

Childhood Trauma, Adulthood Optimism and the Moderating Role of Extraversion

Naama L. Meroz

S3894126

Department of Psychology, University of Groningen

PSB3E-BTHO: Bachelor Honours Thesis

Supervisor: Dr. M. aan het Rot

Second evaluator: L. J. Seidel, MSc

June 30, 2022

A thesis is an aptitude test for students. The approval of the thesis is proof that the student has sufficient research and reporting skills to graduate, but does not guarantee the quality of the research and the results of the research as such, and the thesis is therefore not necessarily suitable to be used as an academic source to refer to. If you would like to know more about the research discussed in this thesis and any publications based on it, to which you could refer, please contact the supervisor mentioned.

Abstract

Objective: Adults who experienced childhood trauma were previously found to express less optimism and to be more prone to be diagnosed with affective disorders. Furthermore, extraversion was shown to be lower in adults who developed PTSD following severe burn injuries, and to have a positive association with optimism. This thesis aimed to investigate the association between childhood trauma and optimism levels in adulthood. In light of past research, extraversion was examined as a possible moderator in the link between childhood trauma and adulthood optimism. *Method:* The data was used from the ‘HowNutsAreTheDutch’ study. A subsample of 1358 participants completed three questionnaires, one measuring childhood trauma (Childhood Trauma Questionnaire-Short Form; CTQ-SF), one measuring dispositional optimism (Life Orientation Test Revised; LOT-R) and one measuring extraversion (Neuroticism-Extraversion-Openness Five-Factor Inventory; NEO-FFI-3). *Results:* Childhood trauma was shown to have a nonlinear association with adulthood optimism. Whereas people who reported none/low, low to moderate and moderate to severe levels of childhood trauma had a linear negative association with optimism scores, individuals reporting severe to extreme levels of childhood trauma showed the highest optimism scores. Extraversion was positively associated with adulthood optimism. The interaction between childhood trauma and extraversion was found non-significant. *Conclusion:* Childhood trauma was found to be associated with adulthood optimism in a way that suggests a pattern of post-traumatic growth (PTG). Perhaps people who developed PTG following trauma were more likely to choose to participate in the study. The role of extraversion in the development of PTG following trauma is discussed.

Keywords: childhood trauma, optimism, extraversion, post-traumatic growth.

Introduction

Optimism

“Optimism is the faith that leads to achievement. Nothing can be done without hope.” (Keller, 1903, p. 68).

Many people are walking around in the world believing they are capable of only doing certain things. Concepts such as self-esteem and self-efficacy shape our perception of reality in a way that could be inherently different from the perspective of an objective observer. “If only you could see yourself as I see you” is a sentence that I personally heard many times in my life and at the same time said to others. The idea that our interpretations of situations shape the way we behave is a fundamental concept in the field of cognitive therapy, a common treatment method for various types of psychological disorders (Beck, 2021). Thus, our perception of our current reality, as well as our expectations of possible future events can influence our daily behaviors. Individuals’ inherent tendency to maintain positive expectations towards their future may be defined as dispositional optimism (Carver et al., 2010; Carver and Scheier, 2014).

Previous studies have consistently shown the positive relations of higher levels of optimism with various constructs: For example, people who reported more optimistic future expectations were shown to have a broader social network and higher ongoing levels of well-being in comparison to people who indicated more negative future expectations (MacLeod and Conway, 2005). Furthermore, optimism was positively associated with better psychological adjustment as well as better physical health in response to stressful life transitions such as cardiac surgery, pregnancy, and caregiving (Carver and Scheier, 1999). Understanding which factors are positively correlated with better adjustment to life stressors is very important, as

stressful life events are associated with higher risk of relapse and onset of psychopathology (Ellicott et al., 1990; Finlay-Jones and Brown, 1981).

Past research such as mentioned above provides some evidence to what intuitively makes sense - optimistic individuals may be using this hopeful perspective in the future as a tool to handle hardships in life. Is it, however, an inborn 'gift' that some people possess (and some people not), who thus have a so-called automatic advantage as opposed to others in dealing with life's struggles? Can people's levels of optimism be changed throughout their lives, and if so, how? Answers to these types of questions hold importance from a clinical perspective, as it is shown that enhanced positive outlook on life is related to the slower progression of psychopathology. In the following paragraphs, I will explore a possible influencing factor for people's optimistic outlook on life.

Optimism and childhood trauma

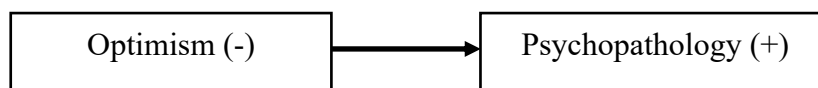
One way to research whether there is indeed an association between people's optimism levels and psychopathology, is by investigating the association between optimism levels and PTSD symptoms of trauma survivors after the traumatic event. Previous studies have investigated exactly that link: in a cross-sectional study conducted by Grasso et al. (2012), individuals who were exposed to trauma but did not report PTSD symptoms were found to have higher optimism levels compared to others with probably PTSD. In addition, following earthquake incidents in New Zealand, lower levels of PTSD symptoms were positively correlated with optimism in a longitudinal study conducted by Kuijer et al. (2013). Finally, in another longitudinal study it was observed that following a traumatic event, more optimistic students also experienced lower levels of PTSD symptoms (Frazier et al., 2011).

There may be multiple reasons for how more optimism can influence one's levels of adjustment to life stressors and thus to one's mental health. In their review, Solberg Nes and Segerstrom (2006) found that a positive mindset predicted more emotion-focused coping after uncontrollable stressors such as trauma, which involves trying to handle or reduce the emotional consequences associated with the trauma (Folkman and Lazarus, 1985; Lazarus and Folkman, 1984). Thus, it might indicate that highly optimistic individuals are more inclined to effectively adapt their coping strategy to the situation at hand (Conway and Terry, 1992; Forsythe and Compas, 1987; Scheier and Carver, 1985, 1992; Vitaliano et al., 1990). For example, looking positively towards the future might increase people's motivation to tackle controllable stressors with a more confident state-of-mind, as well as changing their coping strategy into accepting what cannot be changed and perhaps cognitively reconstructing their perception of the situation in a positive manner, since the core idea that things will get better at the end is already there. Therefore, flexible engagement in reaction to stressful circumstances is more likely to occur in optimistic individuals.

In conclusion, based on the research mentioned above, the link between optimism and psychopathology is shown in Figure 1.

Figure 1

Hypothesized Link Between Childhood Optimism and Psychopathology.

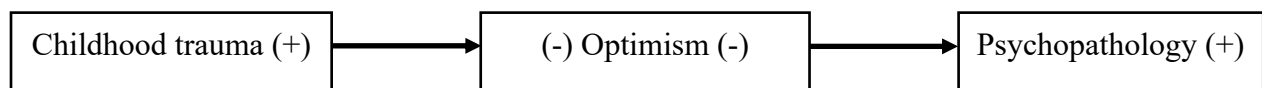


However, one factor that is suggested to negatively influence one's optimism levels is experiences of childhood trauma. Physical abuse, emotional abuse, sexual abuse, emotional neglect and physical neglect can all be considered as experiences of childhood trauma. Childhood trauma was found to not only threaten children's physical and mental health in childhood, but also show long-lasting effects in adulthood, with the appearance of higher rates of various mental disorders reported by adult survivors of childhood abuse, (e.g., depression, anxiety; Felitti et al., 1998; Norman et al., 2012; Springer et al., 2007) and indications of lower psychological well-being (Herrenkohl et al., 2012; Simeon et al., 2007). Furthermore, in a cross-sectional study conducted in Finland among around 20,000 workers, a negative association between childhood trauma and optimism levels was found (Korkeila et al., 2004).

All in all, there seems to be a relation between childhood trauma, optimism, and psychopathology: optimism might protect against the development of trauma-related adult psychopathology, but childhood trauma might negatively influence optimism. On the grounds of the research mentioned here, a hypothesized model is shown in Figure 2.

Figure 2

Hypothesized Model for the Relation Between Childhood Trauma, Optimism and Psychopathology.



In light of these studies, one question arises - are all people who experience childhood trauma more likely to have a lower level of optimism that might inevitably influence their ability

to adjust to additional traumatic events in adulthood and their risk for adult trauma-related psychopathology, or are there person-based factors that might moderate this relation?

The moderating role of extraversion

In the following paragraphs, I will explore the extraversion trait as a possible moderator in the link between childhood trauma and optimism.

Extraversion is one of five fundamental personality traits that together make up a comparatively large system for depicting stabilities in people's experiences and behavior (John et al., 2008). One who scores highly on questionnaires assessing extraversion might come across as assertive, bold and gregarious. Additionally, various studies found a strong positive relation between extraversion and positive affect (Lucas and Fujita, 2000; Smillie et al., 2012), indicating that extraverts are happier compared to more introverted people, a consistent finding in the personality literature (Costa and McCrae, 1980; Diener and Lucas, 1999; Lucas et al., 2008; Tellegen, 1985).

Furthermore, a longitudinal study conducted by Fauerbach et al. (2000) has found extraversion to be lower in adults who developed PTSD after experiencing severe burn injuries compared to trauma survivors who did not develop PTSD. A possible explanation for this association was suggested to be related to the Behavioral Activation System (BAS). The BAS is considered to regulate appetite motivation, and facilitate behavior towards important goals, a conceptual system within midbrain dopamine processes (Pickering and Gray, 1999; Pickering and Smillie, 2008), with dopamine neurons consistently shown to be positively related to the communication of reward-related information (Knutson and Bhanji, 2006; McClure et al., 2004; Robbins and Everitt, 1996; Schultz, 1998; Wise, 2004). The association between extraversion and these processes was supported in previous research linking higher dopamine function and

extrovert personality (Depue and Collins, 1999; Pickering, 2004; Rammsayer, 1998; Reuter et al., 2002; Smillie et al., 2010; Smillie et al., 2011; Wacker et al., 2006). Thus, it was suggested that perhaps people with a dysfunctional BAS, which was found to be related to the absence of high extraversion, find it very difficult to raise the energy, reward-sensitivity and motivation which are highly needed in coping with the struggles after a severe injury. (Fowles, 1994; Gray, 1996).

