The Influence of Personality on Negative Affect:

A Cross-Sectional Analysis

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Abstract

Introduction: Personality and psychopathology have continuously been conceived as overlapping concepts. Most studies have focused on the relationship between higher-order personality traits like the 'Big Three Personality Inventory' and psychopathology, depression, anxiety, and maladjustment in general. However, with new insights into dynamic features of personality and emotion regulation, the study of personality on negative affect has been lacking, since negative emotion regulation majorly contributes to the development of psychopathology. Hence, we expand the existing body of literature by hypothesizing that personality traits are associated with negative affect in the general population.

Methods: On a convenience sample, we used a cross-sectional analysis of 130 European adults, of which the majority were female (n= 97, M= 25.21, SD= 9.65) and the minority males (n= 37, M= 27.59, SD= 11.57) to determine any possible association using multiple regression analysis. Our dependent variable negative affect was conceptualized as high levels of negative inertia, regulation dysfunction, high interaction of emotion components as well as overall sadness and decreased emotional flexibility, increased emotional variability and instabillity.

Results: We found a significant result for our main hypothesis: higher levels of neuroticism lead to greater expression in negative affect (β =0.261, t(130)=5.057, CI= (0.159; 0.363), p<0.001). We found insignificant results for our secondary and third hypotheses: lower levels of conscientiousness lead to greater expression of negative affect ((β= -0.076, t(128) = -1.444, CI= (-0.180; 0.028), p= 0.151) and lower levels of extraversion/positive emotionality lead to greater expression of negative affect (β= -0.052, t(129)= -0.878, CI= (-0.171; 0.66), p= 0.382), respectively.

Discussion: We concluded that high levels of neuroticism indicate a stronger expression of negative affect in the general population. People high in neuroticism often experience

negative emotion dynamics as we have conceptualized negative affect. Furthermore, we argue that sub-clinical expression of neuroticism can be seen as a predictor for high levels of negative affect, which is linked to many forms of psychopathology.

Limitations and future research: Limiting factors include the poor conceptualization of the variables, lack of generalizability, low reliability, and low validity. Nevertheless, we conclude practical applications of our results, filling the research gap of the association between personality and negative affect on sub-clinical maladjustment. Future research should focus on the dynamic perspective of the concepts studied by implementing longitudinal studies and adding mediators to an experimental design to obtain more reliable results.

Keywords: Emotion Dynamics, Negative Affect, Personality, Neuroticism, Conscientiousness, Extraversion

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"A person is a fluid process, not a fixed and static entity; a flowing river of change, not a block of solid material; a continually changing constellation of potentialities, not a fixed quantity of traits." — *Carl R. Rogers* (EverydayPower, 2023)

Introduction

The association between personality and well-being has been a highly discussed topic in the academic literature (Cloninger, Svrakic & Przybeck, 2006; Klein, Kotov & Bufferd, 2010). Previous research has found a significant link between personality and different aspects of well-being, such as the onset of depression (Koorevaar et al., 2013), future depression (Cloninger et al., 2006), anxiety disorder (Bienvenu & Stein, 2003), schizophrenia (Camisa, Bockbrader, Lysaker, Rae, Brenner, & O'Donnell, 2005), and an array of other mood disorders (Klein, Durbin & Shankman, 2009; Kuppens & Verduyn, 2017). Whilst well-being reflects the adaptive side of emotions, the concept of negative affect represents maladaptive emotion regulation. Negative affect is a major contributor in understanding clinical maladjustment. Yet, to better understand the impact of personality traits on well-being and increase the possibility of better predicting the emergence of clinical psychopathology, studying the relationship between personality and negative affect becomes imperative. In order to comprehend the notion of well-being, studies have been using the concept of emotions, which is essential in explaining how personality effects well-being, hence negative affect.

Emotions and their Dynamic Features

The American Psychology Association defines emotions as "a complex reaction pattern, involving experiential, behavioral, and psychological elements, by which an

individual attempts to deal with a personally significant matter or event" (American Psychology Association, 2022). Early conceptualizations have regarded emotions as a stable, trait-like perspective (Klein et al, 2010). However, with new insight into the contextual perspective of emotions (Davidson, 2003; Larsen, Augustine & Prizmic, 2009; Lewis, 2005; Scherer, 2009), it has become apparent that a dynamic perspective, considering the change of emotions across time, offers a more completing view on emotional functioning (Larsen 2000; Vallacher, Read & Nowak, 2016). That is because a fundamental concept of emotion is the time dynamic property, in which emotions adjust themselves to environmental stimuli (Houben et al., 2015; Scherer, 2009). Viewing emotions from a dynamic perspective has thus led to a paradigm shift in the respective academic circles (Houben: Larsen, Augustine & Prizmic, 2009; Davidson, 2003; Lewis, 2005; Scherer, 2009). This eventual shift was advantageous due to the conceptualization of emotion regulation as a process to incorporate individual differences, time dynamic factors, external stimuli as well as cognitive changes rather than emotions as a static state. This allows for a more accurate representation of how emotions regulate themselves and shift to effectively adjust themselves to the desired situation.

The dynamic nature of emotions has been defined by Kuppens (in press) as "the patterns and regularities characterizing the changes and fluctuations in people's emotional and affective states over multiple points in time across seconds, hours, and days" (Houben et al., 2015, p. 902). Specifying the timeframe allows for a differentiation between developmental changes and short-term changes in emotion dynamics (Houben et al., 2015). A deeper insight into the principles of emotion dynamics was conceptualized by Kuppens & Verdyun (2017):

The "*Principle of Inertia*" describes emotional states' tendency to resist change. Emotions fluctuate across seconds, hours, or days to affect people's emotional states at

multiple points in time. Important here is to distinguish them from developmental changes, which occur across larger time frames. According to the principle of contingency, which describes the interaction of an emotional state with external factors, once an emotion is formed, it tends to linger, even in the presence of forces that promote a change in said emotion. This leads to the emotion being carried over from one situation to the next. Depending on the intensity of the principle of inertia, one can transfer these emotions to situations where their presence can be disrupting and even harmful. Especially inertia of negative emotions, like the inertia of negative affect can have harmful consequences as discussed later.

Secondly, the "*Principle of Regulation*" can be seen as the counterpart to inertia. While the latter constitutes emotions to linger and preserve to the next situation, the former describes the innate desire of an emotional state to always adapt to the situation and regulate itself to perfectly fit the situation. This manifests itself mostly through downregulation, to prevent harmful emotional states from endlessly preserving themselves which could lead to maladaptive behavior patterns. It can also be used to upregulate emotions to anticipate future events and proceed to engage in the appropriate emotional state. An example of this could be the excitement of anticipating a surprise or watching a scary movie and preparing for the "jump scare". These two principles, namely inertia, and regulation decide to a large extent how an individual's emotional state develops and is maintained throughout time. Lastly, the "Principle of Interaction" is the core component of multifaceted emotional states. Emotions rarely occur as a singular entity. Multiple emotional states regulate, interact and melt into one overall emotion. This continued interaction between emotions to reduce, overshadow or enhance each other generally has two facilitations. On the one hand, emotion components can interact with each other. On the other hand, different emotional states can influence each other as well. An example for the reader would be to imagine the feeling of anger and sadness

which can occur quite often in conjunction with each other when we experience some form of injustice. This form of differentiation between emotions is reflected in the tendency for individuals to identify their emotional states as a specific entity or set of different feelings.

