UNIVERSITY OF TWENTE.

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Bachelor Thesis

Positive Psychology and Technology

The Indirect Effects of Eustress and Distress on the Relation between an Individual's Locus of Control and Depressive Symptoms

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ABSTRACT

There is growing interest in moving away from unidimensional conceptions of stress towards the recognition of the effects of contexts and personality factors on the appraisal of stressors and the resulting stress experience. Therefore, the present study aimed at examining two qualitative different stress responses: eustress, the healthy and constructive stress response, and distress, the more negative stress response. Eustress and distress experiences were compared with regard to their indirect effects on the relationship between an individual's predominant locus of control (LOC) and depressive symptoms. It was assumed that internality (the belief of being in control over one's own life) exerts a negative influence on the onset of depressive symptoms by promoting eustress. Externality (the feeling of being guided by external forces) was expected to be positively correlated with depressive symptoms since it may lead to the more frequent experience of distress. For testing the assumed associations, an exploratory cross-sectional correlational survey design was employed. Contrary to previous assumptions, data analysis shows that the relations between the different aspects of LOC and depressive symptoms are all mediated by distress but not by eustress. Nevertheless, the present study contributes to the reduction and prevention of depressive symptoms by demonstrating the importance of perceived personal control for coping with stressors. It is highly recommended to expand psychoeducation courses to include strategies for enhancing and maintaining a sense of control over one's own life. Furthermore, depressive symptoms interventions are encouraged to shift focus from solely reducing distress experiences to supporting eustress experiences as well.

Keywords: locus of control, eustress, distress, depressive symptoms

SAMENVATTING

Er is behoefte aan alternatieve stress concepties die rekening houden met de invloed van persoonlijkheidskenmerken en verschillen in situaties op de evaluatie van de stressor en de daaraan verbonden stress ervaring. De huidige studie draait dus om twee kwalitatief van elkaar verschillende stress ervaringen: eustress, de gezonde en constructieve stress reactie, en distress, de ongezonde en destructieve reactie op stress. Eustress en distress ervaringen worden vergleken ten opzichte van hen indirecte effecten op de relatie tussen iemands beheersingsoriëntatie (d.w.z. iemands locus of control) en depressieve klachten. Er werd ervan uitgegaan dat een interne beheersingsoriëntatie (het geloof dat jezelf je eigen leven bepaalt) leidt tot minder depressieve klachten door eustress ervaringen te bevorderen. Bovendien werd verwacht dat een externe beheersingsoriëntatie (het geloof dat je leven wordt bepaald door externe factoren zoals het lot of andere mensen) leidt tot de ontwikkeling van depressieve klachten door distress ervaringen te bevorderen. Om deze verwachtingen te toetsen is een explorative cross-sectional survey design gebruikt. In tegenstelling tot de verwachtingen liet de data analyse zien dat de verbanden tussen de verschillende beheersingsoriëntaties en depressieve klachten gemedieerd worden door distress maar niet door eustress. Desondanks draagt de huidige studie bij aan de vermindering en preventie van depressieve klachten door te wijzen op het belang van persoonlijke controle voor het omgaan met stressoren. Als logisch gevolg wordt aanbevolen strategieën ter sterking van persoonlijke controle op te nemen in psycho-educatie cursussen. Bovendien wordt aangeraden de focus niet alleen te leggen op de vermindering van distress maar ook op de bevordering van eustress om het welbevinden van mensen te vergroten.

Sleutelwoorden: beheersingsoriëntatie, eustress, distress, depressieve klachten

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INTRODUCTION

Stress is an inevitable part of everyday living. We may experience stress before having an exam, while driving to work or when breaking up with our partner. Most commonly, stress is associated with negative emotions and outcomes. However, stress experiences may also be positive in nature. Over the last 50 years, more and more research has been conducted investigating the positive effects of stress. In 1975, Selye was the first to use the term eustress for such positive stress outcomes, thereby introducing the differentiation between *distress* and *eustress*.

According to Nelson and Simmons (2011), distress can be defined as the outcomes of stressful events that may cause impairment in physiological, psychological and affective functioning. Previous research established a link between distress and mental health problems such as burnout (Maslach, Schaufeli, & Leiter, 2001) and impaired cognitive functioning (McEwen & Seeman, 1999), as well as depression and anxiety disorders (Dyrbye, Thomas, & Shanafelt, 2006; Hammen, 2005). Experiencing distress may also have a serious impact on physical health by contributing to the development of cardiovascular disease (Myers, 2017), cancer (McDaniel, Musselmann, Porter, Reed, & Nemeroff, 1995) and strokes (Sapolsky, 1996). Hence, distress has consistently been linked to negative work-related outcomes such as turnover (Mosadeghrad, Ferlie, & Rosenberg, 2011) and absenteeism (Manning & Osland, 1989). According to the Netherlands Organisation for Applied Scientific Research (TNO), for instance, distress is one of the most frequent reasons for sick leave in the Netherlands, costing employers an estimated 2.2 billion Euros each year (den Broeder-Ooijevaar, 2015).

Compared to distress, eustress is a less examined construct. The term describes the positive effects of stressful events on body and mind (Selye, 1975). Experiencing eustress includes being focused and being in a healthy state of aroused attention and exhilaration, for example (Hargrove, Nelson, & Cooper, 2013). This is in line with a study of Cahill, Gorski and Le (2003) who demonstrated that eustress contributes to memory consolidation by making use of a free-recall test. With regard to occupational settings, Fay and Sonnentag (2002) found that employees experiencing eustress are more likely to take personal initiative, thereby displaying extra-role behaviour (i.e. voluntary action not explicitly demanded by supervisors). Consequently, eustress has frequently been linked with enhanced work performance, physical health and psychological well-being (e.g. Babakus, Cravens, Johnston, & Moncrief, 1999; Simmons & Nelson, 2007) and is even able to reduce the negative effects of earlier experienced distress (Edwards & Cooper, 1988).
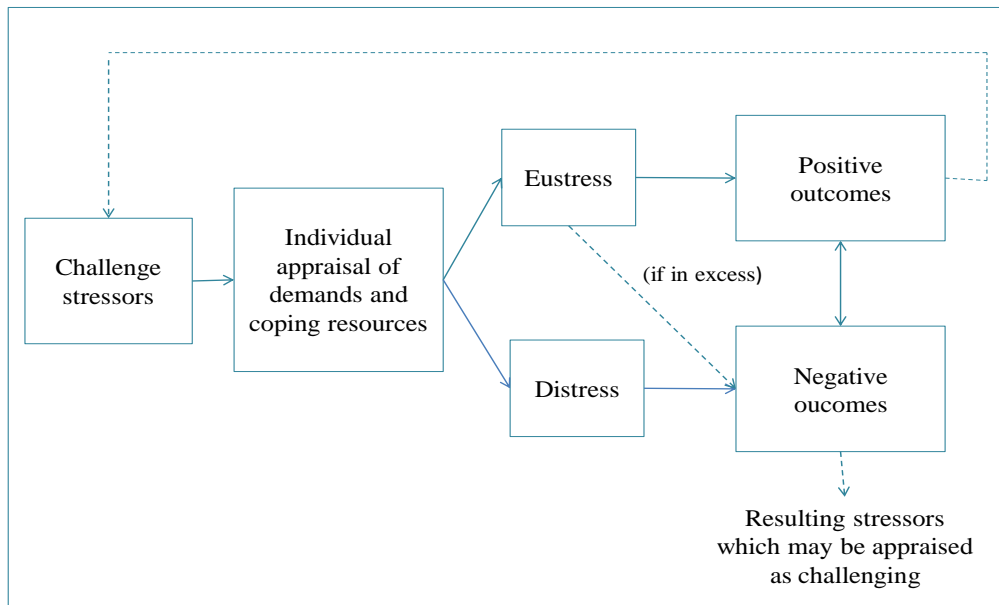
Figure 1. Simplified version of the HRD eustress model. Adapted from "The HRD eustress model: generating positive stress with challenging work," by M. B. Hargrove, W. S. Becker, & D. F. Hargrove, 2015, *Human Resource Development Review, 14*(3), p. 285.

