split the questionnaire into two subscales. One measuring the stress-is-enhancing mindset and the other measuring the stress-is-debilitating mindset. The stress-is-debilitating mindset had a poor internal consistency (α = .59) and the stress-is-enhancing mindset had an acceptable internal consistency (α = .73).

The next questionnaire was the Perceived Stress Scale with ten items (PSS-10) developed by Cohen et al. (1983). This questionnaire was the most widely used instrument to

measure the perception of stress. It measured how much stress the individual experienced during the last month. Although it was actually developed to measure stress in general, it could also be used to measure the amount of eustress and distress separately. The positive formulated items, in total four, were used to measure the degree of perceived eustress. An example item was “In the last month, how often have you felt confident about your ability to handle your personal problems?“. The negative formulated items, in total six, were used to measure distress. An example item was “In the last month, how often have you been angered because of things that were outside of your control?“. Then the participants had to react according to a 5-point Likert-scale (0 = *Never;* 4 = *Very Often*). The psychometric properties of the questionnaire were acceptable. The 10-item version of the Perceived Stress Scale was both reliable and valid. A Cronbach´s alpha of .89 has been calculated in a student population (Roberti, Harrington, & Storch, 2006). Nevertheless, the Cronbach´s alphas computed during this study were moderate to poor (eustress: $\alpha = .78$; distress: $\alpha = .67$).

The last questionnaire was the 36-Item Short Form Survey (SF-36), which was developed by the RAND Cooperation (RAND Health, n.d.). This questionnaire examined the quality-of-life by asking about physical and mental health. The whole questionnaire included eight scales. These scales could be divided into two different types of health, namely physical and mental health. The physical health measure consisted of physical functioning, role-physical, bodily pain and general health. And the mental health measure consisted of vitality, social functioning, role-emotional and mental health. These scales were measured using 36 items, which were clustered into 11 main topics, while always being related to one of the different scales mentioned before. Depending on the different main topics, the participants had to react according to a different answer scale. These included 3,5 or 6-point Likert-scales and yes-or-no-questions. An example statement would be “In general, would you say your health is“ with a 5-point Likert-scale as answer scale. According to McHorney, Ware, Lu and Sherbourne (1994), who compared different surveys discovering the psychometric properties of the test, the test was both valid and reliable. The item-internal validity and item-discriminant validity were satisfactory, while Cronbach´s alpha had a median of .85, which showed that the questionnaire had a high internal consistency (McHorney, et al., 1994). The computed Cronbach´s alpha for this study was .89, which supported the finding that it had a high internal consistency.

Procedure

The study was approved by the ethical committee of the University of Twente. The period of data collection was four weeks. It started on the 29th of March and was closed on the 28th of April. To conduct the necessary data the four questionnaires described above were all transformed into online questionnaires, using the survey website Qualtrics. To contact participants, the link to the survey was posted on facebook with basic information about the topic and the sample group that was needed. Additionally, it was mentioned that it would take 15-20 minutes to fill in the questionnaire. Next to using social media, friends were approached by personal contact, for example through text message or telephone calls. Participants had to click on the link which redirected them to the website of the questionnaire. During the first part of the questionnaire, the participants were informed what the questionnaire was about and they were asked for their informed consent. Next, the participants filled in the four questionnaires. After all questionnaires were completed, the participants were asked if they wanted to be informed about the results of the research. If so, they had to fill in their email-address. Furthermore, they were thanked for their participation and informed about the possibility to contact the researchers in case of any questions.

Design and Analysis

The research had a descriptive, cross-sectional design. SPSS 22.0 was used to analyze the data. First, descriptive statistics were computed. These included the means, standard deviation, skweness, kurtosis and Cronbach´s alpha of all variables. Second, depending on the normality of the data, Pearson or Spearman correlations were employed. The effect sizes were set at .30 (medium effect) and .50 (large effect). The statistical significance was set at $p < .05$ (moderately significant) and $p < .001$ (significant).