Furthermore, in the context of emotion dynamics, individual differences can be categorized into an array of patterns to better grasp the complexity of the regulatory functions they possess:

Emotional variability describes the amplitude of an emotional state across time. This means that higher levels of variability within an individual can lead to more extreme manifestations of the emotions and larger within-person standard deviation, also called the variance of the emotion (Houben et al., 2015).

Contrary, emotional instability is the eminence of emotional change from one situation to the next. People with higher emotional instability can have a rapid emotional change from a comment or any small external trigger (Houben et al., 2015).

Emotion Dynamics and Negative Affect

In cases where the principles of emotion dynamics are exceeding normal boundaries, higher levels of emotional maladjustment have been measured. This oftentimes leads to an increase in negative affect (Kuppens & Verdyun, 2015). The American Psychology Association defines negative affect as “the internal feeling state (affect) that occurs when one has failed to achieve a goal or to avoid a threat or when one is not satisfied with the current state of affairs. The tendency to experience such states is known as negative affectivity” (American Psychology Association, 2022).

Multiple studies have examined these maladjusted emotion regulation patterns. Kuppens & Verduyn (2017) repeatedly link high levels of inertia to psychological ill-being, that being negative affect, namely depression, bipolar disorder, and borderline personality

disorder. Furthermore, inertia in a daily timeframe has been linked to depressive symptoms (Kovel & Kuppens, 2012). Preservative thoughts have also been connected to inertia and depressive symptoms (Brose et al., 2015). When controlling for preservative thoughts, there was still a stronger association between high levels of inertia and depression (Brose, Schmiedek, Kovel & Kuppens, 2015). Additionally, Kuppens & Scheeber (2012) researched the predicted association between inertia and the later onset of depressive disorder in adolescence. Their findings suggest that greater inertia on both positive and negative emotionality is a strong predictor in 2.5 years later onset of clinical depression. This implies, that inertia of negative affect explains and predicts psychopathology.

Furthermore, in the context of the principle of interaction, research has found that in instances of depression or depressive vulnerability, emotion components or states augment each other to build dense networks across time. These emotional networks characterize themselves as being less receptive to external influences, more self-predictive and therefore show inferior flexibility (Kuppens & Verduyn 2017). Overall, these findings suggest an association between negative emotion regulation and psychopathology.

This shows, that when these functions of emotion regulation deviate from the normal expression, psychopathology may be a common cause. The conceptualization of negative affect differs, but for the purpose of this study, we define it as negative affectivity, caused by or derived from insufficient/maladaptive emotion regulation strategies, like high levels of inertia of negative affect, high emotion interaction of emotion components, and the overall feeling of sadness consistent across a well-defined timeframe as well as a decreased flexibility to adjust to negative emotional states, increased emotional variability and instability.

Negative Affect and Psychopathology

As aforementioned, emotional disruptions play an important role in understanding different forms of psychopathology (Kring & Bachorowski, 1999). Even though some research shows that emotion regulation functions are similar within healthy and clinical populations, the strategies to engage in emotion regulation are less well-developed and less rapidly implemented in maladjusted individuals. These tendencies in clinically diagnosed individuals can be described as having high negative affect inertia and low emotion regulation that ultimately can lead to less flexible emotion regulation, higher emotional variability, and emotional instability, which has been linked to numerous forms of psychopathology (Houben et al, 2015, Kring & Bachorowiski, 1999). Individuals who engage in unsuccessful emotion regulation, suppressing their emotions or utilizing insufficient regulation strategies, suffer more from anxiety, depression, and post-traumatic stress disorder (Eftekhari, A., Zoellner, L. A., & Vigil, S. A. 2009).

These findings suggest that emotion dysregulation, in particular negative affect, impacts the development and trajectory of psychopathology. Since the emergence of emotion regulation strategies occurs early and personality also forms during the first few years, a link between the two concepts is assumed. To better understand this association, one must first conceptualize personality.

Personality and Negative Affect

As mentioned above, previous studies have extensively investigated the relationship between personality and psychopathology (Klein et al., 2010; Widiger & Smith, 2008). While negative affect is associated with psychopathology, there has however only been limited research on the relationship between personality and negative affect.

The definition and conceptualization of personality has attracted a vast amount of attention in the academic literature (Klein et al, 2010; Widiger & Smith, 2008; Cloninger, 1999). Over the years, the scientific perspective of personality, also sometimes called temperament, has been well studied (Klein et al., 2010; Widiger & Smith, 2008). Personality was conventionally conceptualized by having two distinct components (Klein et al., 2010). These are character, the individual differences due to external socialization, and temperament, the more stable and genetically based emotion regulation functions. Nowadays, this perspective is challenged due to insufficient flexibility within dynamic changes of personality to external situations, specifically in early developmental stages (Kelin et al., 2010). The American Psychology Association defines it as "the enduring configuration of characteristics and behavior that comprises an individual's unique adjustment to life, including major traits, interests, drives, values, self-concept, abilities, and emotional patterns" (American Psychology Association, 2022). In order to quantify personality, different models have been established in the field of personality research. Some prominent models of personality, such as the 'Five-Factor Personality Inventory', 'Three-Factor Personality Inventory', 'Minnesota Multiphasic Personality Inventory' and 'Sixteen Personality Factor Questionnaire' (Klein et al., 2010; Koorevaar et al., 2012; Malouf et al., 2005) have shown replicability, reliability, and validity over time and are therefore widely used in clinical diagnostics. The 'Three-Factor Personality Inventory' has been shown to be particularly adequate to study the relationship between higher-order personality and psychopathology, as its three personality traits have continuously been linked to depression, anxiety disorder, and other mood disorders (Klein et al., 2010; Kotov et al., 2010; Koorevaar et al., 2012), therefore, it is used in this study to conceptualize personality. The three personality traits the model encompasses are neuroticism (also called negative emotionality/NE: easily upset, maladjusted, easily irritated and anxious), extraversion (positive emotionality/PE: energetic,

outgoing, confident), and disinhibition (low conscientiousness and low agreeableness: low responsibility, not dependable, low energy) (Klein, 2010; Koorevaar et al., 2012). Research has shown that these traits are largely stable in time and consistent across cultures (Cloninger, 1999). For the purpose of this study, we used an adaptation of the 'Three Factor Personality Inventory' using conscientiousness instead of disinhibition.