For a better understanding of the development of eustress and distress and their possible consequences, the human resource development (HRD) eustress model of Hargrove et al. (2015) is discussed. The model presents eustress and distress in terms of stressors, individual responses and different outcomes (*see* Figure 1). The authors assume that if individuals are confronted with a stressor, they appraise the nature of this stressor with regard to the demands and their own coping resources (Hargrove et al., 2015). For instance, an individual's predominant locus of control (LOC; i.e. the extent to which people believe that they are in control over their lives) may influence whether a stressor is perceived as a challenge or hindrance, thereby determining the nature of the resulting stress response. When stressors are perceived as challenging and controllable, eustress arises. If people believe that their abilities are insufficient to cope effectively with the stressor, it is experienced as hindrance and distress results. As outlined above, eustress usually leads to positive outcomes such as well-being and enhanced performance (e.g. Babakus et al., 1999; Simmons & Nelson, 2015), whereas distress is usually associated with more negative outcomes such as depressive symptoms (Hammen, 2005).

The present study intends to shed more light on the relationships between eustress, distress and the onset of depressive symptoms. A personality factor that may exert an influence on both eustress and distress as well as on depressive symptoms is LOC. It is assumed that a LOC regulates the nature of the stress experience, thereby having an impact on

the outcomes of the stress response. In order to further examine these assumptions, the present study investigates the indirect effects of eustress and distress on the relationship between an individual's predominant LOC and the onset of depressive symptoms. In the following sections, the constructs LOC and depression are introduced and related to each other as well as to the factors eustress and distress.

LOC and depressive symptoms

Personality research has shown that people differ in the extent to which they experience control over their own lives. This difference is reflected in an individual's LOC. People with an internal LOC feel in control over their own lives, whereas people with an external LOC feel guided by external forces such as fate or the actions of others (Rotter, 1966). Individuals characterized by an external LOC can be further sub-divided into (a) defensive externals and (b) congruent externals (Jaswal & Dewan, 1997). Defensive externals feel controlled by concrete agencies such as parents and teachers, whereas congruent externals believe that they are controlled by luck, fate and destiny.

A growing body of research indicates a relation between LOC and depressive symptoms. Such symptoms include depressed mood, less interest or enjoyment of most activities, significant weight change, fatigue, feelings of worthlessness, lack of concentration and recurrent thoughts of death and suicide (Davey, 2015). While investigating the relationship between LOC and depression, Jaswal and Dewan (1997) found that an internal LOC is negatively related to depression, whereas an external LOC is positively related to depression. This finding is supported by Endlich (1998) who demonstrated that college students diagnosed with depression are more likely to believe that their lives are controlled by external forces. More recently, an external LOC was found to be a significant predictor of prenatal depression (Richardson, Field, Newton and Bendell, 2012). Similarly, an external LOC was associated with higher levels of depression in a study investigating the quality of life of patients with Parkinson's disease (Zampieri & de Souza, 2011). Regarding the difference between defensive and congruent externality, it was found that depressive symptoms were predicted by congruent but not by defensive externality (Zawawi and Hamaideh, 2009). However, Jaswal and Dewan (1997) also found a positive correlation between defensive externality and depressive symptoms.

The issue of how LOC and depressive symptoms are connected has long been a topic of debate. It appears that an internal LOC is positively associated with other intrinsic factors including self-efficacy (Greenwood, Olejnik, & Parkey, 1990), self-esteem and higher self-

evaluations (Burns, 1979). Internals are thus more confident about their abilities and possess a more positive self-concept. Moreover, internals are expected to be more autonomous since research revealed that they are able to monitor and adjust thoughts, feelings and actions in a way that they fit with personal goals (Toussi and Ghanizadeh, 2012; Williams, McGregor, Zeldman, Freedman, & Deci, 2004). All together, these intrinsic factors are assumed to support the experience of life satisfaction and general well-being, thereby functioning as a protector against the onset of depressive symptoms (Berghella, 2014; Gibson et al., 2013; Zawawi & Hamaideh, 2009).

Externals are more likely to develop depressive symptoms since externality is characterized by the pessimistic belief that individual actions have little effects over outcomes. This idea is reflected in Seligman's (1975) theory of learned helplessness which argues that it is the perceived uncontrollability that makes the individual learn to become 'helpless', lethargic and depressed. In line with this theory, lack of personal control has been linked with increased passivity and a lack of motivation (Abramson, Metalsky and Alloy, 1989). Furthermore, perceived uncontrollability has often been associated with lower self-esteem as well as with poor self-evaluations (McCauley, Mitchell, Burke and Moss, 1988; Zahn et al., 2015). These negative factors may cause impairments in an individual's emotional and cognitive functioning, ultimately leading to the development of depressive symptoms.

The indirect effect of stress

Another factor that might influence the relation between an individual's predominant LOC and depressive symptoms is the stress response. The extent to which eustress and distress can be predicted by an individual's predominant LOC can be determined by utilization of the HRD eustress model illustrated above. As explained earlier, the model assumes that eustress and distress result from different appraisals of a stressor (Hargrove et al., 2015). According to Nelson and Simmons (2011), externals are more likely to perceive demands as threats since they believe that they exert little control over possible outcomes. They also often feel that they do not have sufficient resources for coping with a stressor. Therefore, they are generally more likely to experience distress. Internals, on the other hand, are predisposed to appraise demands as opportunities rather than as threats and believe that they possess the necessary resources for coping with the demand. As a result, they are more likely to experience eustress than are externals (Nelson & Simmons, 2011).