Second, the indirect effects were imputed to determine mediation. The indirect effect of the variable eustress on the association between a stress-is-enhancing mindset as the independent variable and health as the dependent variable was analyzed, hereby it was controlled for the effect of distress. Then, the indirect effect of the variable distress on the association between a stress-is-debilitating mindset and health was analyzed, hereby it was controlled for the effect of eustress. The MEDIATE file developed by Hayes and Preacher (2014) was used to analyze these effects. One concern was that the sample size was small

(59). According to Fritz and MacKinnon (2010), the sample size should be at least 20,886, to achieve a high power. Nevertheless, the use of the mediation analysis could be supported by referring to Preacher and Hayes (2004). With a bootstrap sampling of 50,000, it was possible to circumvent the power problem and to apply the analysis with more confidence.

Results

Preliminary analyses

Table 1 depicts the descriptive statistics and zero-order correlations for all variables of the two mediator models. Before analyzing these correlations it was examined whether the variables were normally distributed. When looking at the two mindsets, participants scored higher on a stress-is-debilitating mindset (*M* = 3.11, *SD* = .64) which was normally distributed with a skewness of .13 (*SE* = .31) and a kurtosis of -1.07 (*SE* = .61). The stress-is-enhancing mindset (*M* = 2.82, *SD* = .69) was also normally distributed with skewness of -.26 (*SE* = .31) and kurtosis of -.80 (*SE* = .61). Furthermore, most participants scored higher on eustress (*M* = 3.65, *SD* = .56). This variable was normally distributed with skewness of -.37 (*SE* = .31) and kurtosis .55 (*SE* = .61). Distress (*M* = 2.86, *SD* = .61) was also normally distributed with skewness of .35 (*SE* = .31) and kurtosis of .15 (*SE* = .61). Furthermore, the participants reported a good health condition when comparing the findings to the norm (current study: *M* = 79.19, *SD* = 11.32; norm group: *M* = 64.16) (RAND Health, n.d.). Health was normally distributed with skewness of -.81 (*SE* = .31) and kurtosis of -.19 (*SE* = .61).

Table 1

Descriptive Statistics and Correlations

	N	M	SD	1.	2.	3.	4.	5.
1. Positive Mindset	59	2.82	.69	-				
2. Negative Mindset	59	3.11	.64	-.79**	-			
3. Distress	59	2.86	.61	-.45**	.38**	-		
4. Eustress	59	3.65	.56	.42**	-.48**	-.54**	-	
5. Health	59	79.19	11.32	.45**	-.49**	-.62**	.57**	-

Note. Pearson's r was calculated to examine the associations between all variables. *p < .05. **p < .001.

Stress-is-enhancing mindset

Table 2 reports the direct effects between the independent variable stress-is-enhancing mindset, the mediators distress and eustress and the dependent variable health. The total variance explained by the proposed model was significant (R^2 = .20, F(3, 55) = 17.06, p < .001). The stress-is-enhancing mindset was significantly associated with eustress (β = .34, p = .001) and distress (β = -.4, p < .001). Additionally, the effect of the mediator eustress on the dependent variable was significant (β = 6, p = .015). The effect of distress on health was also significant (β = -7.25, p = .002).

Table 2

Mediation Analysis for a Stress-Is-Enhancing Mindset (IV), Distress and Eustress (Mediators) and Health (DV)

Stress-is-enhancing mindset (IV to mediators)					Health (Mediators to DV)			
β	SE	t	p		β	SE	t	p
.42	.12	3.44	.001	Eustress	.30	.12	2.50	.015
-.45	.12	-3.79	< .001	Distress	-.39	.12	-3.27	.002

The first mediation analysis showed that the relation between a stress-is-enhancing mindset and health was significant (total effect: β = .45, t(59) = 3.81, p < .001). When looking at the direct effect controlling for the mediators, the association was not significant (direct effect: β = .15, t(59) = 1.45, p = .182). The total indirect effect of the two mediators predicting the coherence between the stress-is-enhancing mindset and health was significant (β = .30), because the bootstrap confidence interval did not include zero [.15, .51]. Furthermore, the indirect effect of eustress was significant (β = .12; [.03, .28]) and the indirect effect of distress as well (β = .18; [.06, .37]). Thus, the first hypothesis was supported. Eustress significantly influenced the effect a stress-is-enhancing mindset has on health. The results can be seen as a graphic display in Figure 2.