There has been limited research on the relationship between these personality traits and sub-clinical negative affect. In a correlational design, we created three hypotheses to study this association. Our primary hypothesis assumes: "High levels of neuroticism lead to a higher expression of negative affect". Our secondary hypothesis supposes: "Low levels of conscientiousness lead to a higher expression of negative affect". And our third hypothesis expects: "Low levels of extraversion lead to a higher expression of negative affect". These hypotheses were based on prior research that has linked these specific personality traits to psychopathology. In a systematic review of the relationship between personality and psychopathology, Klein and colleagues (2010) found a moderate-to-large cross-sectional association between neuroticism/NE, extraversion/PE, and conscientiousness and depression, further, substantiating the association between personality and clinical disorders like depression mood disorders and anxiety disorders as well as post-traumatic stress disorder. Emotional instability has been linked to neuroticism, even sometimes using both terms interchangeably (Houben et al., 2015). Individuals high in neuroticism have also been associated with less flexibility regarding their emotion regulation, higher instability, and vulnerability, as well as higher levels of inertia (Houben et al., 2015; Malouf et al., 2005), greater overall disability, and worst treatment adherence (Andersen & Bienvenu, 2011). Moreover, research has shown that individuals diagnosed with cluster C personality disorder (avoidant personality disorder, dependent personality disorder, and obsessive-compulsive personality disorder) are more likely to be clinically diagnosed with a mood disorder,

particularly depression. These individuals tend to exhibit higher levels of anxiety which correlates with rumination, preservative thoughts, and higher levels of inertia, as well as less flexibility in their ability to regulate and maintain emotional stability under stress leading to longer recovery processes during depressive stages (Cloninger et al., 2006; Houben et al., 2015). Additionally, high levels of neuroticism measured on the NEO-Five Factor Inventory (NEO-FFI) showed an increased severity, as well as an increased likelihood of diagnoses of depression. Low levels of extraversion and conscientiousness, also derived from the NEO-FFI, were significantly linked to depression diagnosis and severity (Koovervaar et al., 2012).

Whilst these findings suggest a relationship between personality traits and psychopathology, and as mentioned above many psychological disorders are associated with maladaptive or negative emotion regulation, prolonged negative emotion inertia and negative affectivity within individuals, there is still lacking evidence for the correlation between personality and negative affect. We were particularly interested in the association between the expression of the three studied personality traits, neuroticism, conscientiousness, and extraversion, and their association with negative affect in a sub-clinical population. This relationship becomes especially imperative when viewing psychopathology on a spectrum since early trajectories of negative emotion dysregulation can imply later clinical development. The possibility to predict and treat a tendency to express negative affect above base level amongst individuals based on their personality can have a major impact in the field of clinical psychology.

Method section

2.1 Participants

The sample consisted of 130 participants with ages between 18 and 68 (M = 25.85, SD = 10.19), specifically 91 females from 18 to 68 years (M= 25.21, SD= 9.65), 37 males ranging from 19 to 58 years (M= 27.59, SD= 11.57) and one 'Non-binary/Third gender' with an age of 25 years (M= 25, SD= N.a.). Finally, one participant, that preferred to withhold gender-related information, was 20 years old. All participants were citizens of the European Union. An a priori power analysis was conducted using G*Power version 3.1.9.7 (Faul, Erdfelder, Lang & Buchner, 2007) to determine the minimum sample size to test the study´s hypotheses. The analysis was based on a correlational test, as it seemed to be the most suitable test for conducting a between-subject comparison within our sample. The results indicated that a sample of 64 participants was required to achieve power = 0.80 for detecting a small effect size (d =0.30) at a significance criterion of = 0.0167 (Bonferroni corrected).

2.2 Research Design and Procedure

The study was approved by the Ethical Committee Psychology (ECP). It was prefaced with an informed consent form and consisted of a cross-sectional questionnaire used during one online study. Measures were taken to ensure participants were not subjected to any harm, nor disadvantages, in the process of the study. Namely, it was allowed for respondents to quit the study at any given time for no specified reason. Participants were also informed of the anonymity of their responses, with no personally identifiable information, like IP addresses, being collected.

We designed a cross-sectional questionnaire taking approximately five to ten minutes to complete. The reliability and validity of the survey are addressed in a later section,

including the mention that the items currently lack professional peer review. The recruitment procedure was carried out by the students from the "Individual Differences in Emotion Dynamics bachelor thesis group" at the University of Groningen, who distributed the study announcement in WhatsApp groups, on Instagram, and on Facebook. A recruitment message was added to the questionnaire, and it was accessible via a Qualtrics link through any internet-capable device. Thus, the study is a voluntary convenience sample, with no compensation offered in exchange. Prior to data collection, participants were provided information about the study after which they could either choose to give consent or discontinue the study. The other requirements for the participation and data collection were to be older than 16 years and being a citizen of the European Union. If either one was not the case for the subject, they were immediately brought to the end of the study and thereby excluded from participating. Participants were informed about potentially sensitive topics, e.g., risky behavior and parenting styles.

2.3 Stimuli, Materials, and/or Apparatus

The data for our current study was collected by means of a Qualtrics questionnaire (https://rug.eu.qualtrics.com/jfe/form/SV_86BEHlu4oVXa43I), consisting of items that were developed by the authors themselves. When opening the study, the participants were asked to indicate their age and whether they are citizens of the European Union, to determine whether they are eligible to participate in the study. They were also inquired to indicate their own, as well as their parents, gender. The latter was used for further insights into the parent-child dynamics.

In general, the main themes addressed in the questionnaire were: parenting style, coping behavior, emotion regulation, risky behavior, personality assessment, negative affect, and emotions augmentation. Appendix B includes an overview of the assessed variables, with their corresponding questionnaire items, in the order in which they were presented to

participants. Most questions used a slider-scale format from zero to 100, with labels added at the middle point, as well as extremities of the scale. This format was adopted to facilitate intuitive and comprehensive answering from participants, as well as for analysis purposes. An attention check was included, and the questionnaire items were spread and grouped over multiple pages to help maintain participants` concentration/attention.

2.3.1 Personality assessment scale

Additionally, there were three items assessing personality traits. These were conscientiousness, extraversion, and neuroticism, for which the participant had to state how much they agreed with certain declarations (e.g., I am someone who gets easily nervous). Here, the continuous approach was used again, with a slider format from zero (strongly disagree) to 100 (strongly agree). These personality traits were conceptualized through the 'Three Factor Personality Inventory' with the adaptation of using conscientiousness instead of disinhibition.

2.3.2 Negative emotion scale

Lastly, five items measured negative affect. For these items, the participants had to state how frequently they experienced the aforementioned emotional states within the past month. This was assessed on a continuous scale, where zero represented "never", and 100 expressed "always".

2.4 Individual measures/Data analysis

This research focused on the relationship between three personality traits and negative affect. For this, a new variable was generated to encapsulate negative affect. We called this variable "*negative affect*". This item consists of questions 13, 14, 16, 17 and 26 (view Appendix B). The concept of negative affect, as discussed in the introduction can be conceptualized as a number of maladaptive emotion dysregulations. Specifically, the

principle of inertia of negative affect (Q13 & 16), the principle of interaction of negative affect (Q14), the principle of regulation of negative affect (Q17), and overall sadness (Q28) were used to create the variable "*negative affect*". This process was done by adding the means of the items together and dividing them by the number of items. One exception was question 16, which had to be reverse-coded due to being negatively worded (100-Q16).