It depends on the stress response whether depressive symptoms are experienced. Since individuals experience eustress when they cope well with a stressor, eustress might be

regarded as a source of pride and self-esteem and is therefore expected to be negatively correlated with depressive symptoms (Selye, 1975). Moreover, eustress may result in a greater ability to cope with future stressors, as indicated by the backward loop in the HRD model. McGowan, Gardener and Fletcher (2006) supported this assumption by demonstrating that eustress is positively related to subjective performance. This greater coping ability may prevent the development of depressive symptoms. Life satisfaction is another positive outcome associated with the experience of eustress (O'Sullivan, 2011) and frequently found to be negatively correlating with depressive symptoms (e.g. Saunders & Roy, 1999; Zawawi & Hamaideh, 2009). In general, eustress is thus assumed to decrease depressive symptoms or prevent them in the first place, whereas distress is expected to support the development of depressive symptoms (e.g. Dyrbye, Thomas, & Shanafelt, 2006; Hammen, 2005).

The present study

The main interest of the present study is investigating the indirect effects of eustress and distress on the relationship between an individual's predominant LOC and depressive symptoms. With regard to relevant literature, three distinctive multiple meditation models are developed which are summarized in Figure 2. Based on this model, several hypotheses are formulated that are tested in the present study.
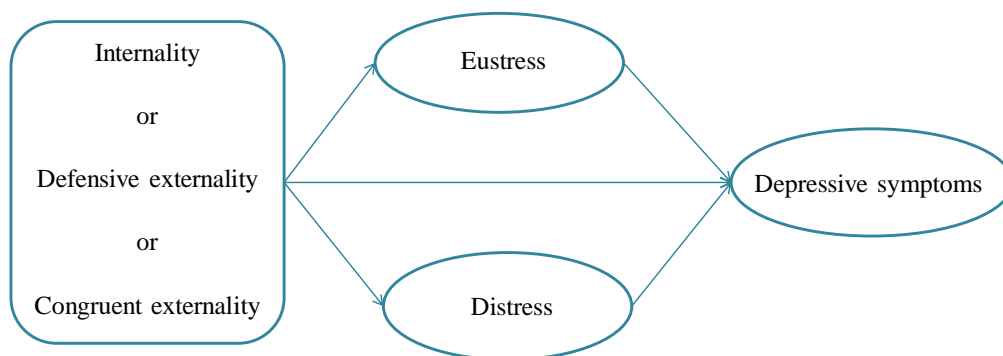

Figure 2. The indirect effect of eustress and distress on the relation between LOC and depressive symptoms.

To begin with, it is expected to find correlations and relations between the independent variables and the dependent variable. In particular, it is assumed to find (Ia) internality and depressive symptoms to be negatively associated. This assumption is based on a study by Berghella (2014), who argued that internals possess intrinsic factors which may also exert a protective function with regard to depressive symptoms. Moreover, it is expected that (Ib) defensive externality and depressive symptoms are positively associated since lack of

personal control is often associated with helplessness and consequently also with depression (Jaswal & Dewan, 1997; Seligman, 1975). The same applies to (Ic) congruent externality and depressive symptoms.

It is also expected to find associations between the independent variables and the mediators eustress and distress. First, it is assumed that (Id) internality is positively associated with eustress as internals are likely to appraise demands as opportunities rather than as threats and believe that they possess the necessary resources for coping with the demand (Nelson & Simmons, 2011). Consequently, it is expected (Ie) to find internality and distress to be negatively associated. Furthermore, (If) defensive externality is assumed to be negatively associated with eustress since externals are likely to perceive demands as threats (Nelson & Simmons, 2011). For the same reason, it is expected (Ig) to find defensive externality to be positively associated with distress. Since defensive and congruent externality both are aspects of externality, it is suggested to find similar correlations and relations for congruent externality. Therefore, (Ih) congruent externality is expected to be negatively associated with eustress but (Ii) positively associated with distress.

Moreover, it is assumed to find associations among the mediators eustress and distress and the dependent variable. With regard to eustress, it is expected to find (Ij) a negative association with depression because of positive self-evaluations triggered by the experience of eustress (Selye, 1975). These may protect individuals against the onset of depressive symptoms. However, (Ik) distress and depressive symptoms are assumed to be negatively correlated and related.

Based on the hypotheses formulated above, it is assumed to find a number of indirect effects. First, (IIa) eustress and (IIb) distress are expected to have an indirect effect on the relation between internality and depressive symptoms. Similarly, it is assumed that (IIc) eustress and (IId) distress have an indirect effect on the link between defensive externality and depressive symptoms. Finally, (IIe) eustress and (IIf) distress are assumed to have an indirect effect on the relationship between congruent externality and depressive symptoms.

METHOD

Design

In this study, an exploratory cross-sectional correlational survey design was employed. The level of depression was used as dependent variable, while internality, defensive externality and congruent externality were used as independent variables. The relationship between those variables was supposed to be mediated by the variables eustress and distress.

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Respondents

The original sample consisted of 144 full aged people but 38 participants did not fill out the questionnaire completely. Another five participants had to be excluded because of poor or terrible English skills. The remaining 101 participants rated their English skills as good (50.5%) or even excellent (24.8%). Eventually, their data was used for analysis (*see*

Table 1

Characteristics of participants (n = 101)

	Frequency	%
Gender		
Male	44	43.6
Female	57	56.4
Age		
18-25 years	76	76.8
26-35 years	13	13.1
36-45 years	4	4.0
46-55 years	4	4.0
56-65 years	4	4.0
Marital status		
Single	44	43.6
In a relationship	48	47.5
Married	9	8.9
Highest educational qualification		
Vocational education	3	3.0
Secondary education	1	1.0
Higher secondary education	64	63.4
Bachelor's degree	20	19.8
Master's degree	13	12.9
Current occupational status		
Student	64	63.4
Employed for wages	30	29.7
Self-employed	1	1.0
Unemployed	3	3.0
Other, namely	3	3.0

Table 1; 43.6% male, 56.4% female, $M_{age} = 26.09$, age range: 18-59 years). With 63.4%, students constituted the largest group, while participants who were employed for wages represented the second largest group (29.7%).

Procedure

Before data collection started, the applied procedure was checked and formally approved by the ethical commission of the University of Twente. During the month of data collection (April 2017), participants were recruited by means of convenience sampling. For validation purposes, people of different age groups were invited to take part in the study. To be able to take part, however, people had to be fluent in English since the questionnaire was written in English. Another study requirement was to have basic knowledge of computers or other devices with internet connection as participants had to fill out the questionnaire online.