Additionally, more extraverted people were found to seek out more social support sources and perceive more support from these sources (Lawrence and Fauerbach, 2003). Relatedly, having a larger social network was shown to positively correlate with people's expectations of positive future outcomes. (MacLeod & Conway, 2005). This ability to expect positive future experiences was suggested to be related to people's amount of material, social, or personal resources which eventually contribute to their advancement towards their desired goals (Diener and Fujita, 1995). Thus, it might be that the extraverts' inclination to surround themselves with many people can be helpful in their process of dealing with a traumatic event and with keeping a positive mindset towards their future.

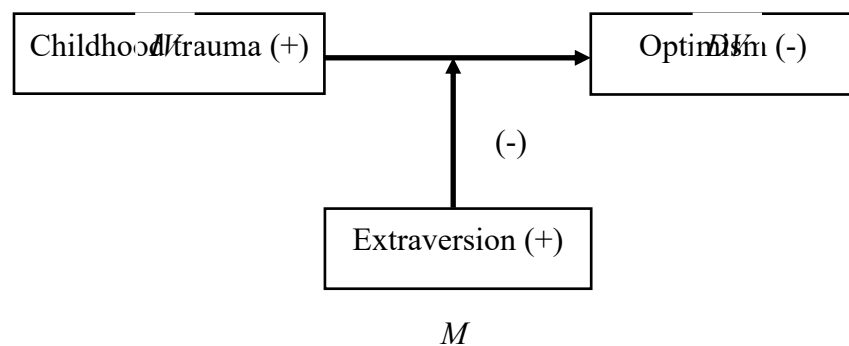
Finally, a study conducted by Milligan (2003) showed a positive correlation between extraversion and optimism, using four different types of measures for optimism. A possible reason for this association is people's sense of control over positive and negative life events. In a study conducted by Darvill and Johnson (1991), people who held more beliefs regarding experiencing positive events in the future were found to be more extraverted and reported thinking that they had more control over these events. On the contrary, people with a more pessimistic mindset were overall less extraverted and reported feeling less in control over future positive events. Therefore, merely the internal perception of extraverts regarding their capability

of sitting in the driver seat of their lives, might help them have a more optimistic point of view, perhaps because in their perception, uncontrolled adverse events are not too likely to happen.

In conclusion, more extraverted people seem to have different ways of coping with struggles in life and are more optimistic in general. In the present thesis I will not only examine the link between childhood trauma and adulthood optimism as shown in the basic model (Figure 2), but also include extraversion as a moderator. The full model can be observed in Figure 3.

Figure 3

Hypothesized Model for the Relation Between Childhood Trauma, Extraversion, and Optimism.



Based on the literature, the following research question and hypotheses were formulated:

Research question: How does extraversion moderate the link between childhood trauma and adulthood optimism?

Hypothesis 1: People who experienced more childhood trauma show lower levels of optimism. This is in line with past research that found the negative link between high levels of optimism and low PTSD symptoms (Frazier et al., 2011; Kuijer et al., 2013).

Hypothesis 2: The negative association between childhood trauma and optimism (see Hypothesis 1) is less strong among more extroverted individuals. This is expected based on the

idea that extraversion is positively associated with optimism (Milligan, 2003) and negatively associated with PTSD symptoms (Fauerbach et al., 2000).

Method

Participants

In this thesis, I used data from the HowNutsAreTheDutch (Dutch: HoeGekIsNL; henceforth HND) cross-sectional study (van der Krieke et al., 2016). Participants had to be 18 years old or above in order to take part in the study. I selected participants who filled out the questionnaire on childhood trauma ($n = 1595$), and who filled out the questionnaire about optimism ($n = 3184$), and who completed the personality questionnaire ($n = 5032$). The resulting subsample of 1358 participants had a mean age of 46.7 years (age range 18-80, $SD = 14.4$). Most participants were female (75 %) and highly educated (completed tertiary education; 80 %). Responders who completed all three questionnaires were found to significantly differ from the participants who did not complete all three questionnaires ($n = 13646$) in gender ($t(1689.08) = 6.22, p = .001$, 75% female versus 67 % female), age ($t(1652.57) = 7.396, p < .001, M = 43.5$ versus $M = 46.7$) and had a lower level of education ($t(1704.72) = 4.41, p = 0.001, 75 %$ versus 80 %).

Procedure

To gather participants for the study, a crowdsourcing method was implemented - inhabitants of the Netherlands were invited to join the research via different platforms such as national radio broadcast, television, newspapers, and other means. Furthermore, they were invited to visit the Dutch website www.HoeGekIs.nl, which has been online since 19 December 2013. In order for them to join the study, they had to register and create an account. In the beginning, responders had to fill out mandatory questionnaires, which were called the 'start

modules', and assessed participants' socio-demographic profile, living situation, affect/mood, and general well-being. Upon completion of these questionnaires, the responders had access to all other modules, in no particular order. Therefore, not all participants completed each measure described in this thesis.

Measures

Childhood trauma

Childhood trauma was evaluated by the Childhood Trauma Questionnaire-Short Form (CTQ-SF; Bernstein et al., 2003). The CTQ-SF contains 25 items, and is a retrospective self-report questionnaire made to assess five different dimensions of childhood trauma: physical abuse, emotional abuse, sexual abuse, physical neglect, and emotional neglect. Each scale of childhood trauma was assessed with 5 items, scored from 1 to 5, indicating the amount of maltreatment experiences (1= never true, 2= rarely true, 3=sometimes true, 4= often true, 5=very often true). Each scale score ranged between 5-25, making the total CTQ-SF score range between 25-125. The higher the frequency of maltreatment experiences the participant had, the higher their score was. The subsample ($n = 1358$) mean score for childhood trauma was found to be 39.3 ($SD = 12.6$). In this sample, the Cronbach's coefficient alpha was .92, which indicates an excellent internal consistency of the questionnaire. The CTQ-SF was translated to Dutch using standard translation and back-translation procedures.

Childhood trauma was used in this thesis as a categorical variable. The total score was divided and recoded into four levels of maltreatment which are clinical cut-off points: none or minimal (total score ≤ 36), low to moderate (total score 37-51), moderate to severe (total score 52-68), and severe to extreme (total score ≥ 69).

Optimism

Optimism was assessed by the Life Orientation Test Revised (LOT-R; Glaesmer et al., 2012). The LOT-R contains 10 items. Three items evaluate optimism, three items evaluate pessimism, and four items are filler items. On a scale from 0 to 4, participants were instructed to indicate their level of agreement with the items (0 = strongly disagree, 4= strongly agree). A total score is calculated by combining the optimism scores and the inverted pessimism scores. The total range of scores was between 0 to 24. In the present sample, the Cronbach's coefficient alpha was .84, which indicates a good internal consistency of the questionnaire. Optimism was used in this thesis as a continuous variable.

Extraversion

Extraversion was assessed by the Neuroticism-Extraversion-Openness Five-Factor Inventory (NEO-FFI-3; De Fruyt and Hoekstra, 2014). The NEO-FFI-3 evaluated the Big Five personality traits Neuroticism, Extraversion, Openness to experience, Agreeableness, and Conscientiousness using 60 items. Each trait was assessed with 12 items. The items were scored on a scale from 1 to 5, and the participants were instructed to indicate their level of agreement with the items (1 = strongly disagree, 5= strongly agree). The range of scores was between 12-72. The subsample ($n = 1358$) total score for the extraversion scale was found to have an average of 37.4 ($SD = 7.1$). In the present sample, the Cronbach's coefficient alpha was .83, which indicates a good internal consistency of the subscale. Extraversion was used in this thesis as a categorical variable. The total score was divided and recoded into three levels of extraversion which were computed according to the sample mean: low (below one standard deviation ≤ 30), moderate (between one standard deviation below and above – 31-44), and high (above one standard deviation ≥ 45).

Statistical analysis

All statistical analyses were performed using SPSS version 28. In the following analyses, gender, age and educational level were included as covariate/control variables because these sociodemographic variables correlated with childhood trauma, optimism or extraversion scores in the subsample (see Sample characteristics). In order to test both hypotheses, the participants were divided into four childhood trauma severity subgroups and into three extraversion subgroups.

To answer Hypothesis 1, childhood trauma severity groups were used as a categorical predictor variable and LOT-R total scores were used as the continuous outcome variable using analysis of variance (ANOVA). ANCOVA was executed to repeat the analysis with childhood trauma severity groups while controlling for age, gender and education level. In case of a significant effect for childhood trauma severity group, post-hoc tests were conducted with Fisher's Least Significant Difference (LSD) procedure and Bonferroni correction for multiple comparisons.

In order to check the assumption of normality, a Q-Q plot of the standardized residuals for optimism scores was conducted for both ANOVA and ANCOVA. According to Shapiro-Wilk tests, the assumption of normality was violated ($p < .001$) in both analyses. However, it can be shown in the Q-Q plot and histogram of standardized residuals (Appendix A) that the deviations from normality were not very large. Finally, the sample size is large ($n > 200$), therefore it can be presumed that the assumption of normality is met. The assumption for homogeneity of variance was met through the Levene's test for equality of variances, which was not violated for both analyses - ANOVA ($F(3, 1354) = 2.26, p = .080$) and ANCOVA ($F(3, 1354) = 2.49, p = .059$).

To answer Hypothesis 2, childhood trauma severity groups, the extraversion groups and the interaction between childhood trauma and extraversion were used as predictor variables of LOT-R scores using ANOVA. ANCOVA was executed to repeat the analysis while controlling for age, gender and education level. Again, in case of a significant effect for childhood trauma, extraversion, or their interaction, post-hoc tests were conducted with Fisher's Least Significant Difference (LSD) procedure and Bonferroni correction for multiple comparisons.