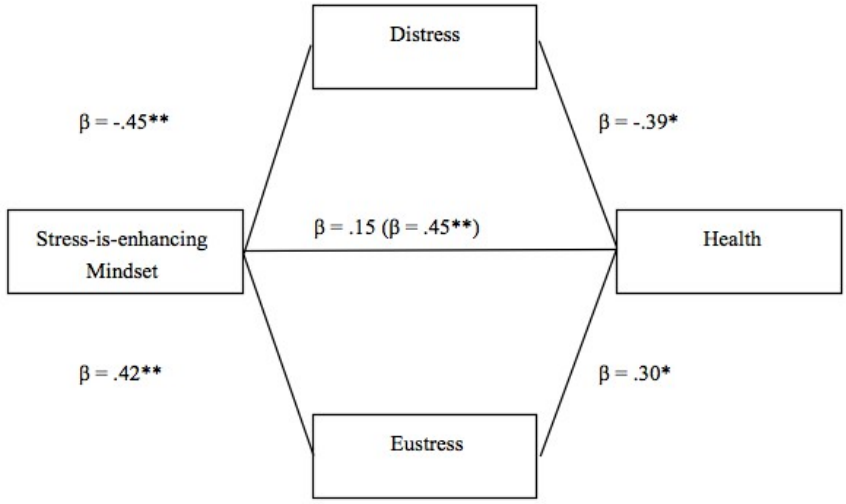

Figure 2. Overview of results. *$p \leq$ .05. **$p <$ .001. The value between the parentheses indicates the 'total' affect.

Stress-is-debilitating mindset

Table 3 reports the direct effects of the independent variable stress-is-debilitating mindset, the two mediators eustress and distress and the dependent variable health. The total variance explained by the proposed model was significant (R^2 = .50, F(3, 55) = 18.28, $p <$ .001). A stress-is-debilitating mindset was significantly associated with eustress (β = -.48, $p <$ .001) and distress (β = .38, p = .003). Furthermore, the association of eustress and health was only moderately significant (β = .25, p = .042), while the association of distress and health was significant (β = -.40, $p <$ .001).

Table 3

Mediation Analysis for a Stress-Is-Debilitating Mindset (IV), Distress and Eustress (Mediators) and Health (DV)

Stress-is-debilitating mindset (IV to mediators)					Health (Mediators to DV)			
β	SE	t	p		β	SE	t	p
-.48	.12	-4.09	< .001	Eustress	.25	.12	2.08	.042
.38	.12	3.12	.003	Distress	-.40	.12	-3.51	<.001

The results indicated that a stress-is-debilitating mindset was significantly associated with lower health (total effect: β = -.49, $t(59)$ = -4.22, p < .001). When controlling for the indirect effect, the association was moderately significant (direct effect: β = -.21, $t(59)$ = -1.95, p = .057). The results indicated that the total indirect effect of the stress-is-debilitating mindset on health was significant (β = -.27) with a bootstrap confidence interval not including zero [-.45, -.15]. Additionally, the indirect effect of eustress was significant (β = -.12; [-.27, -.01]) and the indirect effect of distress as well (β = -.15; [-.32, -.06]). Thus the second hypothesis was supported. The relation between a stress-is-debilitating mindset and health was significantly influenced by distress. These results can be found in Figure 3.