A number of participants decided to take part as a result of word-of-mouth recommendation but most of them were approached via social media (i.e. facebook and WhatsApp). In both cases, participants were provided with a short description of the study topic and the procedure as well as with an online link through which they could enter the questionnaire. Moreover, they were encouraged to send the link to other people in their social environment in order to increase the number of participants by means of snowball sampling.

Clicking on the link opened the questionnaire on Qualtrics, an internet platform for creating online surveys. Initially, the aim of the study was shortly explained and participants read about the length of the study (approximately 35 minutes). Furthermore, they were informed that they would not get any rewards from participating but that participation is completely voluntary and that they may choose to discontinue the study at any point in time. Finally, participants were provided with information about the confidential manner in which their data would be stored and processed. They had to declare their consent with these terms and conditions before filling out the questionnaire. For more detailed information on the study topic and the applied procedure, participants were encouraged to send an e-mail to the researcher.

Measuring instruments

The questionnaire used in this study consists of several demographic questions, some scales adopted from previous research and a newly designed scale measuring distress and eustress. In total, the questionnaire contains 204 items. Since the present study was part of a more general research on eustress, the short form of the Mental Health Continuum (MHC-

SF), the revised versions of the Life Orientation Test (LOT-R) and the Ego-Resiliency Scale (ER89), the COPE Inventory and the General Self-Efficacy Scale (GSE) were integrated in the questionnaire for other researchers' purposes. For the present study, however, the depression subscale of the Hospital Anxiety and Depression Scale (HADS-D), Levenson's (1973a) Multidimensional Locus of Control IPC Scale (IPC LOC Scale) and the newly created scale measuring distress and eustress are of primary importance.

Locus of control. As indicated by the name, Levenson's (1973a) IPC LOC Scale measures the extent to which people believe that they exert control over their lives. The scale consists of three subscales with eight items each. These are presented to the participant as a unified 24-items scale, with the items being of a 6-point Likert-type, ranging from -3 = *strongly disagree* to 3 = *strongly agree* (*see* Appendix A). The first subscale measures internality by items such as 'Whether or not I get into a car accident depends mostly on how good a driver I am'. Calculating Cronbach's alpha revealed a poor internal consistency (α = .57) but previous studies found more acceptable alphas between .70 and .80 for all LOC dimensions (e.g. Kourmousi, Xythali, & Koutras, 2015; Levenson, 1973b). A participant's external LOC is assessed by the second and third subscale, with the second subscale examining defensive externality and the third subscale comprising eight items with reference to congruent externality. An example of an item from the second subscale is 'Whether or not I get into a car accident depends mostly on the other driver'. The third subscale includes items such as 'Whether or not I get into a car accident is mostly a matter of luck'. Both the second and the third subscale have a questionable reliability (α = .65).

Eustress and distress. In order to examine peoples' experiences with stress, a questionnaire was developed that measures a participant's level of eustress and distress (*see* Appendix B). Participants rated on a 6-point Likert scale, ranging from 1 = *never* to 6 = *always*, how many times they experienced eustress or distress during the past month. The original questionnaire consisted of two subscales with 50 items measuring eustress and 50 items measuring distress. To reduce the number of items, a principal component analysis with orthogonal rotation (varimax) and two fixed factors was conducted. For each factor, the seven items with the highest factor loading were selected for the questionnaire. An example item of eustress is: 'In the last month, how often have you been able to stay positive in stressful situations?' Distress is explored by items such as 'In the last month, how often have you felt incapable to overcome difficulties?'According to George and Mallery's (2003) rules of thumb for interpreting reliability coefficients, the internal consistency of the eustress scale was good (α = .87), and the internal consistency of the distress subscale was excellent (α = .93).

Depressive symptoms. The HADS-D was used for assessing the level of depression that a participant is experiencing (*see* Appendix C). This subscale was originally developed by Zigmond and Snaith (1983) and contains seven 4-point Likert-type questions, with most of the items ranging from 0 = *not at all* to 3 = *most of the time*. It includes items such as 'I still enjoy the things I used to enjoy'. Calculating Cronbach's alpha revealed that the scale possesses a questionable reliability ($\alpha = .68$) but previous studies found more acceptable alphas of .77, for example (Al Aseri et al., 2015).

Data analysis

Before analyzing the data with the statistical programme SPSS, the data set was checked for possible outliers. As no outliers could be detected, the data of 101 participants was used for analysis. In a second step, descriptive statistics were performed to get an overview of the variation in answers given by the participants. Since the Shapiro-Wilk test of normality revealed that the variables internality ($p = .001$), depressive symptoms ($p < .001$) and distress ($p < .001$) are not normally distributed, it was chosen to implement the Spearman rank-order correlation, a bivariate non-parametric population correlation analysis, to get a first impression of the association between the variables included in the mediation models. Correlations were statistically significant if $p < 0.05$. For determining the practical significance of the findings, effect sizes were used. A cut-off point of 0.30 (medium effect) was set for the practical significance of Spearman's rho (Field, 2013). The assumptions resulting from correlation analysis were further investigated by utilization of inferential statistics. Performing three multiple mediation analyses with the method of Preacher and Hayes (2008) finally led to the acceptance or rejection of the indirect effect hypotheses. Their procedure calculates indirect effects with the average of 5000 bootstrap samples and does therefore not assume normality. Furthermore, their procedure allows for significant indirect effects without a significant direct effect between the independent and the dependent variable (Zhao, Lynch and Chen, 2010). Mediation is significant if the 95% confidence interval of the effect does not include zero (Preacher & Hayes, 2008).

RESULTS

Descriptive statistics

Descriptive statistics were utilized to get an overview of the variations in scores and the correlations between the variables included in the mediation models (*see* Table 2).

Regarding mean scores, it appears that participants scored slightly higher on the internal LOC subscale ($\mu = 1.19$, $\sigma = 0.76$) than on the subscales measuring defensive externality ($\mu = -0.83$, $\sigma = 0.90$) and congruent externality ($\mu = -0.40$, $\sigma = 0.93$). This implies that people in the sample tend to feel in control over their lives instead of feeling guided by external forces. Furthermore, results show that participants scored rather low on the HADS-D ($\mu = 0.60$, $\sigma = 0.42$), indicating that the majority of participants does not suffer from depressive symptoms. During the last month, distress ($\mu = 2.55$, $\sigma = 0.80$) was not as frequently experienced as was eustress ($\mu = 4.08$, $\sigma = 0.77$).