Furthermore, the variable *neuroticism* is conceptualized by question 22 ("I am someone who easily gets nervous"). Question 23 ("When I am confronted with a task, I tend to do it immediately and thoroughly") depicts *conscientiousness*. And lastly, question 24 ("I see myself as outgoing and sociable") portrays *extraversion*.

2.4.1 Reliability

In order to test for internal consistency/inter-item reliability, a Cronbach's alpha analysis was conducted between the items making up the variable *negative affect* (Table A5). Out of the 130 participants, 12 were excluded from the analysis due to missing responses on the questionnaire. The inter-item reliability is displayed in Table A5. We can see a moderate to low reliability between the items that were used to conceptualize our dependent variable.

2.4.2 Validity

The validity of our design lacks definition because of missing pre-existing evidence of our questionnaire. The assessments for the personality types were loosely based on a preexisting assessment tool like the "Big-Five Personality Inventory". While we assume accurate measurements of the variables regarding our concepts, definitive validity robustness is still unknown.

2.5 Data Analysis

For this correlational study, we assessed our primary hypothesis: "high level of neuroticism leads to higher expression in negative affect", our secondary hypothesis: "low

level of conscientiousness lead to higher expression in negative effect", and our final hypothesis: "low levels of extraversion lead to higher expression of negative affect". We conducted a multiple regression analysis by including the independent variable, personality (*neuroticism, conscientiousness* & *extraversion*), and the dependent variable, *negative affect* in one model to account for multicollinearity as well as adjusting our model to the idea that different personality traits may explain the same aspects of negative affect. Furthermore, the correlation coefficient was calculated. The power was calculated using a 'Prior-Power' analysis and a 'Post Hoc' analysis.

Results

3.1 Descriptive statistics

The descriptive statistics for the dependent variable *negative affect* and the three independent predictors *neuroticism*, *conscientiousness*, and *extraversion* are displayed in Table 2 below.

Table 1. Descriptive statistic

	N	Minimum	Maximum	Mean	Std. Deviation
Negative affect	122	5.00	88.00	49.536	16.490
Neuroticism	130	0.00	100.00	54.831	26.647
Conscientiousness	128	0.00	100.00	51.969	27.478
Extraversion	129	5.00	100.00	61.504	24.226
Valid N	120				

N representing the number of valid observations, and the minimum and maximum values as well as the mean and standard deviation for each variable being included.

3.2 Assumption check for multiple linear regression

No violation against multicollinearity is observed between the predictors since the Pearson Correlation between all predictors does not exceed r=0.4 (Appendix A, Table A1). Furthermore, the assumption of collinearity was not violated since the Variance Inflation Factor was not greater than 10, and the Tolerance was smaller than 0.1 which would indicate Multicollinearity (Neuroticism, Tolerance = 0.962, VIF = 1.04; Conscientiousness, Tolerance = 0.877 VIF = 1.14; and Extraversion, Tolerance = 0.854, VIF = 1.71).

The assumption of Homoscedasticity is not violated which can be seen when plotting the Regression Standardized Residuals (y-axis) versus the Regression Standardized Predicted Values (x-axis). Figure 1 shows a similar variance between the variables. Additionally, the Durbin-Watson test was conducted to test for autocorrelation (DW= 1.973 (Table A2)). Since the value is close to two, it shows a slight but not significant positive autocorrelation between the residuals, indicating independence. In the P-P plot of the Regression Standardized

Residuals (Figure 2), we can see that the residuals are overall normally distributed, because a linear distribution can be plotted through the values, indicating is no violation of the assumption of normality.

Figure 1. Scatterplot of Regression standardized residual (y) and Regression Standardized Predicted Value (x)

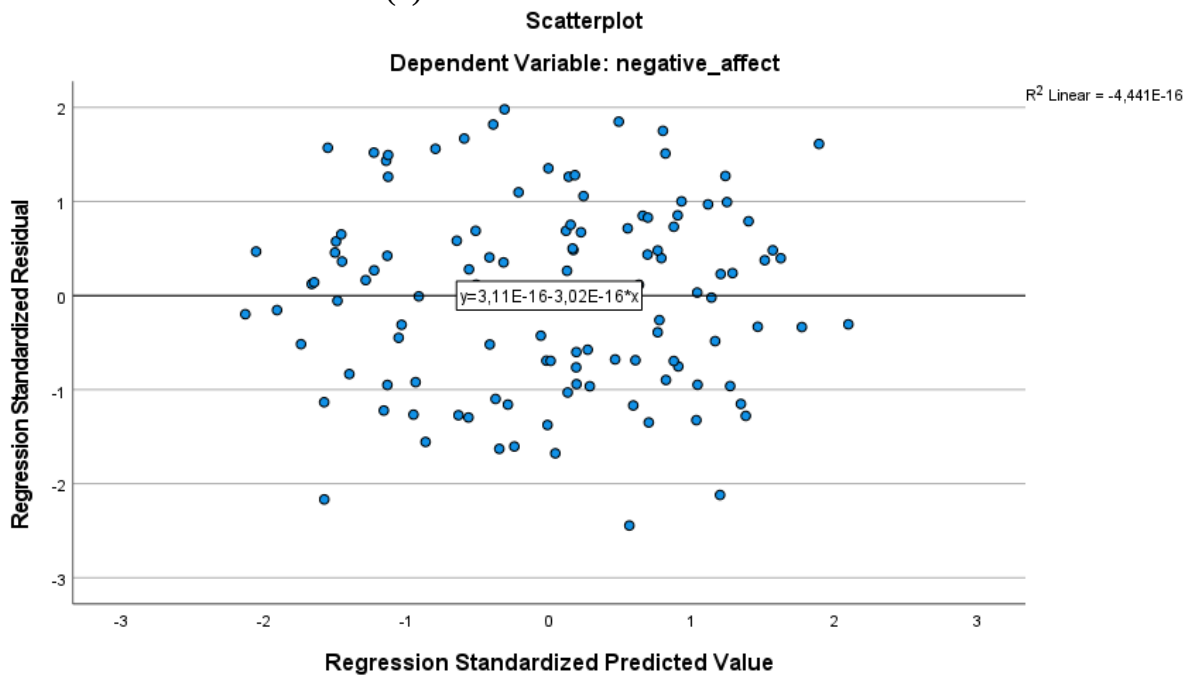
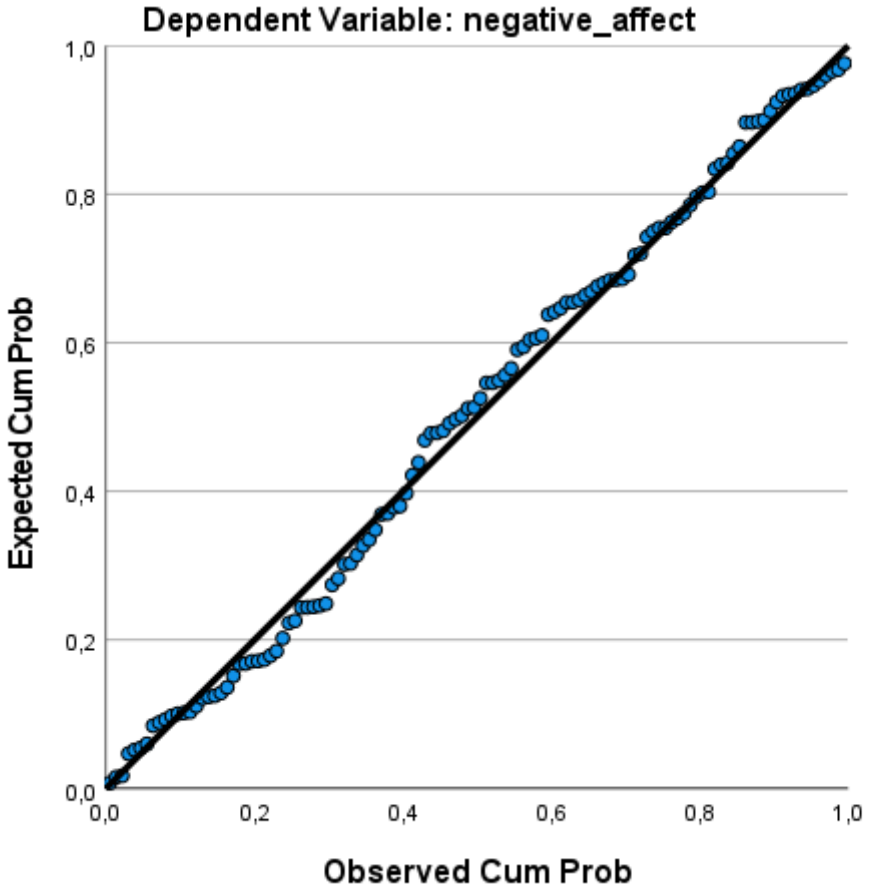