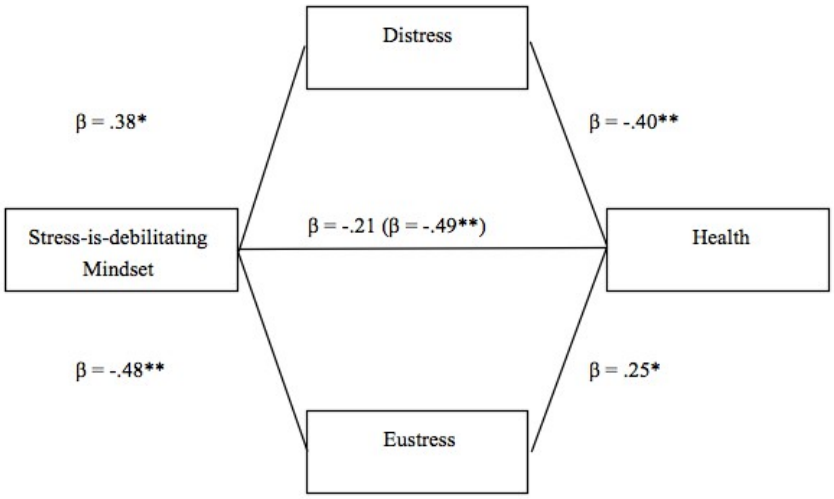

Figure 3. Overview of results. *$p \leq$ .05. **p < .001. The value between the parentheses indicates the 'total' affect.

Discussion

The purpose of this paper was to investigate the relation between the mindset towards stress, eustress, distress and health. Specifically, the aim was to determine whether the two variables eustress and distress have an indirect effect on the association between the mindset towards stress and health. The first hypothesis was that the relation between a stress-is-enhancing mindset and health is mediated by eustress. The second hypothesis was that the relation between a stress-is-debilitating mindset and health is mediated by distress. The results showed that both hypothesis were supported.

Both mediators were significantly influenced by the mindset towards stress. A stress-is-enhancing mindset significantly influenced eustress and a stress-is-debilitating mindset significantly influenced distress. This finding supports previous research. Crum and Lyddy (2014) stated that a stress mindset is a self-fulfilling prophecy. According to them, the stress mindset we hold alters and influences the effects of stress, with the consequence of making the expected effects more likely. Thus, the mindset we hold significantly influences the way of experiencing stress and the ways of coping with stress. Hereby the stress-is-enhancing mindset results in better outcomes when comparing it to the stress-is-debilitating mindset (Crum & Lyddy, 2014).

Furthermore, both mediators were significantly associated with health. Eustress was related with good general health and distress was related with worse general health. When looking at previous research papers, it becomes obvious that the effects of eustress on health were only speculative and no significant results could be found (Salovey et al., 2000; Edwards & Cooper, 1998). Thus the finding, that eustress is significantly related with better health among students is innovative in the eustress research. It supports both the speculations of Edwards and Cooper (1988) and the finding of Simmons and Nelson (2001).

The effect of distress on health was supported by a number of research (Edwards & Cooper, 1988; Schneiderman, Ironson, & Siegel, 2005). Edwards and Cooper (1988) reported that distress enhances the development of degenerative diseases, with the result of premature death. This was supported by Crum et al. (2013) who found that distress is linked to the six most common causes of death. Additionally, Schneiderman et al. (2005) reviewed different research papers and found that distress affected the probability of developing cold symptoms, resulted in a faster progression of HIV to AIDS and influenced the exacerbations of autoimmune diseases.

Furthermore, both hypotheses were supported by the results. Eustress influenced the relation between a stress-is-enhancing mindset and higher health scores. This is in line with the research by Tugade, Fredrickson and Feldman Barret (2004). They focused on the association between positive emotions and health and found that people that experience more positive emotions are characterized by a high resilience level. Thus the ways of coping with stress are more effective and they do not value stress as negative that fast. Furthermore, their ways of coping are more broad-minded, which according to Tugade et al. (2004) results in

more experienced eustress and consequently better health. Thus, a positive mindset could result in more positive emotions and an increase of eustress, because eustress has been linked to positive emotions (McGowan, Gardner & Fletcher, 2006).

The second hypothesis was supported as well. There exists a relation between a stress-is-debilitating mindset and health and this mindset is indirectly affected by the mediator distress. This aligns with the findings of Crum et al. (2013). They found that a stress-is-debilitating mindset results in worse health when comparing it to a stress-is-enhancing mindset (Crum et al., 2013). People with a negative mindset are more likely to have de-regulated physiological arousal, for example excessively high cortisol levels, when they have to respond to a specific stressor (Crum & Lyddy, 2014). Furthermore, according to Crum, Leibowitz and Verghese (2017b), mindsets significantly influence physical symptoms of patients. They found that a negative mindset results in higher pain responses and more side effects. Additionally, a study by Keller et al. (2012), found that when controlling for the actual stress level, participants with a stress-is-debilitating mindset experienced significantly more health related problems and were more likely to die prematurely.