Table 2

Mean scores and correlations between variables (n = 101)

	μ (σ)	Internality	Defensive externality	Congruent externality	Depressive symptoms	Eustress	Distress
Internality (-3-3)	1.19 (0.76)	-					
Defensive externality (-3-3)	-0.83 (0.90)	-.11	-				
Congruent externality (-3-3)	-0.40 (0.93)	-.19	.35*+	-			
Depressive symptoms (0-3)	0.60 (0.42)	-.40*+	.13	.13	-		
Eustress (1-6)	4.08 (0.77)	.33*+	-.19	-.12	-.36*+	-	
Distress (1-6)	2.55 (0.80)	-.27*	.23*	.25*	.38*+	-.46*+	-

Note. *$p < 0.05$ – statistically significant; +$r > 0.30$ - practically significant (medium effect)

After calculating mean scores, correlation analysis was utilized to explore the degree of association between the variables. The results reveal no significant correlations between participants' internal LOC and the extent to which they believe that their lives are controlled by powerful others ($r = -.11$, $p = .26$) or chance ($r = -.19$, $p = .05$). As expected, however, the two variables assessing external LOC are weakly positively correlated ($r = .35$, $p < .001$, medium effect), indicating that they measure different aspects of the same construct. Internality is weakly negatively correlated with depressive symptoms ($r = -.40$, $p < .001$, medium effect), verifying hypothesis Ia. Contradictory to hypotheses Ib and Ic, there are no

significant correlations between the variables measuring external LOC and depressive symptoms even though a large number of studies established a link between these constructs (defensive externality: $r = .13$, $p = .19$; congruent externality: $r = .13$, $p = .20$). Eustress and internality are weakly positively correlated, providing support for hypothesis Id. The correlations between the two variables assessing external LOC and eustress are not significant (defensive externality: $r = -.19$, $p = .05$; congruent externality: $r = -.12$, $p = .25$). Therefore, hypotheses If and Ih are rejected. Verifying hypotheses Ie, Ig and Ii, distress and internality are weakly negatively correlated ($r = -.27$, $p = .007$, small effect) whereas distress and the two external LOC variables are weakly positively correlated (defensive externality: $r = .23$, $p = .019$, small effect; congruent externality: $r = .25$, $p = .010$, small effect). Moreover, eustress is weakly negatively correlated with depressive symptoms ($r = -.36$, $p < .001$, medium effect), providing support for hypothesis Ij. Distress is weakly positively correlated with depressive symptoms ($r = .38$, $p < .001$, medium effect), verifying hypothesis Ik.

Testing indirect effects

Further exploration of the assumed relationships led to the acceptance or rejection of the previous established indirect effect hypotheses. Results of the mediation analyses are presented in Figure 3, 4 and 5.

First, the indirect effects of eustress and distress on the relation between internality and depressive symptoms were analyzed (i.e. hypotheses IIa and IIb were tested). A significant model was observed [$F(3,97) = 9.83$, $p < .001$], with a R^2 of .23, suggesting that approximately 23% of the variance in depressive symptoms is accounted for by internality and the stress variables. As Figure 3 illustrates, the regression coefficient between internality and depressive symptoms is statistically significant [$\beta = -.11$, $SE = .05$, $t(101) = -2.11$, $p = .037$]. Moreover, the regression coefficients between internality and eustress [$\beta = .36$, $SE = .10$, $t(101) = 3.79$, $p < .001$] and internality and distress [$\beta = -.37$, $SE = .10$, $t(101) = -3.72$, $p < .001$] are significant. This does not apply to the regression coefficient between eustress and depressive symptoms [$\beta = -.11$, $SE = .06$, $t(101) = -1.94$, $p = .06$] but the regression coefficient between distress and depressive symptoms is significant [$\beta = .11$, $SE = .06$, $t(101) = 2.02$, $p = .046$]. Multiplying these coefficients result in an indirect effect of $(.36)(-.11) = -.04$ for eustress and $(-.37)(.11) = -.04$ for distress. Results of the bootstrapping procedure reveal that the indirect effect of eustress is not significant ($\beta = .03$, 95% CI $= -.10, .01$) but the indirect effect of distress was ($\beta = .02$, 95% CI $= -.10, -.01$). This suggests that the relation between

internality and depressive symptoms is mediated by distress but not by eustress. Thus, hypothesis IIa is rejected while hypothesis IIb is confirmed.
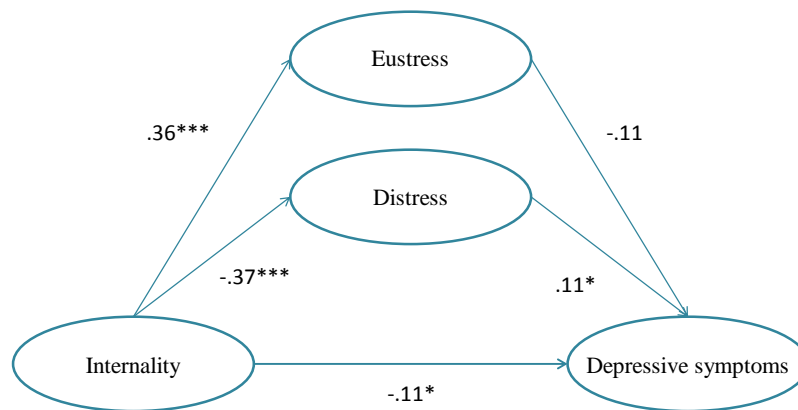

Figure 3. Regression coefficients for the relation between internality and depressive symptoms as mediated by eustress and distress. *$p < .05$, ***$p < .001$