Again, the assumption for normality was found to not be met by the Shapiro-Wilk tests ($p < .001$) for both ANOVA and ANCOVA. Once again, it can be shown in the Q-Q plot and histogram of standardized residuals (Appendix B) that there were no large deviations from normality. The assumption for homogeneity of variance was met through the Levene's test for equality of variances, which was not violated for ANOVA ($F(11, 1346) = 1.74, p = .059$), as well as to ANCOVA ($F(11, 1346) = 1.77, p = .055$). The Variance Inflation Factor (VIF) was below 1.02 for both childhood trauma and extraversion, therefore multicollinearity was not a concern.

Results

Sample characteristics

None/minimal childhood trauma was reported by 52.2 % ($n = 709$), low to moderate childhood trauma was reported by 32.9 % ($n = 447$), moderate to severe childhood trauma was reported by 10.8 % ($n = 147$), and severe to extreme childhood trauma was reported by 4.1 % ($n = 55$). Gender (1 = female, 2 = male) and CTQ scores were strongly negatively correlated, indicating that women scored higher on childhood trauma than men ($r = -.85, p = .002$). Furthermore, age strongly positively correlated with CTQ scores ($r = .75, p = .006$). Finally, level of education negatively correlated with CTQ scores ($r = -.15, p < .001$), but only minimally so.

LOT-R total scores did not significantly correlate with age ($r = .03, p = .213$) and gender ($r = .04, p = .162$). LOT-R total scores were found to have a small negative correlation with level of education ($r = -.07, p = .008$).

Finally, The NEO-FFI-3 extraversion scale total scores were found to have a small negative correlation with age ($r = -.07, p = .014$) and a small positive correlation with level of education ($r = .12, p < .001$). Extraversion scores did not significantly correlate with gender ($r = -.02, p = .491$).

Stated differently, gender negatively correlated with childhood trauma, age positively correlated with childhood trauma and extraversion, and level of education negatively correlated with childhood trauma and optimism, and positively correlated with extraversion.

Childhood trauma and optimism

Hypothesis 1

The results showed that the model obtained by ANOVA was overall significant ($F(3, 1354) = 3.22, p = .022$). The ANCOVA obtained similar results. The overall model was significant $F(7, 1350) = 8.97, p < .001$. There was a significant effect for trauma severity when controlling for gender, age and educational level (see Table 1). In this model, partial eta squared for childhood trauma was found to be .01.

A multiple comparison analysis using Fisher's LSD procedure found a significant difference on optimism levels between the none/minimal and the extreme to severe trauma group ($p = .037$). Furthermore, a significant difference was found between the severe to extreme trauma group and two other groups - the low to moderate trauma group ($p = .020$) and the moderate to severe trauma group ($p = .009$). Thus, it seems that individuals in the severe to extreme trauma group showed higher optimism levels than the individuals in lower levels of childhood trauma.

However, after the Bonferroni correction no significant differences between the trauma groups' adjusted means remained.

Figure 4 visualizes the different trauma groups and their average optimism level.

Table 1

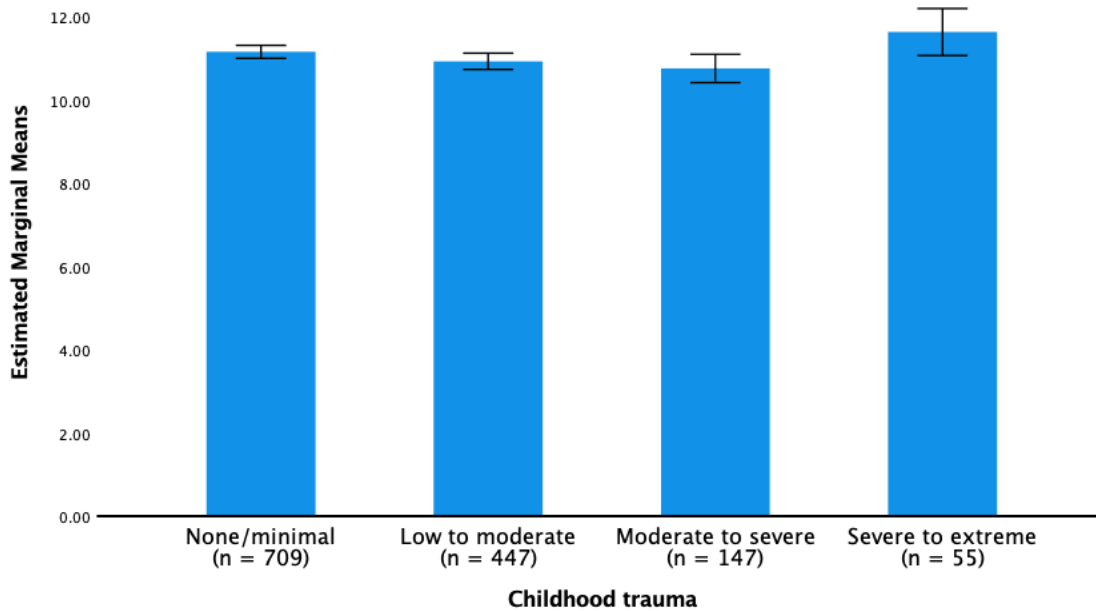
Results From ANOVA and ANCOVA Predicting LOT-R Total Scores From Childhood Trauma Groups.

Model	Predictor	Sum of squares	df	Mean square	<i>F</i>	<i>p</i>	η^2
ANOVA	Intercept	69382.80	1	69382.80	15562.36	.000	.92
	Childhood trauma severity	43.04	3	14.35	3.22	.022	.01
ANCOVA	Intercept	8013.92	1	8013.92	1807.26	<.001	.57
	Gender	4.54	1	4.54	1.02	.312	.00
	Age	5.66	1	5.66	1.27	.260	.00
	Education level	30.42	1	30.42	6.86	.009	.01
	Childhood trauma severity	45.78	3	15.26	3.44	.016	.01

Note. CTQ = childhood trauma questionnaire (scale 0-125). Gender: 1 = female, 2 = male. Educational level: 0 = secondary education or lower, 1 = tertiary education. Dependent variable: dispositional optimism (scale 0-24).

Figure 4

Adjusted Means of LOT-R Total Scores Per Childhood Trauma Group.



Note. Covariates are evaluated at the following values: gender = 1.25, age = 46.65, educational level = .8. Dependent variable: dispositional optimism (scale 0-24).

The moderating role of extraversion

Hypothesis 2

The results showed that the overall model is a significant ($F(11, 1346) = 2.02, p = .024$). The ANCOVA obtained similar results ($F(14, 1343) = 2.44, p = .002$). Childhood trauma and extraversion were both found to have significant main effects, as shown in Table 2. However, the interaction effect between the two variables was found to be nonsignificant.

Table 3

Results From ANOVA and ANCOVA Predicting LOT-R Total Scores From Childhood Trauma Severity Groups and Extraversion Level Groups.

Model	Predictor	Sum of squares	df	Mean square	<i>F</i>	<i>p</i>	η^2
ANOVA	Intercept	47897.30	1	47897.30	10779.13	.000	.89
	Childhood trauma severity	38.05	3	12.69	2.86	.036	.01
	Extraversion	41.02	2	20.51	4.62	.010	.01
	Childhood trauma severity*Extraversion	11.78	6	2.96	0.67	.677	.00
ANCOVA	Intercept	7506.98	1	7506.98	1700.53	<.001	.56
	Gender	5.11	1	5.11	1.16	.282	.00
	Age	7.98	1	7.98	1.81	.179	.00
	Education level	32.87	1	32.87	7.45	.006	.01
	Childhood trauma severity	41.70	3	13.90	3.15	.024	.01
	Extraversion	42.29	2	21.15	4.79	.008	.01
	Childhood trauma severity*Extraversion	15.24	6	2.54	0.58	.750	.00

Note. CTQ = childhood trauma questionnaire (scale 0-125). Gender: 1 = female, 2 = male. Educational level: 0 = secondary education or lower, 1 = tertiary education. Dependent variable: dispositional optimism (scale 0-24).

Like before, using Fisher's LSD procedure showed significant differences in optimism scores between the severe to extreme trauma group and two other trauma groups – low to moderate ($p = .016$) and moderate to severe ($p = .011$). Using the Bonferroni correction showed no significant differences between the groups.

Using Fisher's LSD procedure, a significant difference in optimism scores was shown between the high extraversion group and the two other groups – the low ($p = .002$) and the

moderate ($p = .048$). Furthermore, using the Bonferroni correction still showed a significant difference in optimism between the high and the low extraversion group ($p = .006$). Thus, it seems that people scoring higher on extraversion showed higher optimism levels. Adjusted means and standard deviations of total LOT-R scores per extraversion group are presented in Table 4.

Table 4

Adjusted Means and Standard Deviations of LOT-R Total Scores Per Extraversion Group.

Extraversion group	<i>n</i>	<i>Mean</i>	<i>SD</i>
Low	216	10.7	0.2
Moderate	918	11.3	0.1
High	224	11.6	0.2

Note. Covariates are evaluated at the following values: gender = 1.25, age = 46.65, educational level = .8. Dependent variable: dispositional optimism (scale 0-24).

Additional analyses

Hypothesis 1

Figure 4 suggests that the association between childhood trauma and optimism obtained in the analyses may have a nonlinear pattern. In comparison to the ANOVA conducted above, which was used to compare between childhood trauma groups based on clinical cut-off points in the CTQ-SF score, I used multiple regression analysis to examine the nonlinear quadratic relation observed in the data. I used the z-transformation to standardize the CTQ-SF scores. I compared between three models – model 1 used the three control variables (gender, age and education level) as predictors of optimism levels, model 2 used the control variables and childhood trauma total scores as predictors of optimism levels, and model 3 used the control

variables, childhood trauma total scores, and trauma scores squared as predictors of optimism levels. All models were found to be overall significant (model 1: $F(3, 1354) = 3.23, p = .022, R^2 = .01$; model 2: $F(4, 1353) = 2.43, p = .046, R^2 = .01$; model 3: $F(5, 1352) = 3.61, p = .003, R^2 = .01$). In model 2, there was no significant effect for trauma ($p = .845$). However, in model 2 there was a significant effect for trauma ($p = .035$) and for the squared trauma scores ($p = .004$). Table 5 provides the results for the three models and Figure 5 provides a visual representation of optimism scores predicted by trauma scores in the two models.