Figure 2. Normal P-P Plot of Regression Standardized Residuals



3.3 Hypothesis 1 Higher levels of *neuroticism* lead to higher expression of *negative affect*.

To test our first hypothesis "higher levels of *neuroticism* lead to higher expression of *negative affect*" we conducted a multiple linear regression for the relationship between *neuroticism* and *negative affect*. We used a model where all predictors were added before running the regression due to the overlap of the effect of the independent variable on the dependent variable. We argue that since the results for all three hypotheses were taken from the same sample, an interaction effect had to be accounted for. The correlation table is displayed in Appendix A. Figure 3 shows a positive linear relationship between the predictor *neuroticism* and the dependent variable *negative affect*. We found a significant effect (β =0.261, $t(130)$=5.057, CI= (0.159; 0.363), p<0.001) at an alpha level of α= 0.0167 (Bonferroni correction). A one-unit increase in our independent variable neuroticism,

increases our dependent variable *negative affect* by (β=) 0.261 units. This is coherent with our hypothesis that people high in *neuroticism* will have higher expression of *negative affect*. Furthermore, we found a moderate effect size of r = 0.448 (Appendix A, Table A1). This indicates a medium relationship between our predictor and our dependent variable. A prior power analysis of the correlation was conducted to estimate the required sample size. With a low predicted effect size of $|\rho|$= 0.2, an alpha level of α= 0.0167, the power was estimated at 0.5. The total sample size was determined at n=141 (df=139) with a final power of 1- β= 0.502. A post hoc analysis was conducted to determine the power of the test. The power was very high 1- β= 0.999, df=126.

The results are displayed in Table 2.

Figure 3. Scatterplot of *negative affect* and *neuroticism*

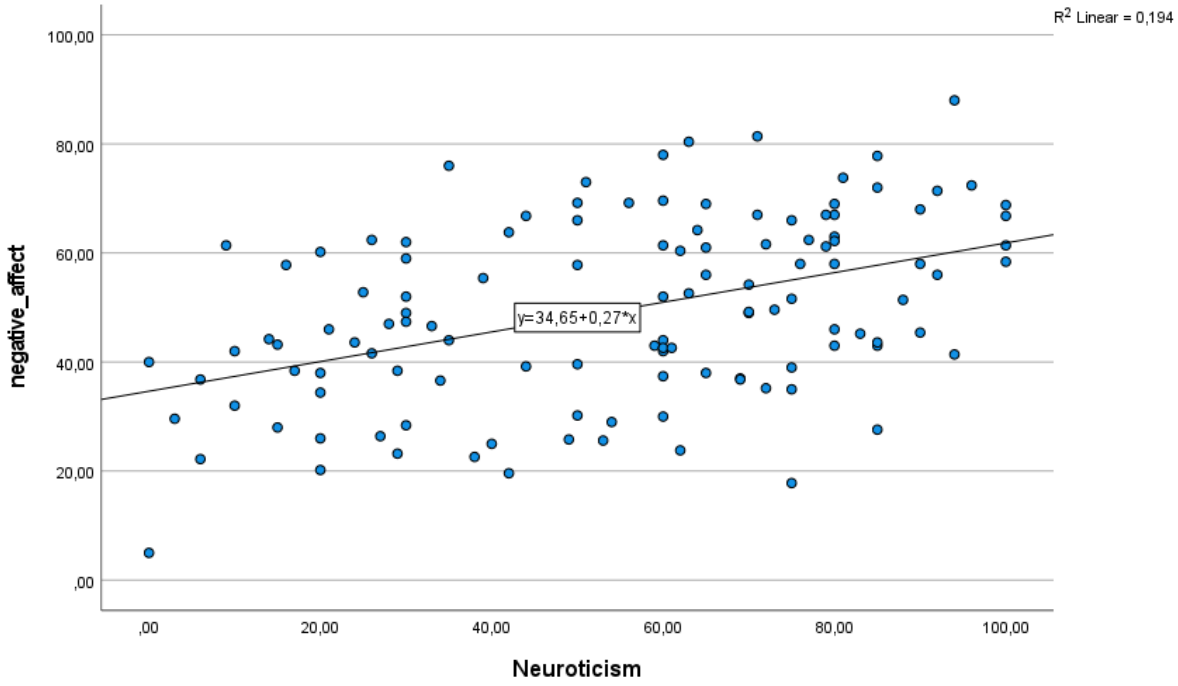


Table 2. Coefficients

	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	*t*	Sig.
(Constant)	22.273	5.257		4.237	<0.001
Neuroticism	0.261	0.052	0.420	5.057	<0.001
Conscientiousness	-0.076	0.053	-0.126	-1.444	0.151
Extraversion	-0.052	0.060	-0.078	-0.878	0.382