A second mediation analysis was performed to test if the relation between defensive externality and depressive symptoms is mediated by eustress or distress (i.e. hypotheses IIc and IId were tested). A significant model was observed [$F(3,97) = 8.06$, $p < .001$], with a R^2 of .20. This indicates that defensive externality and the stress variables explain 20% of the variance in depressive symptoms. As Figure 4 demonstrates, the regression coefficient between defensive externality and depressive symptoms is not significant [$\beta = -.02$, $SE = .04$, $t(101) = -.45$, $p = .65$]. The regression coefficient between defensive externality and eustress is also not significant [$\beta = -.13$, $SE = .09$, $t(101) = -1.47$, $p = .15$] but the regression coefficient between defensive externality and distress was [$\beta = .18$, $SE = .09$, $t(101) = 2.10$, $p = .039$]. Furthermore, the regression coefficients between eustress and depressive symptoms [$\beta = -.14$, $SE = .06$, $t(101) = -2.44$, $p = .017$] and distress and depressive symptoms [$\beta = .14$, $SE = .06$, $t(101) = 2.52$, $p = .014$] both are significant. Multiplying the regression coefficients results in an indirect effect of (-.13)(-.14) = .02 for eustress and (.18)(.14) = .03 for distress. The outcomes of the bootstrapping procedure reveal that the indirect effect of eustress is not significant ($\beta = .02$, 95% CI = -.01, .06) but the indirect effect of distress is ($\beta = .02$, 95% CI = .01, .07). This suggests that the relation between defensive externality and depressive symptoms is mediated by distress but not by eustress. Therefore, hypothesis IIc is rejected while hypothesis IId is confirmed.
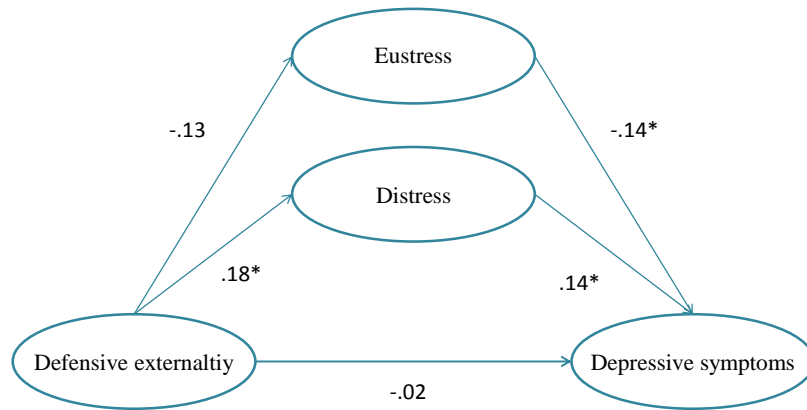
Figure 4. Regression coefficients for the relation between defensive externality and depressive symptoms as mediated by eustress and distress. *$p < .05$

The last mediation analysis was performed to analyze the indirect effects of eustress and distress on the relationship between congruent externality and depressive symptoms (i.e. hypotheses IIe and IIf were tested). A significant model was found [$F(3.97) = 7.99$, $p < .001$], with a R^2 of .20, demonstrating that 20% of the variance in depressive symptoms is accounted for by congruent externality and the stress variables. As illustrated by Figure 5, the regression coefficient between congruent externality and depressive symptoms is not significant [$\beta = .01$, $SE = .04$, $t(101) = .21$, $p = .83$]. The same applies to the regression coefficient between congruent externality and eustress [$\beta = -.08$, $SE = .08$, $t(101) = -1.02$, $p = .31$]. However, the regression coefficient between congruent externality and distress is significant [$\beta = .26$, $SE = .08$, $t(101) = 3.15$, $p = .002$]. Moreover, the regression coefficients between eustress and depressive symptoms [$\beta = -.14$, $SE = .06$, $t(101) = -2.42$, $p = .017$] and distress and depressive symptoms [$\beta = .13$, $SE = .06$, $t(101) = 2.30$, $p = .023$] both are significant. This results in an indirect effect of $(-.08)(-.14) = .01$ for eustress and an indirect effect of $(.26)(.13) = .03$ for distress. Results of the bootstrapping procedure indicate that the indirect effect of eustress is not significant ($\beta = .01$, 95% CI $= -.01$, .05) but the indirect effect of distress is ($\beta = .02$, 95% CI $= .01$, .08), suggesting that the relation between congruent externality and depressive symptoms is mediated by distress but not by eustress. Thus, there is support for hypothesis IIf but not for hypothesis IIe.
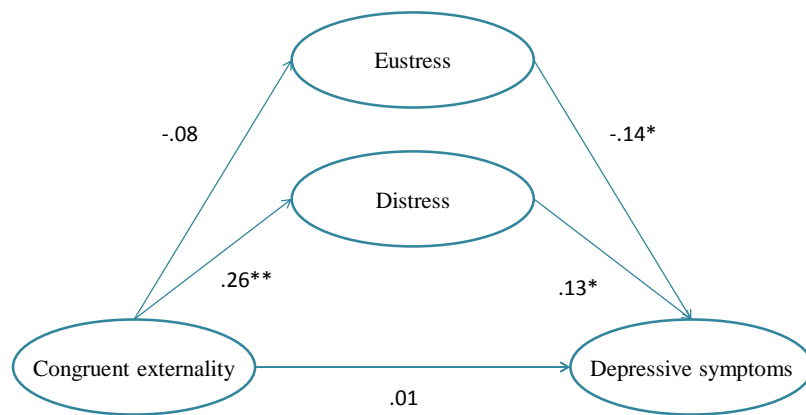
Figure 5. Regression coefficients for the relation between congruent externality and depressive symptoms as mediated by eustress and distress. *p < .05, **p < .01

DISCUSSION

The aim of the present study was to investigate the mediating effects of eustress and distress on the relationship between an individual's predominant LOC and depressive symptoms but the outcomes of the study provide evidence for only some of the previous established hypotheses. More specifically, the results reveal that internality is a significant predictor of depressive symptoms whereas defensive externality and congruent externality are not. Moreover, all three LOC variables can be associated with distress but only internality is also related to eustress. The outcomes also provide support for the assumption that distress is a predictor of depressive symptoms. Furthermore, the present study demonstrates that eustress is no significant mediator of the relationship between the three LOC variables and depressive symptoms. However, distress mediates the relations between all three LOC variables and depressive symptoms. In the following sections, these outcomes are discussed with regard to relevant literature.

A large number of studies have consistently found the three LOC variables and depressive symptoms to be correlated (e.g. Endlich, 1998; Jaswal & Dewan, 1997; Richardson et al., 2012). However, Omani, Maroufizadeh, Navid and Amini (2017) confirmed the relation between internality and depressive symptoms but could not found a significant relationship between externality and depressive symptoms. Their results are in line with the outcomes of the present study, indicating that internality is the only significant predictor of depressive symptoms. As proposed by Berghella (2014), this may suggest that internals possess intrinsic factors which may exert a protective function with regard to depressive symptoms.

Moreover, it was expected that the three LOC variables are related to eustress as well as to distress. However, the present results revealed that all three LOC variables can be associated with distress but only internality can also be related to eustress. The influence of the personality factor LOC on the nature of the stress response indicates that perceived controllability over the stressor plays an important role in stress appraisal processes (Lucas et al., 2014). Internals are more likely to evaluate stressors as a challenge rather than as a threat since they expect the stressor to be controllable (Nelson & Simmons, 2011). In contrast, defensive externals and congruent externals evaluate stressors as a threat as they are more likely to believe that their actions have little effect over the outcomes. That is, they perceive the stressor as uncontrollable. With regard to these stress perceptions, the question arises whether internals and externals would still react to stressors in such a way when the nature of the stressor changes. Chronic stressors, for instance, were found to be qualitatively different from acute stressors (Gignac & Gottlieb, 1997). The onset of chronic stressors is often gradual, they are experienced as continuous since they are regularly reoccurring, and their offset is typically unpredictable. Therefore, it might be assumed that even internals perceive such long-lasting stressors as uncontrollable. Further research will be required to examine whether the link between LOC and the stress response is determined by the nature of the stressor.