Table 5

Results From Multiple Regression Analysis Predicting LOT-R Total Scores From Control Variables, Childhood Trauma Total Scores and Childhood Trauma Scores Squared.

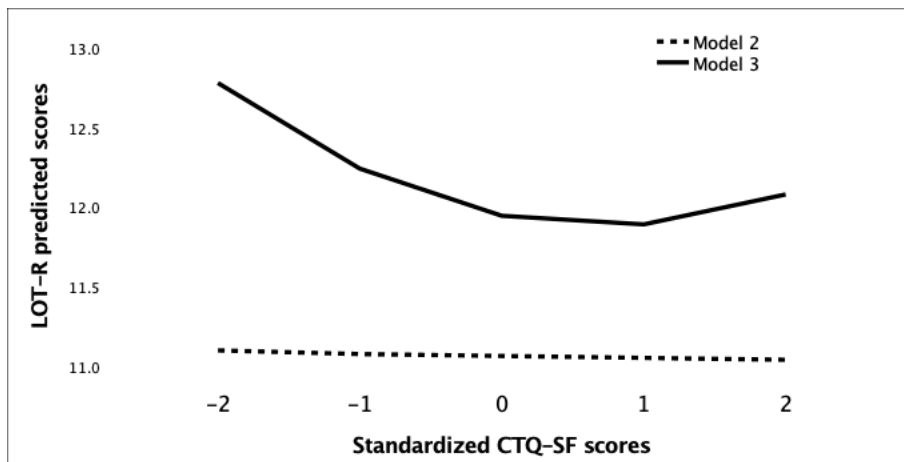
Model	Predictor	β	B	95% CI	t	p
1	Intercept	11.01		10.51, 11.52	42.96	<.001
	Gender	0.14	0.03	-0.13, 0.40	0.98	.326
	Age	0.00	0.03	-0.00, 0.01	0.93	.352
	Education level	-0.38	-0.07	-0.65, -0.10	-2.63	.009
2	Intercept	11.02		10.51, 11.52	42.86	<.001
	Gender	0.13	0.03	-0.14, 0.40	0.95	.342
	Age	0.00	0.03	-0.00, 0.01	0.95	.344
	Education level	-0.38	-0.07	-0.66, -0.10	-2.63	.009
	Childhood trauma	-0.01	-0.01	-0.13, 0.11	-0.20	.845
3	Intercept	10.83		10.31, 11.35	40.98	<.001
	Gender	0.14	0.03	-0.13, 0.41	1.03	.302
	Age	0.01	0.03	-0.00, 0.01	1.19	.233

Education level	-0.37	-0.07	-0.65, -0.09	-2.57	.010
Childhood trauma	-0.18	-0.08	-0.34, -0.01	-2.11	.035
Childhood trauma ²	0.12	0.11	0.04, 0.20	2.88	.004

Note. Control variables are evaluated at the following values: gender = 1.25, age = 46.65, educational level = .8. Dependent variable: dispositional optimism (scale 0-24).

Figure 5

Estimated Marginal Means of Optimism Scores Across Standardized CTQ-SF Scores According to Model 2 and Model 3



Note. Control variables are evaluated at the following values: gender = 1.25, age = 46.65, educational level = .8. Dependent variable: dispositional optimism (scale 0-24).

Furthermore, Figure 5 shows that there might be a negative relation between the first three trauma groups. To check whether this is the case, I repeated the same ANCOVA as for Hypothesis 1, only excluding the severe to extreme trauma group. The results showed that the overall model is significant ($F(5, 1297) = 2.69, p = .020$). However, childhood trauma was found to have a non-significant effect on optimism levels ($p = .051$). Similarly, the results from the multiple regression analysis excluding the severe to extreme trauma group showed that the

overall model is significant ($F(4, 1298) = 2.83, p = .024$). However again, the main effect for childhood trauma without the severe to extreme trauma group was found non-significant ($p = .050$). Thus, these analyses suggest that the significant effect of childhood trauma in the complete model (with all trauma groups, see Table 1) may be accounted for by the severe to extreme trauma group.

Hypothesis 2

To check if extraversion moderated the association between childhood trauma and adulthood optimism, another multiple regression analysis was conducted. I used the z-transformation to standardize the NEO-FFI-3 for the extraversion subscale scores. I compared between four models – model 1 (see model 1 in Table 5). Model 2 used the control variables, standardized childhood trauma total scores and the standardized extraversion subscale scores as predictors of optimism levels. Model 3 used the variables in model 2 in addition to the interaction between childhood trauma and extraversion and the childhood trauma scores squared. Finally, model 4 used the variables in model 3 in addition to the interaction between extraversion and childhood trauma scores squared (see Table 6 for the analyses of the four models).

All models were found to be overall significant (model 2: $F(5, 1352) = 7.24, p < .001, R^2 = .03$; model 3: $F(7, 1350) = 6.15, p < .001, R^2 = .03$; model 4: $F(8, 1349) = 5.90, p < .001, R^2 = .03$). Again, as is shown in Table 6, a significant effect for the squared trauma scores was observed in model 3 ($p = .011$). Additionally, compared to the non-significant interaction effect between childhood trauma and extraversion shown in the previous ANOVA (see Table 3), the triple interaction effect between trauma squared and extraversion in model 4 had a significant effect on optimism levels ($p = .044$). Figure 6 provides a visual representation of optimism scores predicted by model 4. It shows that people who reported similar levels of childhood

trauma and scored higher on extraversion had higher optimism scores compared to people who scored lower on extraversion.

Table 6

Results From Multiple Regression Analysis Predicting LOT-R Total Scores From Childhood Trauma Total Scores, Extraversion Total Scores, Childhood Trauma Scores Squared and the Interaction Between Extraversion and Childhood Trauma Scores Squared.

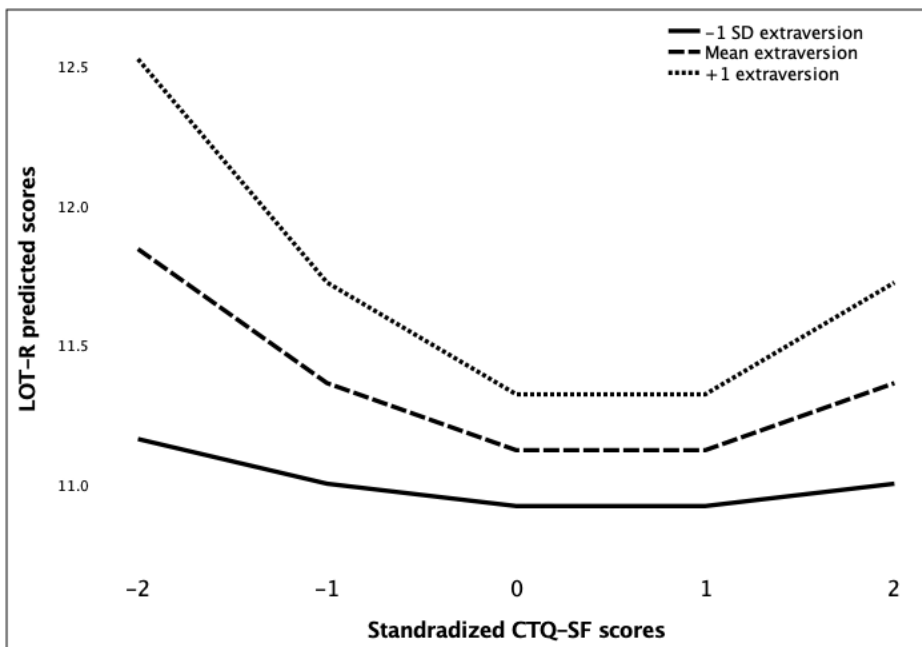
Model	Predictor	β	<i>B</i>	95% CI	<i>t</i>	<i>p</i>
2	Intercept	11.01		10.51, 11.51	43.25	<.001
	Gender	0.14	0.03	-0.13, 0.41	1.01	.313
	Age	0.01	0.04	-0.00, 0.01	1.22	.220
	Education level	-0.45	-0.09	-0.73, -0.17	-3.14	.002
	Childhood trauma	0.03	0.01	-0.09, 0.14	0.42	.677
	Extraversion	0.30	0.14	0.18, 0.41	5.13	<.001
3	Intercept	10.85		10.34, 11.37	41.38	<.001
	Gender	0.15	0.03	-0.12, 0.41	1.07	.286
	Age	0.01	0.04	-0.00, 0.01	1.45	.149
	Education level	-0.43	-0.08	-0.72, -0.15	-3.01	.003
	Childhood trauma	-0.11	-0.05	-0.26, 0.05	-1.33	.183
	Extraversion	0.28	0.13	0.17, 0.40	4.81	<.001
	Childhood trauma*extraversion	0.04	0.02	-0.07, 0.15	0.77	.441
Childhood trauma ²	0.11	0.10	0.02, 0.19	2.53	.011	
4	Intercept	10.81		10.30, 11.33	41.19	<.001

Gender	0.14	0.03	-0.13, 0.41	1.04	.300
Age	0.01	0.04	-0.00, 0.01	1.51	.131
Education level	-0.41	-0.08	-0.70, -0.13	-2.87	.004
Childhood trauma	-0.12	-0.06	-0.29, 0.04	-1.46	.145
Extraversion	0.20	0.10	0.07, 0.34	2.94	.003
Childhood trauma*extraversion	-0.08	-0.04	-0.25, 0.08	-0.97	.332
Childhood trauma ²	0.12	0.11	0.04, 0.20	2.81	.005
Childhood trauma ² *extraversion	0.08	0.09	0.00, 0.16	2.02	.044

Note. Covariates are evaluated at the following values: gender = 1.25, age = 46.65, educational level = .8, Dependent variable: dispositional optimism (scale 0-24).

Figure 6

Estimated Marginal Means of Optimism Scores Across Standardized CTQ-SF Scores and Extraversion Scores According to Model 4 in Table 6.