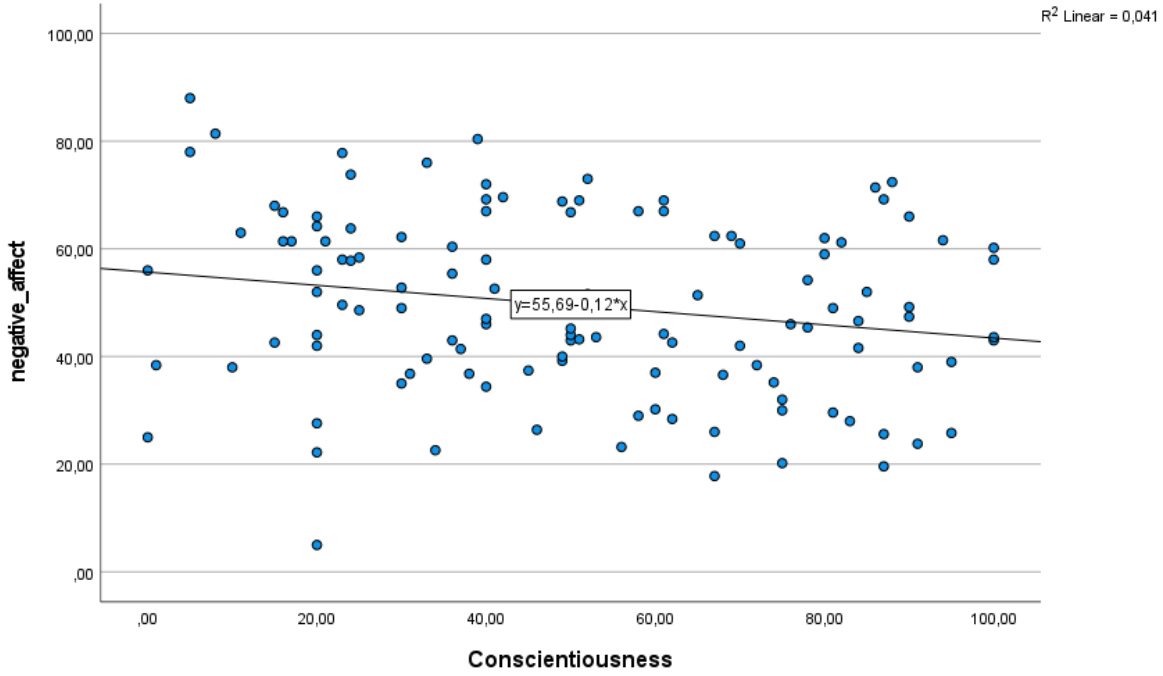
a. dependent variable: negative affect

3.4 Hypothesis 2 Lower levels of *conscientiousness* lead to higher expression of *negative affect*.

For our secondary hypothesis "lower levels in *conscientiousness* lead to higher expression in *negative affect*" we also conducted a multiple linear regression to analyse the relationship between the predictor *conscientiousness* and our dependent variable *negative affect*. Figure 4 shows a slight negative linear relationship between the predictor *conscientiousness* and the dependent variable *negative affect*. The multiple linear regression for the relationship between *conscientiousness* and *negative affect* found a negative but not significant effect (β= -0.076, t(128) = -1.444, CI= (-0.180; 0.028), p= 0.151) at an alpha level of α= 0.0167 (Bonferroni correction). We did observe a negative relationship between our predictor *conscientiousness* and our independent variable *negative affect* indicating that a one-unit increase in conscientiousness leads to a (β=) 0.076 decrease in *negative affect*. Even though there was no significant report the trend of the relationship shows that higher expression of *conscientiousness* will decrease the overall *negative affect* on an individual. Our effect size for the second hypothesis was r = -0.196 (Appendix A, Table A1). This indicates a small to medium effect size between the predictor *conscientiousness* and the dependent variable *negative affect*.

The results are displayed in Table 2.

Figure 4. Scatterplot of *negative affect* and *conscientiousness*



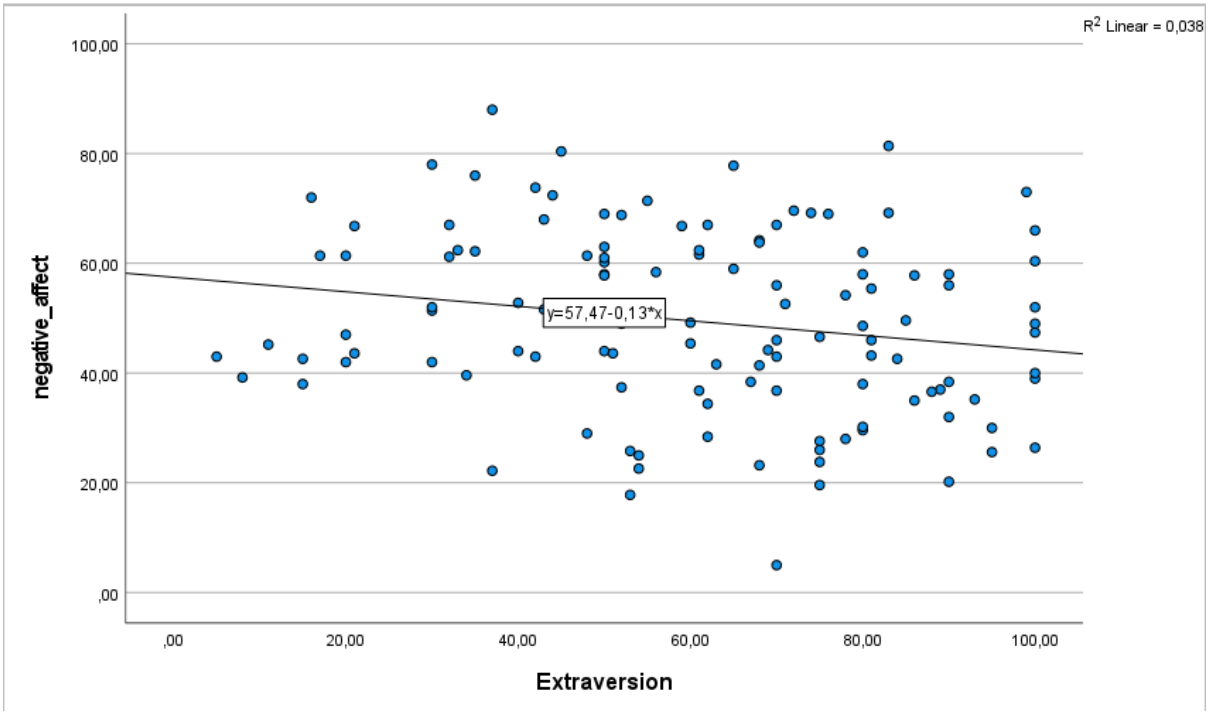
3.5 Hypothesis 3 Lower levels of *extraversion* lead to higher expression of *negative affect*

For our last hypothesis "Lower levels of extraversion lead to higher expression of negative affect" we used multiple linear regression to analyze our relationship between the independent variable *extraversion* and our dependent variable *negative affect*. Figure 5 shows a slight negative linear relationship between the predictor *extraversion* and the dependent variable *negative affect*. We found a slightly negative relationship with no significance (β= -0.052, t(129)= -0.878, CI= (-0.171; 0.66), p= 0.382) at an alpha level of α= 0.0167 (Bonferroni correction).