Limitations

Different limitations were faced during this research. First of all, the sample size was low. Although the bootstrap sample was raised up to 50,000, the representativeness of the results is still low. Therefor, the findings are not conclusive and future research has to be conducted with a larger sample size. Furthermore, based on the proposed model, it was only possible to describe associations, but no causality could be demonstrated.

The second problem regarded the chosen questionnaires. The health questionnaire was actually developed for measuring the quality of life of different patient populations (RAND Health, n.d.). The sample in this group did not include patients. All participants were healthy individuals without current diseases and none of them was older than 35 years. Nevertheless, the questionnaire was still appropriate, because it was sensitive enough to generate significant results.

The last problem was that the internal consistency for both mindset measurements and both stress measurements was low. This influenced the representativeness of the results, because the scores cannot be seen as reliable. The reason to still use the questionnaire for the

mindset towards stress was that no other questionnaire was available. Furthermore, Nielsen et al. (2016), examined the dimensionality of the PSS-10 and no unidimensionality could be established. The PSS-10 is better considered as a two-dimensional model, because eustress and distress have to be seen as two separate concepts, instead of the two sides of one continuum (Simmons and Nelson, 2007). Supporting this assumption, Nielsen et al. (2016) found that the statistical fit for a two-dimensional model was better than for the unidimensional model. Another reason to use the positively formulated items to measure eustress is that there is no valid scale for measuring eustress so far (O´Sullivan, 2010).

Future Research

The first aspect future research should focus on is to verify the found results. This includes having a larger sample size. Furthermore, it would be important to not only focus on self-reported stress, but to examine the effects of the mindset on objective health measured by physicians. Another aspect that requires more research is the type and the amount of stress people experience. There is a difference between acute and chronic stress and consequently, this influences the findings. Thus, it has to be looked at which effect the mindset has on the different types of stress. Furthermore, the amount of stress differs significantly between people. The resulting question that has to be researched is whether a positive mindset still has a more positive effect when the amount of stress is extremely high.

Another future research could focus on the way of changing the mindset of people towards stress. As suggested by this research, a stress-is-debilitating mindset resulted in more distress and a bad health condition. Among students this is a problem, because they experience a great amount of stress during their study and this influences their academic performances (Dyrbyre et al, 2005; Saleh et al., 2017). Recent research already addressed this problem. Different studies tried to find solutions to change the mindset of people to a stress-is-enhancing mindset (Crum, 2011; Crum et al., 2017a). The most current research was implemented by Crum et al. (2017a). They tried to manipulate the stress mindset of participants by showing them short multi-media film clips. Thereby they either enhanced or debilitated the nature of stress. Their results showed that it is possible to influence the mindset of the participants. The responses towards stress were improved in both a challenging stress condition and a threatening stress condition. The participants experienced

an increase in anabolic hormones, also called growth hormones. They experienced more positive emotions and their cognitive flexibility increased. Furthermore, they experienced a greater attentional bias towards happy faces. Another study that supported these findings was implemented by Crum (2011). She assigned individuals to two different conditions, one control condition and one treatment condition. In the treatment condition the participants were informed about the nature of stress and trained to apply a stress-is-enhancing mindset. This training program resulted in improved health and better performance at work. Thus it can be concluded that it is possible to train a stress-is-enhancing mindset with better outcomes regarding health, performance and general quality of life. Future research should focus on the long-term effects of these treatments. It is not known yet if the change of mindset still exists after some years. Furthermore, the focus groups so far were students and employees and it was not looked at children yet. Nevertheless, it would also be interesting to apply these findings to children and to change their mindset towards stress. In a longitudinal research it could then be examined whether this early change of mindset still has a positive effect when they get older so that the negative health outcomes perceived by many students and employees could be prevented.

CONCLUSION

After implementing this research, it became obvious that there exists no direct relation between the mindset towards stress and health. Eustress explains the association between a stress-is-enhancing mindset and health and distress explains the association between a stress-is-debilitating mindset and health. This means that the two stress responses are the main indicator of whether the mindset results in good or bad health.

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