Note. Control variables are evaluated at the following values: gender = 1.25, age = 46.65, educational level = .8. Dependent variable: dispositional optimism (scale 0-24).

Discussion

In this thesis I investigated the association between childhood trauma and adulthood optimism, and the possible moderating effect of extraversion on this association. I hypothesized that individuals who experienced more childhood trauma would show lower levels of adulthood optimism. The results were not consistent with this hypothesis. Instead of the hypothesized negative linear association, it appeared that there might be a curvilinear pattern between the two constructs, starting with a negative linear relation and then a positive relation at the highest level (extreme to severe, see Figure 4). However, model 3 in Table 5 shows that the negative linear

association between childhood trauma and optimism was found to be significant when childhood trauma squared was also analyzed.

The significance of the effect of childhood trauma on adulthood optimism might be different in the fourth group of childhood trauma. Thus, even though childhood trauma did not have the hypothesized effect on adulthood optimism, it still significantly associated with it with a different pattern, which brings about the question – what could possibly be behind the highly optimistic perspective of individuals who report such high levels of childhood trauma?

These results align with past research which shows evidence for a phenomenon called post-traumatic growth (PTG). This phenomenon describes individuals who, after a traumatic event, show positive social, spiritual, or psychological growth (Tedeschi and Calhoun, 2004). Furthermore, it seems that there are certain determinants which could influence the extent of positive change experienced by people, which include individuals' social support systems, demographic and financial backgrounds, as well as their levels of values and affect before the trauma (Schaefer and Moos, 1992). Moreover, highly optimistic individuals were found to obtain a sense of gain from adversity (Tennen et al., 1992), and the capability to handle demands of perhaps a traumatic event was found to be predicted by optimism levels (Benight and Bandura, 2004). Since only correlational analyses were conducted in this thesis, it is impossible to know whether the participants who reported high levels of childhood trauma were also optimistic individuals before their trauma, a factor which might have influenced their current levels of optimism. Also, currently optimistic people may have completed the CTQ differently than if they were not in an optimistic state of mind. This notion may suggest under-reported levels of childhood trauma within currently highly optimistic individuals.

Furthermore, the results indicate a counterintuitive picture: Why would we find an indication of PTG only in people who reported highest levels of childhood trauma, and not within people who reported lower levels of trauma? A possible reason behind this might be the different sample sizes between the childhood trauma groups. Since there were more people in lower trauma severity groups compared to the highest severity group, it can be speculated that in the case there are people who experienced PTG in those groups, their scores would have less impact on the group mean compared to people in the highest trauma severity group with the smallest sample size ($n = 55$).

Regarding this thesis, it can be speculated that individuals who chose to volunteer their time and take part in the HND study, might have also dealt with their trauma in a way that fostered growth and a highly optimistic perspective in life. It might be that there are certain differences between the individual characteristics of HND participants who suffered great trauma and survivors of trauma who did not take part in it (the latter might show a different pattern of adulthood optimism). However, past research indicates a certain growth process that can take place following trauma, and unexpectedly to the aim of this thesis, the current data provides additional evidence to it.

These results partially align with past research that showed a negative association between childhood trauma and optimism levels (Korkeila et al., 2004, Kessler et al., 2010). For example, the study by Korkeila et al. (2004) used the same adulthood optimism measurement (LOT-R scale), and different questionnaires assessing various types of childhood adversities. In their study, a clear negative relation was found between levels of childhood adversities and optimism scores. Differently to our results, in their study a curvilinear relation was not found between childhood trauma and optimism.

In addition, I hypothesized that extraversion would moderate the relation between childhood trauma and adulthood optimism, and more specifically that the hypothesized negative association between childhood trauma and adulthood optimism would be weaker among more extroverted individuals. The results from the planned analysis were not consistent with this hypothesis. Even though it was shown that childhood trauma and extraversion had a significant effect on adulthood optimism, the interaction between extraversion and childhood trauma was found non-significant in the planned analyses. However, the results in the additional analyses which checked for the significance of a nonlinear association between childhood trauma, extraversion and optimism showed a significant triple interaction effect between trauma squared and extraversion (see model 4 in Table 6 and Figure 6).

As is shown in Figure 6, more extraverted people were found to score on average higher on optimism than less extraverted individuals irrespective of their levels of childhood trauma. These results align with past research that showed a positive association between optimism and extraversion (Darvill and Johnson, 1991; Milligan, 2003). The significant triple interaction effect with a positive slope indicates that people who scored higher on extraversion also scored higher on optimism within people who reported highest levels of childhood trauma, where the nonlinear relation is observed.

Thus, it may be that people who scored higher on extraversion were also more inclined to experience the process of PTG indicated earlier, which would align with past research that showed a positive relation between extraversion and PTG (Tedeschi and Calhoun, 2004; Panjikidze et al., 2019; Garnefski et al., 2008). It was shown that highly extraverted people were also more inclined to use higher levels of problem-focused coping, a coping method that was found to act as a mediator between extraversion and PTG (Sheikh, 2004). Moreover, from an

interpersonal perspective, more extraverted individuals are fun-loving, optimistic and energetic (Vazquez et al., 2021), thus they might also express their emotions and reveal themselves to the people surrounding them, a factor that might enhance PTG due to the large support these people can receive from social interactions (Jia et al., 2015). This way of handling the trauma can help them feel like they are not alone or the only ones who ever experienced such emotions.

Again, similarly to the analysis of Hypothesis 1, in the analyses of Hypothesis 2 the first three childhood trauma groups had a negative linear relation with optimism, and then had a rise between the third and fourth group, in all three levels of extraversion. Further analysis of the linear relation between the first three groups and the overall curvilinear relation showed that the linear relation between childhood trauma and optimism was non-significant, whereas the curvilinear association was found significant. However, model 3 in Table 5 indicates that there is a significant negative linear association between childhood trauma and optimism when trauma scores squared are analyzed. Thus, it seems that through an examination of the nonlinearity of the data, the linear relation between childhood trauma and optimism is obtaining significance, compared to model 2 in Table 5 where the effect of childhood trauma scores squared is not analyzed, and the linear effect of childhood trauma is not significant.

Strengths and limitations

One of the strengths of the present thesis is the use of a large community sample. In addition, the use of a crowdsourcing method to get participants made it a completely voluntary process. Thus, compared to other studies where participants are getting paid or must participate in psychological studies as part of their educational program, it might be that intrinsic motivation to participate encouraged more honest responses, with the aim to contribute to psychological science rather than personal gain. Finally, the likelihood of response bias is low, since

participants could not have known this data would be used to examine the link between childhood trauma, extraversion and optimism. Thus, they could not have tried to answer in a ‘correct’ manner to confirm or reject a certain hypothesis.

However, there are several limitations. Firstly, the sample of responders who completed all three questionnaires were found to significantly differ from participants who did not complete all three questionnaires on gender, age and education level. More specifically, there were slightly more women in the current sample under investigation. This might act as a limitation since previous research indicates that females are consistently shown to develop PTSD at a rate twice that of males (Kessler et al., 1995; Breslau et al., 1998; Stein et al., 1997), and thus it may be that the way of handling a traumatic event is different between genders. However, these studies should be taken with caution, as men were found to hold less positive attitudes towards using mental health services compared to women (Yousaf et al., 2015), and to be less willing to seek professional support (Gonzalez et al., 2011). Thus, the suggested difference between genders in regards to PTSD development may be due to the presumed general attitude of men towards seeking mental health support, rather than an actual lower prevalence of PTSD across men.

Furthermore, the participants in this thesis were slightly younger than the rest of the responders in the study. This could be considered a limitation since childhood trauma might be perceived very differently throughout one’s lifetime, as time can bring healing and an opportunity to grow, similarly to the process of PTG discussed above. Finally, the current sample of participants were slightly less educated than the rest of the responders in the study.

Additionally, a possible covariate that was not included in the analysis of this thesis is the role of the neuroticism personality trait. Neuroticism was found to have a strong negative association with optimism (Milligan, 2003), as it is suggested that more neurotic people feel they

have less control over future life events, specifically negative ones, which may explain the negative correlation between neuroticism and optimistic mindset (Darvill and Johnson, 1991). These results could also be explained from an interpersonal perspective: For example, it could be that people who are highly neurotic would find it more difficult to maintain or perceive a large and strong social support system (Jurgen et al., 2014), and thus would find it more difficult to reach a more optimistic perspective in life or experience PTG following a traumatic event, as social support was found to be a predictor of PTG (Schaefer and Moos, 1992). It may be that considering neuroticism as a covariate would have influenced the results, due to its strong negative relation with optimism. However, exploring further the role of neuroticism was outside of the scope of this thesis, but it may be interesting for future research to explore the effect of neuroticism in relation to childhood trauma, optimism and extraversion.

In addition, the unequal sample sizes between different extraversion and childhood trauma groups can be considered as another limitation (see Figure 4). The severe to extreme trauma group includes the lowest sample size and highest variability within the group as is shown by its standard deviation and error bars. Comparing this sample size to the study conducted by Korkeila et al. (2004), they had overall a very large number of participants (19,970) and thus had a larger number of participants in each category of childhood adversity, enhancing the reliability of the study. Therefore, it is hard to determine whether in a similar study as described in this thesis, with equal sample sizes between levels of childhood trauma (perhaps obtained from clinics specializing in trauma treatment), the same nonlinear association would be observed.

In addition, the measures used were self-report questionnaires, and only a single measure was analyzed to determine each construct – childhood trauma, extraversion, and optimism.

Including different types of measures such as observational measures could have helped with strengthening the results, as well as including more than only one measurement per variable.

Firstly, even though the Life Orientation Test (LOT) is the most used measurement for adulthood optimism in psychological research (Scheier and Carver, 1985; Scheier et al., 1994), it could be that individuals would have biased opinions towards their own optimism levels, and thus the accuracy of their responses could be questioned. An option to strengthen the accuracy of individuals' optimism levels is to interview people who are close to them (such as family members or romantic partners) and to ask for their perception of the participants' optimism levels. As this method seems to be quite difficult to implement in all scenarios, perhaps an open-ended questionnaire that asks the participant to describe their way of handling different challenges or how they see their future could be helpful. That way, it would be harder for people to 'fake good' like they can easily do by choosing the most optimistic option in a multiple-choice test. To my knowledge, there are currently no alternative methods of assessment of optimism that are remotely as commonly used as the LOT-R.