The results are displayed in Table 2. As hypothesized, we observed a negative relationship which indicates that for a one-unit increase in the personality trait *extraversion*, we have a decrease in our dependent variable *negative affect* of (β=) 0.052. Again, we failed to find a significant result for our last hypothesis, yet like our second hypothesis, we see a

trajectory in the data suggesting that people with lower expression of *extraversion* tend to experience more *negative affect*. Our effect size was small at r = -0.202 (Appendix A, Table A1) which indicates a rather small effect between our predictor *extraversion* and *negative affect.*

Figure 5. Scatterplot of *negative affect* and *extraversion*



The overall regression analysis was significant (F(df= 3)= 11.455, p< 0.001) stating that the linear combination of our independent variables *neuroticism*, *conscientiousness*, and *extraversion* was predicting negative affect beyond chance levels (Appendix A, Table A5). The overall effect size for the ANOVA analysis was determined by using Cohen's f test (*f*= 0.546) and showing a large effect size with a percentage of explained variance of (r^2= 0.229). This indicates a large standardized average effect in the sample across all levels of the independent variables (Table A2).

Discussion

In this study, we tested the association between personality and negative affect. We examined whether personality traits, in particular, high levels of neuroticism, low levels of conscientiousness, and low levels of extraversion influence the expression of negative affect. Specifically, we investigated if higher levels of the personality trait neuroticism would increase the expression of negative affect, which was conceptualized by high levels of negative affect inertia, lower emotion regulation, less flexibility, and higher variability in emotion regulation as well as higher emotional interaction causing emotional networks to reduce dynamic responsivity to outside stimuli. Consistent with the scientific literature on the link between personality and psychopathology we found a significant relationship between high levels of neuroticism and a higher expression of negative affect (Kuppens et al., 2012; Koorevaar et at, 2012). Whilst these findings were not surprising, considering the large quantity of research conducted on the association between personality and psychopathology (Klein et al., 2010; Andersen & Bienvenu, 2011; Koorevaar et al., 2012) a few key implications can be drawn. Firstly, we argue that with the aforementioned shift in the understanding of emotion regulation to incorporate dynamic environmental changes, the subclinical maladjustment in emotion regulation, expressed through higher levels of negative affect, is dependent on personality manifestations (Klein et al, 2010; Tackett, 2006, Houben et al, 2017). Secondly, higher-order personality traits, conceptualized through the 'Big Three Personality Inventory', may act as future markers for clinical diagnoses (Kuppens & Sheeber, 2012). Spectral models of psychopathology show that the early development of excessively experiencing negative affect can lead to the later development of clinical disorders (Klein et al, 2010; Tackett, 2006). Our findings imply that even in sub-clinical populations a high expression of neurotic personality characteristics reduces well-being by increasing the overall negative affect of an individual. Furthermore, emotion dynamics influence the development

and trajectory of psychopathology (Houben et al., 2015, Klein et al., 2010). Understanding the link between somewhat stable personality traits and their correlation with the expression of negative affect can help predict the later onset of clinical diagnosis. We argue that individuals, who for example engage in inertia of negative affect extensively, may have difficulties maintaining emotional stability, which in stressful situations can overwhelm their emotional response capacities leading to the development of psychopathology, such as depression. These negative emotions, which carry over from moment to moment or the regulatory dysfunction as well as an intertwined emotion network all make up negative affectivity within an individual. Whilst we conceptualized negative affect as a multifaceted model, our Cronbach's alpha analysis showed, that the items had medium to poor inter-item reliability. Based on this the following can be implied. First, whilst the principle of inertia, the principle of regulation, the principle of interaction, and decreased emotional flexibility as well as increased variability and instability were all individually linked to psychopathology as concepts, the assessment of these concepts had limitations within our study design. Secondly, how individuals experience negative affect may differ. Some participants might experience "strong" feelings of sadness in one situation, which however does not persist for long, whilst others experience "weaker" feelings of sadness which influences their emotion regulation for long periods leading them into a spiral of developing other negative emotions. How these emotional dynamics persist and develop in individuals can be highly complex and individual and requires future research to fully evaluate genetic and environmental influences on the emotion dynamics of negative affect. Specifically, it can be difficult to fully express "strong/weak" feelings of sadness for example through a questionnaire, since the feeling of emotions as well as their description varies highly between people. Nevertheless, we still believe, that our results are valid when examining the association between neuroticism and

negative affect. How individuals express negative affect may differ extensively, with some researchers defining the concept as sadness and others viewing it as multifactorial, as we did.

Somewhat surprisingly, our secondary hypothesis, which assessed the relationship between low levels of conscientiousness and higher expression of negative affect was not significant, even though a positive relationship was indicated. We argue that low levels of conscientiousness may indicate a general dissatisfaction within individuals, but we could not conclude heightened levels of negative affect to a significant standard. For our third hypothesis, assuming that lower levels of extraversion lead to higher expression of negative affect, we found no significant results either. Similarly, to our secondary hypothesis, we did find a directional effect, which however was not significant.

The lack of significant results for both hypotheses can be explained by several factors. On the one side, we argue that the expression of personality varies on a continuous spectrum, with higher levels of the emphasized traits leading to maladjusted emotion regulation, hence negative affect and even clinical diagnoses. The degree to which the lack of the expression of conscientiousness and extraversion are required to reach significant results in displaying negative affect beyond normal levels might unlikely to be found in the general population. Furthermore, as we have mentioned, personality and corresponding emotion dynamics are highly flexible and strongly depend on situational factors as well as individual tendencies to react differently in some situations. Individual emotion dynamics and their negative expression, conceptualized through negative affect are linked to a varying extent to personality. As shown in an analysis by Malouff, Thorsteinson, & Schutte (2005) the association between neuroticism and several clinical diagnoses had the strongest effect size (d= 0.92), whilst conscientiousness (d= -0.66) and extraversion (d= -0.41) were less strongly associated suggesting that the personality trait neuroticism may predict negative affect and therefore clinical diagnoses to a greater extent than low levels of conscientiousness or low

levels of extraversion, in particular in a subclinical population. This is consistent with our findings showing that only neuroticism is a predictor for higher expression of negative affect. The sub-clinical expression of neuroticism may be used as an indicator by clinicians to predict psychopathology since it is strongly associated with negative emotion dynamics. It can also help the general public to better understand the relationship between one's personality and negative affectivity. We hope to add to the already extensive, but somewhat inconclusive and ever-shifting field of personality research regarding emotion dysregulation. We emphasize that personality, emotion regulation, and psychopathology are not discant entities but rather different dimensional perspectives of similar concepts overlapping each other and thereby creating one's character (Andersen & Bienvenu, 2011). Lastly, since negative affect was assessed rather than depression or other forms of psychopathology, the application and generalization of the findings are high, as fewer people suffer from clinically diagnosed disorders, but most do experience some form of negative affect during their lifetime.

Limitations and Future Research

Several limiting factors were identified in the cross-sectional design. The most dominant limitation concerns the conceptualization of the three personality concepts. Each concept was only assessed by using a single item on a scale. These items were mostly manufactured by the researchers themselves. The reliability of the items is unknown since they are lacking a peer-reviewed ground. Another limitation was the sampling procedure. The convenient sample, led to limitations in generalizability since most participants were females, in their 20s. A simple random sample could lead to better generalizability of the results and thereby providing better reliability of the study. Furthermore, control variables like age and gender and mediators like daily mood swings, since they can contribute to major fluctuations,

could be implemented to control for lurking factors influencing the relationship. Furthermore, the cross-sectional design only allowed for associative conclusions. Future studies should focus on experimental designs for causational analysis as well as focusing on longitudinal studies to examine changes in emotion dynamics over time. Furthermore, an emphasis on situational factors should be both implemented on the dependent variable negative affect as well as the predictor personality since research has indicated the dynamic and situational aspects they possess (Andersen & Bienvenu, 2011). It could be beneficial to rethink how the conceptualization of these studied entities has been mostly distinct and separated. Substantial evidence has indicated a beneficial shift in perspective regarding the existing models of the personality/ psychopathology association. This could be done by focusing more on within-persona designs over long periods with socio-biological perspectives of personality in the foreground.