Earlier research suggests that distress and eustress both are predictors of depressive symptoms (e.g. Aschbacher et al., 2013; Hargrove et al., 2015; Roy, Virkkunen, & Linnoila, 1987). Indeed, correlation analysis as well as the second and third mediation analysis revealed that distress and eustress both are associated with depressive symptoms. However, the first mediation analysis did not confirm these results. This might be due to differences in variance explained by the different independent variables. Contradictory to the second and third mediation analysis, eustress was not associated with depressive symptoms in the first mediation analysis, since internality is a stronger predictor of depressive symptoms than are defensive and congruent externality. This is reflected in the fact that the regression coefficient between internality and depressive symptoms was significant whereas the regression coefficients between the two external LOC variables and depressive symptoms were not.

Moreover, with exception of the first mediation analysis, none of the analyses indicate a difference in the extent to which eustress and distress are related to depressive symptoms even though Radstaak, Spijkerman and Bohlmeijer (2017) demonstrated that eustress is a stronger predictor of depressive symptoms than is distress. This implies that the promotion of

eustress is as important as the reduction of distress when it comes to the reduction and prevention of depressive symptoms.

Based on the previously discussed hypotheses, it was assumed that eustress and distress both are mediators of the relationship between an individual's predominant LOC and depressive symptoms. However, the present study demonstrated that eustress does not mediate this relation whereas distress was found to be a significant mediator of the relation between the three LOC variables and depressive symptoms. These results indicate that an external's reaction to a stressor promotes the onset of depressive symptoms by decreasing eustress experiences and increasing distress experiences. An internal's reaction to a stressor is relevant in the reduction and prevention of depressive symptoms since internality decreases distress experiences which, in turn, reduce and prevent depressive symptoms.

Strengths, limitations and recommendations for further research

Even though some of the previously formulated hypotheses could not be confirmed, the present study comes up with a couple of strengths. First, it is one of the first studies to examine the mediating effects of eustress and distress on the relationship between an individual's predominant LOC and depressive symptoms. As such, it contributes to scientific progress on this topic since further research may be drawn upon the outcomes of the present study.

Since there are no previous studies examining the reliability and validity of the newly developed stress scale, one might argue that it should not have been used in the present study. However, the internal consistency of the eustress scale was good ($\alpha = .87$), and the internal consistency of the distress subscale was excellent ($\alpha = .93$). This implies that the items meant to assess these variables yield similar scores, an indicator of good reliability. Another strength that has to be mentioned in this context is the utilization of multiple mediation analysis. This approach includes mediators controlling for each other, thereby ruling out possible confounding effects (Preacher & Hayes, 2008). In the present study, that is, eustress controls for distress and vice versa. Based on the study outcomes it might therefore be concluded that eustress and distress are related but nevertheless independent constructs. This is also reflected in the weak negative correlation ($r = -.46$, $p < .001$) between eustress and distress. Thus, utilization of the scale was reasonable even though there are no previous studies examining the reliability and validity of the used stress scale.

Several limitations should be taken into consideration when interpreting the results of the present study. As outlined above, multiple mediation analysis controls for possible

confounding effects of the mediators. However, this procedure includes the limitation of not allowing for drawing conclusions about causality (Spencer, Zanna, & Fong, 2005). For follow-up research, it is therefore highly recommended to include experiments that demonstrate the proposed causal chains instead of relying on the results of mediation analyses.

Moreover, the internal consistencies of the internality scale and the externality scales were poor and questionable respectively, suggesting that participants might have interpreted items differently. This might be due to the different nationalities of the participants since the scales were written in English and not in the language of participants' home countries. Even though the participants rated their English skills as good or even excellent, this might not be enough for understanding a questionnaire with items formulated for native speakers. Since assessment of participant's English skills was solely based on self-reported measures, it might also be argued that participants rated their English proficiency as better or worse than it actually was, thereby falsifying the outcomes of the present study. For future research, careful translation or simplification of the items is recommended to improve the psychometric qualities of the IPC LOC Scale.

A final limitation is the lack of variance in the study sample. Especially with regard to highest educational qualification and current occupational status, there are huge differences in representation. With constituting 64.2% of the whole study sample, students with higher secondary education as highest educational qualification are definitely overrepresented. There are hardly any participants of other age groups or with inferior educational qualifications. Since generalization of results is therefore not appropriate, it is recommended to ensure a greater variance in future studies on this topic.

CONCLUSION AND IMPLICATIONS

There is growing interest in moving away from unidimensional conceptions of stress towards the recognition of the effects of contexts and personality factors on the appraisal of stressors and the resulting stress experience. Therefore, the aim of the present study was to compare the mediating effects of eustress and distress experiences on the relationship between an individual's predominant LOC and depressive symptoms. Even though several hypotheses could not be accepted, the present study contributes to scientific progress in the field of stress experiences by demonstrating the importance of perceived personal control for coping with stressors. These findings might also be relevant for the reduction and prevention of depressive symptoms, holding implications for depressive symptoms interventions. An example might be

the expansion of psychoeducation courses to include strategies for enhancing and maintaining a sense of control over one's own life. Furthermore, depressive symptoms interventions are encouraged to shift focus from solely reducing distress experiences to promoting eustress experiences as well, thereby acknowledging the impact eustress has on the development of depressive symptoms.

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APPENDICES

Appendix A: Items of the Multidimensional Locus of Control IPC Scale

Internal Locus of Control Scale

1. Whether or not I get to be a leader depends mostly on my ability.
2. Whether or not I get into a car accident depends mostly on how good a driver I am.
3. When I make plans, I am almost certain to make them work.
4. How many friends I have depends on how nice a person I am.
5. I can pretty much determine what will happen in my life.
6. I am usually able to protect my personal interests.
7. When I get what I want, it's usually because I worked hard for it.
8. My life is determined by my own actions.

Powerful Others Scale

1. I feel like what happens in my life is mostly determined by powerful people.
2. Although I might have good ability, I will not be given leadership responsibility without appealing to those in positions of power.
3. My life is chiefly controlled by powerful others.
4. People like myself have very little chance of protecting our personal interests when they conflict with those of strong pressure groups.
5. Getting what I want requires pleasing those people above me.
6. If important people were to decide they didn't like me, I probably wouldn't make many friends.
7. Whether or not I get into a car accident depends mostly on the other driver.
8. In order to have my plans work, I make sure that they fit in with the desires of people who have power over me.