Furthermore, in their review, Roy and Perry (2004) compared 21 observer-rated and 21 self-report measures which assess childhood trauma. They mention the advantages of using the interview method in addition or instead of a self-report questionnaire. An example to a benefit can be that in an interview the rating is based on specific events instead of depending on the judgment of the patient, which might be influenced by their existing emotional state. Using multiple methods of assessment can sharpen the accuracy of the patient's diagnosis and therefore help with the most fitting type of treatment for them (for a detailed review of the different measures and their psychometric properties, see Roy and Perry, 2004). Furthermore, the CTQ questionnaire is retrospective, which means that people's perception of their childhood trauma

may be shaped by their current mental states and/or the amount of treatment they received since the trauma. Therefore, this sort of potential biased memory should be taken into account in the analyses of CTQ results. Finally, the CTQ checks for the existence of childhood trauma only rather than current PTSD symptoms. This is important to keep in mind, as people might report severe levels of childhood trauma but have gone through great recovery, or the other way around, people might report low levels of childhood trauma but still suffer great pain from it in adulthood. In analyzing the results of the questionnaire, childhood trauma severity should not be a synonym of PTSD symptoms severity.

Finally, even though self-report measures of personality can easily access intimate thoughts and mental states, previous research shows they can be subject to biases in self-perception (Baumeister et al., 2007). People may answer a personality questionnaire in the way they wish to present themselves rather than responding with complete honesty. Thus, response distortion is less expected to be a problem for observer ratings (Van Iddekinge et al., 2005). The Work Simulation Personality Rating Scale (WSPRS) is an example for an observational assessment of personality which was constructed in order to add to the knowledge obtained by self-report regarding one's personality from an outside point of view (Speer et al., 2015). Even though this measurement was built specifically for the assessment of future employees' personality, it shows how personality can be assessed through different modalities.

Implications

Despite the limitations mentioned above, this thesis suggests several theoretical and practical implications. Firstly, it was shown that people may react to childhood trauma in different ways, and that many aspects can contribute to people's journey to recovery (such as personal values and affect as well as social support systems). Obtaining the unexpected results of

a curvilinear relation between childhood trauma and adulthood optimism is shedding a light on the idea that maybe experiencing trauma does not necessarily determine a path of negative consequences. Rather, people who went through severe traumatic events in their lives and could keep an optimistic mindset, could perhaps differentiate between the horrifying events that happened to them in their childhood, and positively believe in what the future holds for them.

Furthermore, the LOT-R is formally testing for ‘dispositional optimism’. However, the idea of optimism being dispositional suggests that it is something that we are either born with or not. However, I believe that this notion needs to be examined. As was also mentioned above, a part of going through the process of PTG is changing one’s perspective in life and appreciating it more – obtaining psychological growth (Tedeschi and Calhoun, 2004). The idea of optimism being an innate trait should be questioned, as it may decrease and increase following trauma.

Finally, the association between the personality trait extraversion and optimism as partially a consequence of interpersonal processes brings an important implication for clinical settings. That is, taking out specific types of advantages that are seen frequently with people who are high on a specific personality trait, can be extremely beneficial for the general population, perhaps also to people who are very far away from that specific trait. As an illustration, gaining evidence that part of the effect of high extraversion levels on optimism levels is the amount of perceived social support people feel from their surroundings, can be implemented in therapy through close guidance and support of the therapy provider. People following trauma can slowly learn to expose their vulnerability to others around them, to feel less alone, and perhaps most importantly, to learn to perceive that social support and gain mental strength from it.

Future research

In terms of future research, it could be beneficial to explore further the role of extraversion within its association with PTG. More specifically, research can take place in clinics who treat people with PTSD and who have patients which are experiencing PTG. Through psychological testing (such as the NEO-FFI-3), people's levels of personality traits can be assessed, and thus interviews can be held with people who scored high on the extraversion scale. During these interviews, it may be important to understand which sort of behaviors the clients took that helped them in their recovery, and perhaps with experiencing PTG. From that point, conclusions can be drawn regarding specific intervention methods clients can benefit from during treatment of PTSD,

Furthermore, future research might benefit from conducting a longitudinal study with clients who are receiving treatment for PTSD and measure their optimism levels continuously during their time in therapy, in the aim of gaining better insight in the role of optimism in the recovery of PTSD. Through such a procedure, new revelations might be found about what is promoting optimistic perspectives within the population of trauma survivors and the opposite, what can inhibit such a mindset. This knowledge can greatly enhance the improvement of interventions for people who are dealing with PTSD symptoms.

Conclusion

In conclusion, in this thesis I obtained unexpected findings which suggest that perhaps the process of PTG took place within the sample of participants. Even though these findings do not fully align with my hypotheses, they still provide important evidence to the notion that human beings are adaptive creatures that can grow from terrifying situations. Furthermore, different personality traits, such as extraversion, may have an impact on the process to recovery after trauma. What mediates the association between extraversion and PTG is outside of the

scope of this thesis but is a very important question in the aim of improving current interventions for people who are struggling with PTSD symptoms.

I believe that we are not cuffed to our own misfortune. Moreover, I think that everyone is strong enough to heal from trauma, and at the same time I believe that most people need a long time to learn how to do so, or do not have the needed resources and professionals to guide the way. That is why it was important for me to stress in this thesis that certain concepts that have been conceptualized as ‘inborn’ or ‘inherent’ in earlier research (such as dispositional optimism) should be looked at under a magnifying glass. In my perspective, the only way for us to help individuals who suffered great pain to move forward, is by us firstly believing in change being an option, and that people’s behaviors, thoughts and affect are dynamic, rather than stable.

After the current findings, there are still many questions that are left unanswered - how can we develop a better optimistic approach to life following trauma? Which personality traits correlate strongly with PTG, and what can we learn about the characteristics of these traits to help the general population recover from trauma? How can we research this topic in an experimental setting? To me, these are all extremely important questions that hopefully will get clearer with future research in this field, and that I personally intend on continuing exploring.

References

- Baumeister, R. F., Vohs, K. D., & Funder, D. C. (2007). Psychology as the science of self-reports and finger movements: Whatever happened to actual behavior? *Perspectives on Psychological Science*, 2, 396-403.
- Beck, J. (2021). *Cognitive Behavior Therapy, Basics and Beyond* (second edition). Guilford Press.
- Benight, C. C., & Bandura, A. (2004). Social cognitive theory of posttraumatic recovery: The role of perceived self-efficacy. *Behaviour Research and Therapy*, 42, 1129–1148.
- Bernstein, D. P., Stein, J. A., Newcomb, M. D., Walker, E., Pogge, D., Ahluvalia, T., Stokes, J., Handelsman, L., Medrano, M., Desmond, D., & Zule, W. (2003). Development and validation of a brief screening version of the Childhood Trauma Questionnaire. *Child Abuse & Neglect*, 27(2), 169-190. [https://doi.org/10.1016/S0145-2134\(02\)00541-0](https://doi.org/10.1016/S0145-2134(02)00541-0)
- Breslau, N., Kessler, R. C., Chilcoat, H. D., Schultz, L. R., Davis, G. C., & Andreski, P. (1998). Trauma and posttraumatic stress disorder in the community: Detroit area survey of trauma. *Archives of General Psychiatry*, 55, 626–632.
- Carver, C.S., Scheier, M.F., 1999. Stress, coping, and self-regulatory processes. In: Pervin, L.A., John, O.P. (Eds.), *Handbook of Personality*. pp. 553–575. Guilford Press.
- Carver, C.S., Scheier, M.F., 2014. *Dispositional optimism*. Trends Cogn. Sci. 18 (6), 293–299.
- Carver, C.S., Scheier, M.F., Segerstrom, S., 2010. Optimism. *Clin. Psychol. Rev.* 30, 879–889.
- Conway, V. J., & Terry, D. J. (1992). Appraised controllability as a moderator of the effectiveness of different coping strategies: A theoretical stress model. *Personality and Individual Differences*, 14, 15–24.

- Costa, P. T., Jr., & McCrae, R. R. (1980). Influence of extraversion and neuroticism on subjective well-being: Happy and unhappy people. *Journal of Personality and Social Psychology*, 38,668–678. doi:10.1037/0022-3514.38.4.668.
- Darvill, T. J., & Johnson, R. C. (1991). Optimism and perceived control of life events as relate to personality. *Personality and Individual Differences*, 12(9), 951–954.
[https://doi.org/10.1016/0191-8869\(91\)90184-D](https://doi.org/10.1016/0191-8869(91)90184-D)
- De Fruyt F., Hoekstra H. (2014). *NEO-PI-3 persoonlijkheidsvragenlijst*. Hogrefe.
- Depue, R. A., & Collins, P. F. (1999). Neurobiology of the structure of personality: Dopamine, facilitation of incentive motivation, and extraversion. *Behavioral and Brain Sciences*, 22, 491–517. doi:10.1017/S0140525X99002046
- Diener, E., & Lucas, R. E. (1999). Personality and subjective well-being. In D. Kahneman, E. Diener, & N. Schwarz (Eds.), *Well-being: The foundations of hedonic psychology* (pp. 213- 229). Russell Sage Foundation.
- Diener, E., & Fujita, F. (1995). Resources, personal strivings, and subjective well-being monothetic and idiographic approach. *Journal of Personality and Social Psychology*, 6 926-935.
- Ellicott, A., Hammen, C., Gitlin, M., Brown, G., & Jamison, K. (1990). Life events and the course of bipolar disorder. *American Journal of Psychiatry*, 147, 1194–1198.
- Fauerbach, J. A., Lawrence, J. W., Schmidt, C. W., Munster, A. M., & Costa, P. T. (2000). Personality predictors of injury-related posttraumatic stress disorder. *Journal of Nervous and Mental Disease*, 188, 510–517. doi:10.1097/00005053- 200008000-00006
- Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., Koss, M. P.,& Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction

- to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. *American Journal of Preventive Medicine*, 14(4), 245-258.
[https://doi.org/10.1016/S0749-3797\(98\)00017-8](https://doi.org/10.1016/S0749-3797(98)00017-8)
- Finlay-Jones, R., & Brown, G. W. (1981). Types of stressful life event and the onset of anxiety and depressive disorders. *Psychological Medicine*, 11, 803–815.
- Folkman, S., & Lazarus, R. S. (1985). If it changes it must be process: Study of emotion and coping during three stages of a college examination. *Journal of Personality and Social Psychology*, 48, 150–170.
- Forsythe, S., & Compas, B. F. (1987). Interaction of cognitive appraisals of stressful events and coping: Testing the goodness-of-fit hypothesis. *Cognitive Therapy and Research*, 11, 473–485.
- Fowles, D. C. (1994). A motivational theory of psychopathology. *Nebr Symp Motiv*, 41, 181-238.
- Frazier, P. A., Gavian, M., Hirai, R., Park, C., Ten- nen, H., Tomich, P., & Tashiro, T. (2011). Prospective predictors of posttraumatic stress disorder symptoms: Direct and mediated relations. *Psychological Trauma: Theory, Research, Practice, and Policy*, 3, 27–36.
doi:10.1037/a0019894.
- Garnefski, N.; Kraaij, V.; Schroevers, M.J.; Somsen, G.A. (2008). Post-Traumatic Growth after a Myocardial Infarction: A Matter of Personality, Psychological Health, or Cognitive Coping? *J. Clin. Psychol. Med. Settings*, 15, 270–277.
- Glaesmer H., Rief W., Martin A., Mewes R., Brähler E., Zenger M., Hinz A. (2012). Psychometric properties and population-based norms of the life orientation test revised

(LOT-R). *British Journal of Health Psychology*, 17(2), 432–445.

DOI:10.1111/j.2044-8287.2011.02046.x.

- Gonzalez, J.M., Alegria, M., Prihoda, T.J., Copeland, L.A., Zeber, J.E. (2011). How the relationship of attitudes toward mental health treatment and service use differs by age, gender, ethnicity/race and education. *Soc Psychiatry Psychiatr Epidemiol*, 46 (1), 45–57.
- Grasso, D. J., Cohen, L. H., Moser, J. S., Hajcak, G., Foa, E. B., & Simons, R. F. (2012). Seeing the silver lining: Potential benefits of trauma exposure in college students. *Anxiety, Stress & Coping*, 25 (2), 117–136. doi:10.1080/10615806.2011.561922.
- Gray, J. A. (1996). The neuropsychology of anxiety: reprise. *Nebr Symp Motiv*, 43, 61-134.
- Herrenkohl, T.I., Klika, J.B., Herrenkohl, R.C., Russo, M.J., Dee, T., 2012. A prospective investigation of the relationship between child maltreatment and indicators of adult psychological well-being. *Violence and Victims*. 27 (5), 764–776.
- Jia, X.; Ying, L.; Zhou, X.; Wu, X.; Lin, C. (2015). The Effects of Extraversion, Social Support on Posttraumatic Stress Disorder and Posttraumatic Growth of Adolescent Survivors of the Wenchuan Earthquake. *Plos One*, 10, e0121480.
- John, O. P., Naumann, L. P., & Soto, C. J. (2008). Paradigm shift to the integrative Big Five trait taxonomy: History, measurement, and conceptual issues. In O. P. John, R. W. Robins, & L.A. Pervin (Eds.), *Handbook of personality: Theory and research* (pp. 114–158). Guilford Press.
- Jurgen, M., Steven, E., & Laura, V. (2014). Neuroticism, extraversion, perceived social support, and escape television viewing as determinants of psychological distress in crime victims. *Journal of Aggression, Maltreatment & Trauma*, 23(3), 249–267.
- <https://doi.org/10.1080/10926771.2014.881949>

- Keller H. (1903). *Optimism: An Essay*. Merrymount Press.
- Kessler, R. C., Sonnega, A., Bromet, E., Hughes, M., & Nelson, C. B. (1995). Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry, 52*, 1048-1060.
- Kessler, R.C., McLaughlin, K.A., Green, J.G., Gruber, M.J., Sampson, N.A., Zaslavsky, A.M., Aguilar-Gaxiola, S., Alhamzawi, A.O., Alonso, J., Angermeyer, M., Benjet, C., Bromet, E., Chatterji, S., de, G.G., Demyttenaere, K., Fayyad, J., Florescu, S., Gal, G., Gureje, O., Haro, J.M., Hu, C.Y., Karam, E.G., Kawakami, N., Lee, S., Lepine, J.P., Ormel, J., Posada- Villa, J., Sagar, R., Tsang, A., Ustun, T.B., Vassilev, S., Viana, M.C., Williams, D.R., 2010. Childhood adversities and adult affective disorders in the WHO World Mental Health Surveys. *Br. J. Psychiatry, 197* (5), 378–385.
- Korkeila, K., Kivela, S.L., Suominen, S., Vahtera, J., Kivimaki, M., Sundell, J., Helenius, H., Koskenvuo, M., 2004. Childhood adversities, parent-child relationships and dispositional optimism in adulthood. *Soc. Psychiatry. Epidemiol. 39* (4), 286–292.
- Kuijer, R. G., Marshall, E. M., & Bishop, A. N. (2013). Prospective predictors of short-term adjustment after the Canterbury earthquakes: Personality and depression. *Psychological Trauma: Theory, Research, Practice, and Policy, 6*(4), 361–369. doi:10.1037/a0034591.
- Knutson, B., & Bhanji, J. (2006). Neural substrates for emotional traits? In T. Canli (Ed.), *Biology of personality and individual differences* (pp. 116–132). Guilford Press.
- Lawrence, J. W., & Fauerbach, J. A. (2003). Personality, coping, chronic stress, social support and PTSD symptoms among adult burn survivors. *Journal of Burn Care & Rehabilitation, 24*, 63–72. doi:10.1097/00004630-200301000-00016
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer.

- Lucas, R. E., & Fujita, F. (2000). Factors influencing the relation between extraversion and pleasant affect. *Journal of Personality and Social Psychology*, 79, 1039–1056.
<http://dx.doi.org/10.1037/0022-3514.79.6.1039>
- Lucas, R. E., Le, K., & Dyrenforth, P. S. (2008). Explaining the extraversion/positive affect relation: Sociability cannot account for extraverts' greater happiness. *Journal of Personality*, 76, 385–414. doi:10.1111/j.1467-6494.2008.00490.x
- McClure, S. M., York, M. K., & Montague, P. R. (2004). The neural substrates of reward processing in humans: The modern role of fMRI. *Neuroscientist*, 10, 260–268.
doi:10.1177/1073858404263526
- MacLeod, A. K., & Conway, C. (2005). Well-being and the anticipation of future positive experiences: The role of income, social networks, and planning ability. *Cognition and Emotion*, 19, 357–374.
- Milligan, M. (2003). Optimism and the five-factor model of personality, coping, and health behavior. *Dissertation Abstracts International*, 64 (11-B), 5830.
- Norman, R. E., Byambaa, M., De, R., & Butchart, A. (2012). The long-term health consequences of child physical abuse, emotional abuse, and neglect: a systematic review and meta-analysis. *Plos Medicine*, 9(11). <https://doi.org/10.1371/journal.pmed.1001349>
- Panjikidze, M.; Beelmann, A.; Martskvishvili, K.; Chitashvili, M. (2019). Posttraumatic Growth, Personality Factors, and Social Support among War-Experienced Young Georgians. *Psychol. Rep.*, 123, 687–709.
- Pickering, A. D. (2004). The neuropsychology of impulsive antisocial sensation seeking personality traits: From dopamine to hippocampal function? In R. M. Stelmack (Ed.), *On*

- the psychobiology of personality: Essays in honor of Marvin Zuckerman* (pp. 453–476).
Elsevier.
- Pickering, A. D., & Gray, J. A. (1999). The neuroscience of personality. In L. Pervin & O. John (Eds.), *Handbook of personality* (2nd ed., pp. 277–299). Guilford Press.
- Pickering, A. D., & Smillie, L. D. (2008). The behavioral activation system: Challenges and opportunities. In P. J. Corr (Ed.), *The reinforcement sensitivity theory of personality* (pp. 120–154). doi:10.1017/CBO9780511819384.005
- Rammsayer, T. H. (1998). Extraversion and dopamine: Individual differences in response to changes in dopaminergic activity as a possible biological basis of extraversion. *European Psychologist*, 3, 37–50. doi:10.1027//1016-9040.3.1.37
- Reuter, M., Netter, P., Toll, C., & Hennig, J. (2002). Dopamine agonist and antagonist responders as related to types of nicotine craving and facets of extraversion. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, 26, 845–853.
doi:10.1016/S02785846(01)00329-3
- Roy, C. A., & Perry, J. C. (2004). Instruments for the assessment of childhood trauma in adults. *The Journal of Nervous and Mental Disease*, 192(5), 343–51.
- Robbins, T. W., & Everitt, B. J. (1996). Neurobehavioral mechanisms of reward and motivation. *Current Opinion in Neurobiology*, 6, 228–236. doi:10.1016/S0959-4388(96)80077-8
- Schaefer J.A., Moos R.H. (1992). Life crises and personal growth. In: Carpenter BN, ed. *Personal coping: theory, research, and application*. Praeger Publishers
- Scheier, M. F., & Carver, C. S. (1985). Optimism, coping, and health: Assessment and implications of generalized outcome expectancies. *Health Psychology*, 4, 219–247.
- Scheier, M. F., & Carver, C. S. (1992). Effects of optimism on psychological and physical