Appendix A

Table A1. Correlations between predictors and dependent variable

		negative affect	*Neuroticism*	*Conscientiousness*	*Extraversion*
Pearson Correlation	*negative affect*	1.00	0.448	-0.196	-0.202
	Neuroticism		1.00	-0.102	-0.191
	Conscientiousness			1.00	0.349
	Extraversion				1.00

Pearson Correlation

Table A2. Model Summary

Model	R	R Squared	R Squared Adjusted	Std. Error of the Estimate
	0.478	0.229	0.209	14.715

R Squared Change	F Change	df1	df2	Sig. F Change	Durbin Watson
0.229	11.455	3	116	<0.001	1.973

Model summary of the regression analysis with dependent variable negative affect and predictors; neuroticism, conscientiousness, extraversion

Table A3. 95% Confidence interval for B

	Lower Bound	Upper Bound
negative affect	31.661	52.484
Neuroticism	0.159	0.363
Conscientiousness	-0.180	0.028
Extraversion	-0.171	0.066

95% Confidence interval of the Unstandardized Coefficients B

Table A4. Cronbach's Alpha

	Q13_Inertia	Q14_Interaction	Q16Rev_Inertia	Q17_Regulation	Q28_Sadness
Q13_Inertia	1.00	0.449	0.459	0.314	0.495
Q14_Interaction		1.00	0.235	0.203	0.232
Q16Rev_Inertia			1.00	0.389	0.425
Q17_Regulation				1.00	0.457
Q28_Sadness					1.00

Cronbach's alpha between items making up the variable "negative affect"

Table A5. ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	7441.552	3	2480.517	11.455	<0.001
Residual	25118.10	116	216.535		
Total	32.559.652	119			

Dependent Variable: negative affect

Predictors: Neuroticism, Conscientiousness, Extraversion

Appendix B

Questionnaire Survey Emotion Dynamics

Age	Participants age
Gender	Male/Female/Non-binary/Prefer not to say
Nationality	EU citizen/ non-EU citizen
Parenting style Parent 1	Male/Female/ Non-binary
Parenting style Parent 2	Male/Female/ Non-binary

Think about **your childhood** and how you grew up over the years…	
Q8: How did you perceive your parents combined parenting style to be?	0 = Very neglectful; 50 = Balanced; 100 = Very overprotective
Q9: How did you perceive the parenting style of **Parent 1** to be?	0 = Very neglectful; 50 = Balanced; 100 = Very overprotective
Q10: How did you perceive the parenting style of **Parent 2** to be?	0 = Very neglectful; 50 = Balanced; 100 = Very overprotective

Q11: How well did you deal with negative emotions when you were younger? (age 12-18)	0 = Not well at all; 50 = Average 100 = Exceptionally well
Q12: How well did you deal with negative emotions from age 19 to today?	0 = Not well at all; 50 = Average 100 = Exceptionally well

Q13: Once faced with an anxious, depressive otherwise negative emotion: How much does it affect your mood throughout the day?	0 = Little; 50 = Average; 100 = Considerably
Q14: Think about a situation in which emotions might have augmented each other (e.g. anxiousness making you more irritated and irritation contributing to anger). How much did the intensity of your emotional experience increase?	0 = Little; 50 = Average; 100 = Considerably

Think about your mood/lifestyle **in the last month**. Determine whether you agree or disagree with the following statement.	
Q16: If I am sad, the feeling passes quickly, and I do not feel sad anymore.	0 = Strongly disagree; 50 = Neither agree nor disagree; 100 = Strongly agree
Q17: When I'm sad, I believe there is nothing I can do to make me feel better.	0 = Strongly disagree; 50 = Neither agree nor disagree; 100 = Strongly agree
Q18: I can manage my emotions as well as I would like to.	0 = Strongly disagree; 50 = Neither agree nor disagree; 100 = Strongly agree
Q19: When I am sad, I extensively analyse my emotions' causes, manifestations or consequences.	0 = Strongly disagree; 50 = Neither agree nor disagree; 100 = Strongly agree
Q20: When I am sad, I want to resolve the feeling as soon as possible.	0 = Strongly disagree; 50 = Neither agree nor disagree; 100 = Strongly agree
Q21: When I am sad, I know exactly what to do to resolve this feeling.	0 = Strongly disagree; 50 = Neither agree nor disagree; 100 = Strongly agree
Q22: I am someone who gets easily nervous.	0 = Strongly disagree; 50 = Neither agree nor disagree; 100 = Strongly agree
Q23: When confronted with a task I tend to do it immediately and thoroughly.	0 = Strongly disagree; 50 = Neither agree nor disagree; 100 = Strongly agree

Q24: I see myself as outgoing and sociable.	0 = Strongly disagree; 50 = Neither agree nor disagree; 100 = Strongly agree

Think about your mood/lifestyle **in the past month**. This section will be concerned with the *frequency* of your experiences.	
Q26: How often did you experience negative emotions, e.g., sadness?	0 = Never, 50 = About half the time; 100 = Always
Q27: How often did you experience Melancholia (defined as a state of deep or deliberating sadness)?	0 = Never, 50 = About half the time; 100 = Always
Q28: How often do you pay attention? If you're paying attention now, answer with 60.	0 = Never, 50 = About half the time; 100 = Always
Q29: How often did you engage in risky driving behaviour (e.g., speeding, drink-drive, unfastening of a seat belt, driving while feeling sleepy, and highway code violations) when feeling sad?	0 = Never, 50 = About half the time; 100 = Always
Q30: How often did you engage in risky driving behaviour to reduce feelings of sadness?	0 = Never, 50 = About half the time; 100 = Always
Q31: How often did you engage in aggressive behaviour (e.g., acts of physical violence. shouting, swearing, and harsh language) when feeling sad?	0 = Never, 50 = About half the time; 100 = Always
Q32: How often did you engage in aggressive behaviour to reduce feelings of sadness?	0 = Never, 50 = About half the time; 100 = Always
Q33: How often do you engage in substance use (alcohol, drugs) when feeling sad?	0 = Never, 50 = About half the time; 100 = Always
Q34: How often do you engage in substance use to reduce feelings of sadness?	0 = Never, 50 = About half the time; 100 = Always

Q35: How often do you engage in sexual risky behaviour (unprotected sex, multiple sex partners) when feeling sad?	0 = Never, 50 = About half the time; 100 = Always
Q36: How often do you engage in sexual risky behaviour to reduce feelings of sadness?	0 = Never, 50 = About half the time; 100 = Always

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