Chance Scale

1. To a great extent my life is controlled by accidental happenings.
2. Often there is no chance of protecting my personal interests from bad luck.
3. When I get what I want, it's usually because I'm lucky.
4. I have often found that what is going to happen will happen.
5. Whether or not I get into a car accident is mostly a matter of luck.
6. It's not always wise for me to plan too far ahead because many things turn out to be a matter of good or bad fortune.
7. Whether or not I get to be a leader depends on whether I'm lucky enough to be in the right place at the right time.

Appendix B: Eustress and Distress Scale

Eustress Subscale [the items chosen after factor analysis are in bold]

In the last month, how often...

1. ...have you been able to control the important things in your life?
2. ...have you felt confident about your ability to handle your responsibilities?
3. ...have you felt that things were going well?
4. ...have you been able to cope with all the things that you had to do?
5. ...have you been able to control the responsibilities in your life?
6. ...have you felt in control of a situation?
7. ...have you been capable to overcome difficulties?
8. ...have you dealt successfully with stressful situations?
9. ...have you felt excited in a stressful situation?
10. ...have you felt that stressful situations resulted in positive outcomes?
11. **...have you been able to stay positive in stressful situations?**
12. ...have you been able to effectively cope with difficult changes?
13. ...have you been able to successfully cope with irritating hassles?
14. ...have you been challenged by your goals?
15. ...have you been able to successfully control the irritations in your life?
16. ...have you felt that stress positively contributed to your abilities to cope with life circumstances?
17. ...have you been able to cope with painful situations?
18. ...have you felt that coping with your daily responsibilities were a source of pleasure and satisfaction?
19. ...have you felt encouraged after success?
20. ...have you felt that coping with difficult situations increased the belief on how strong you are?
21. **...have you felt that coping with a difficult situation facilitated your learning and growth?**
22. ...have you felt that stress enhanced your performance and productivity?
23. ...have you felt that stress improved your health and vitality?
24. ...have you felt that stress is positive and should be utilized?
25. ...have you been able to 'pull something off'?
26. ...have you been able to cope successfully with your responsibilities?
27. ...have you felt pride in your achievements?

28. ...have you felt that coping with a difficult situation strengthens?

29. ...have you been able to give your best effort in a difficult situation?

30. ...have you felt that being under pressure made you think more clearly and focused?

31. ...have you felt in control of your life?

32. ...have you felt pleased because of something that happened unexpectedly?

33. ...have you been able to adapt to changes?

34. ...have you been able to solve stressful situations?

35. ...have you enjoyed coping with your responsibilities?

36. ...have you felt that a stressful situation had a positive impact on you?

37. ...have you felt in control of what you were doing?

38. ...have you been able to meet the demands of the situation?

39. ...have you learned from coping with a difficult situation?

40. ...have you felt that handling a difficult situation made you grow as a person?

41. ...have you felt satisfied because you handled your daily responsibilities well?

42. ...have you felt motivated by the task you had to carry out?

43. ...have you been able to overcome a problem?

44. ...have you been able to tackle a difficult situation?

45. ...have you felt pleased about an outcome of a difficult situation?

46. ...have you felt satisfied because you coped well with a difficult situation?

47. ...have you felt that being under pressure made you more productive?

48. ...have you felt motivated by your stress?

49. ...have you felt that being under pressure made you perform better?

50. ...have you felt that stress has a positive effect on your performance?

Distress Subscale [the items chosen after factor analysis are in bold]

In the last month, how often...

1. ...have you been overstrained by your possibilities?

2. ...have you felt overwhelmed by the task you had to carry out?

3. ...have you been discouraged by failure?

4. ...have you been unable to control the important things in your life?

5. ...have you felt doubtful about your abilities to handle your responsibilities?

6. ...have you felt that things were going wrong?

7. ...have you been unable to cope with all the things that you had to do?

8. ...have you been unable to control the responsibilities in your life?

9. ...have you felt a lack of control in a situation?

10. ...have you felt incapable to overcome difficulties?

11. ...have you failed to deal with stressful situations?

12. ...have you felt upset in a stressful situation?

13. ...have you felt that stressful situations resulted in negative outcomes?

14. ...have you been unable to stay positive in a stressful situation?

15. ...have you been unable to effectively cope with difficult changes?

16. ...have you been unable to successfully cope with irritating hassles?

17. ...have you felt threatened by your goals?

18. ...have you been unable to successfully control the irritations in your life?

19. ...have you felt that stress negatively contributed to your abilities to cope with life circumstances?

20. ...have you felt that you were unable to cope with painful situations?

21. ...have you felt that coping with your daily responsibilities were a source of sorrow and disappointment?

22. ...have you felt doubtful when coping with difficult situations?

23. ...have you felt that coping with a difficult situation impeded your learning and growth?

24. ...have you felt that stress decreased your performance and productivity?

25. ...have you felt that stress decreased your health and vitality?

26. ...have you felt that stress is negative and should be avoided?

27. ...have you felt that you were unable to make things happen?

28. ...have you been unable to cope successfully with your responsibilities?

29. ...have you felt disappointment in your achievements?

30. ...have you felt that coping with a difficult situation made you feel weak?

31. ...have you been unable to give your best effort in a difficult situation?

32. ....have you felt that being under pressure made you disorganized and think chaotically?

33. ...have you felt a lack of control in your life?

34. ...have you felt irritated because of something that happened unexpectedly?

35. ...have you been unable to adapt to changes?

36. ...have you been unable to solve stressful situations?

37. ...have you disliked coping with your abilities?

38. ...have you felt that a stressful situation had a negative impact on you?

39. ...have you felt a lack of control of what you were doing?

40. ...have you been unable to meet the demands of the situation?

41. ...have you felt incapable when coping with a difficult situation?

42. ...have you felt dissatisfied because you poorly handled your daily responsibilities?

43. ...have you felt discouraged by the task you had to carry out?

44. ...have you been unable to overcome a problem?

45. ...have you felt irritated about an outcome of a difficult situation?

46. ...have you felt displeased because you were not able to successfully cope with a difficult situation?

47. ...have you felt that being under pressure made you less productive?

48. ...have you felt discouraged by your stress?

49. ...have you felt that being under pressure made you perform worse?

50. ...have you felt that stress had a negative effect on your performance?

Appendix C: Items of the Hospital Anxiety and Depression Scale (depression subscale)

1. I still enjoy the things I used to enjoy.
2. I can laugh and see the funny side of things.
3. I feel cheerful.
4. I feel as if I am slowed down.
5. I have lost interest in my appearance.
6. I look forward with enjoyment to things.
7. I can enjoy a good book or TV program.