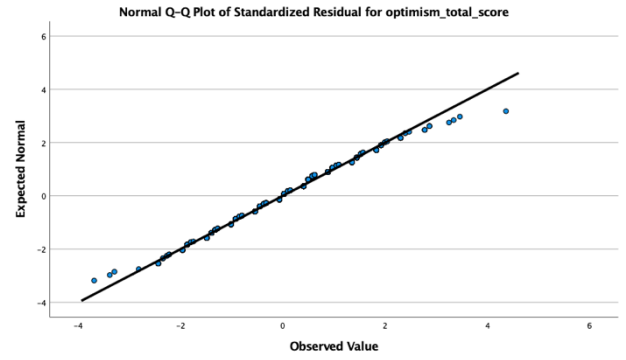
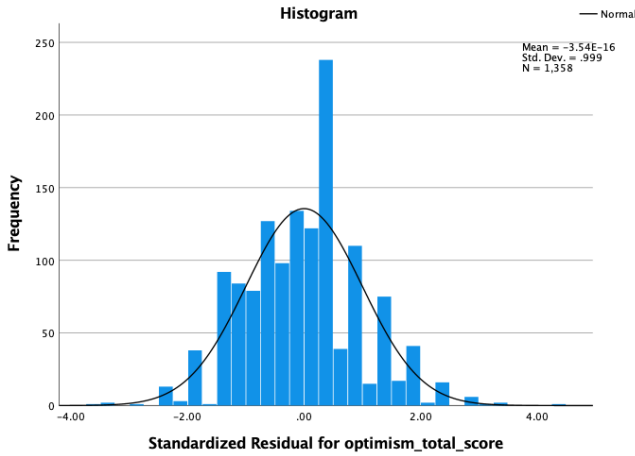
- well-being: Theoretical overview and empirical update. *Cognitive Therapy and Research*, 16, 201–228.
- Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem) – A reevaluation of the life orientation test. *Journal of Personality and Social Psychology*, 67, 1063–1078.
- Schultz, W. (1998). Predictive reward signal of dopamine neurons. *Journal of Neurophysiology*, 80, 1–27.
- Sheikh, A.I. (2004). Posttraumatic Growth in the Context of Heart Disease. *J. Clin. Psychol. Med. Settings*, 11, 265–273.
- Simeon, D., Yehuda, R., Cunill, R., Knutelska, M., Putnam, F.W., Smith, L.M., 2007. Factors associated with resilience in healthy adults. *Psychoneuroendocrinology*, 32 (8-10), 1149–1152.
- Smillie, L. D., Cooper, A., & Pickering, A. D. (2011). Individual differences in reward prediction-error: Extraversion and feedback-related negativity. *Social Cognitive and Affective Neuroscience*, 6, 646–652. doi:10.1093/scan/nsq078
- Smillie, L. D., Cooper, A., Proitsi, P., Powell, J., & Pickering, A. D. (2010). Variation in DRD2 dopamine gene predicts extraverted personality. *Neuroscience Letters*, 468, 234–237. doi:10.1016/j.neulet.2009.10.095
- Smillie, L. D., Cooper, A. J., Wilt, J., & Revelle, W. (2012). Do extraverts get more bang for the buck? Refining the affective-reactivity hypothesis of extraversion. *Journal of Personality and Social Psychology*, 103, 306–326. <http://dx.doi.org/10.1037/a0028372>
- Solberg Nes, L., & Segerstrom, S. C. (2006). Dispositional optimism and coping: A meta analytic review. *Personality and Social Psychology Review*, 10, 235–251.

- Speer, A., Christiansen, N., & Honts, C. (2015). Assessment of personality through behavioral observations in work simulations. *Personnel Assessment and Decisions*, 1(1).
<https://doi.org/10.25035/pad.2015.006>
- Springer, K. W., Sheridan, J., Kuo, D., & Carnes, M. (2007). Long-term physical and mental health consequences of childhood physical abuse: Results from a large population-based sample of men and women. *Child Abuse & Neglect*, 31(5), 517-530.
<https://doi.org/10.1016/j.chiabu.2007.01.003>
- Stein, M., Walker, J., Hazen, A., & Forde, D. (1997). Full and partial posttraumatic stress disorder: Findings from a community survey. *American Journal of Psychiatry*, 154, 1114–1119.
- Tedeschi, R. G., & Calhoun, L. G. (2004). Posttraumatic growth: conceptual foundations and empirical evidence. *Psychological Inquiry*, 15(1), 1–18.
- Tellegen, A. (1985). Structures of mood and personality and their relevance to assessing anxiety, with an emphasis on self-report. In A. H. Tuma & J. D. Maser (Eds.), *Anxiety and the anxiety disorders* (pp. 681–706). Erlbaum.
- Tennen, H., Affleck, G., Urrows, S., Higgins, P., & Mendola, R. (1992). Perceiving control, construing benefits, and daily processes in rheumatoid arthritis. *Canadian Journal of Behavioral Science*, 24, 186–203.
- Van Der Krieke, L., Jeronimus, B. F., Blaauw, F. J., Wanders, R. B. K., Emerencia, A. C., Schenk, H. M., De Vos, S., Snippe, E., Wichers, M., Wigman, J. T. W., Bos, E. H., Wardenaar, K. J., & De Jonge, P. (2016). HowNutsAreTheDutch ((HoeGekIsNL): A crowdsourcing study of mental symptoms and strengths. *International Journal of Methods in Psychiatric Research*, 25(2), 123-144. <https://doi.org/10.1002/mpr.1495>

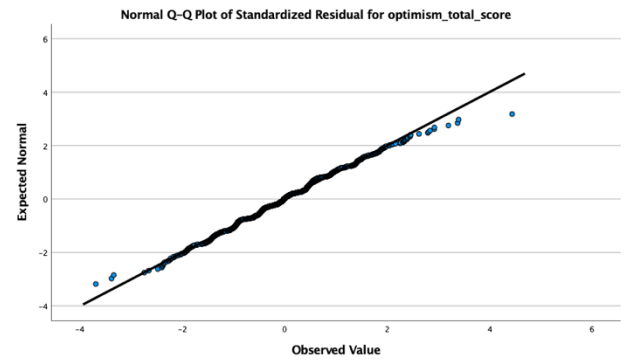
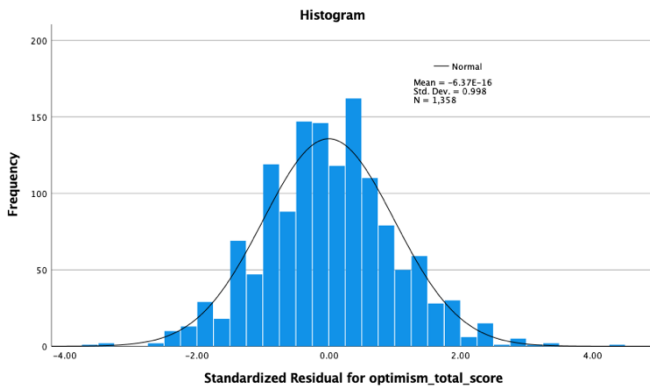
- Van Iddekinge, C. H., Raymark, P. H., & Roth, P. L. (2005). Assessing personality with a structured employment interview: Construct-related validity and susceptibility to response inflation. *Journal of Applied Psychology, 90*, 536-552.
- Vazquez, C.; Valiente, C.; García, F.E.; Contreras, A.; Peinado, V.; Trucharte, A.; Bentall, R.P. (2021). Post-Traumatic Growth and Stress-Related Responses During the COVID-19 Pandemic in a National Representative Sample: The Role of Positive Core Beliefs About the World and Others. *J. Happiness Stud, 22*, 2915–2935.
- Vitaliano, P. P., DeWolfe, D. J., Maiuro, R. D., Russo, J., & Katon, W. (1990). Appraised changeability of a stressor as a modifier of the relationship between coping and depression: A test of the hypothesis of fit. *Journal of Personality and Social Psychology, 59*, 582–592.
- Wacker, J., Chavanon, M. L., & Stemmler, G. (2006). Investigating the dopaminergic basis of extraversion in humans: A multilevel approach. *Journal of Personality and Social Psychology, 91*, 171–187. doi:10.1037/0022-3514.91.1.171\
- Wise, R. A. (2004). Dopamine, learning and motivation. *Nature Reviews Neuroscience, 5*, 483–494. doi:10.1038/nrn1406
- Yousaf, O., Popat, A., Hunter, M.S. (2015). An investigation of masculinity attitudes, gender, and attitudes toward psychological help-seeking. *Psychol Men Masc, 16* (2), 234.

Appendix A

Output of the Assumptions tests for Hypothesis 1 - ANOVA

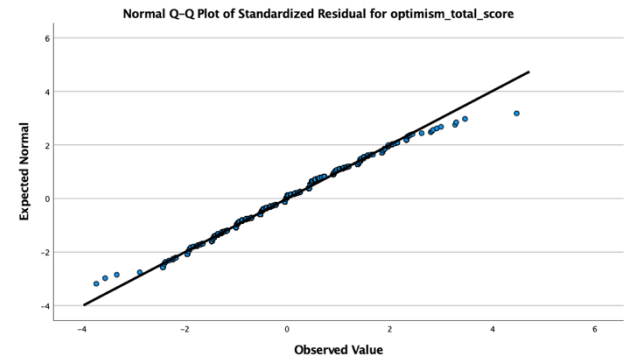
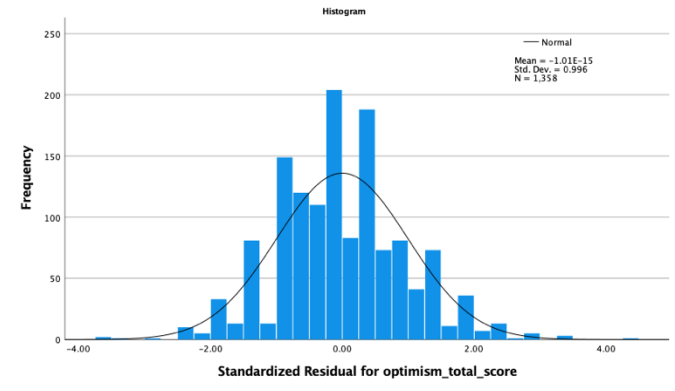


Output of the Assumptions tests for Hypothesis 1 – ANCOVA



Appendix B

Output of the Assumptions tests for Hypothesis 2 – ANOVA



Output of the Assumptions tests for Hypothesis 2 – ANCOVA

