



The relationship between extraversion, neuroticism and aspects of trait affect

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ABSTRACT

Individual differences in the affective component of global personality traits such as extraversion and neuroticism can be described in terms of three different aspects: frequency, intensity and duration. Extraversion and neuroticism have been found to be related to the frequency and intensity of positive and negative emotions, respectively. However, it is unclear whether both personality traits are related to the duration of emotions and which aspect of trait affect most strongly characterizes the emotional life of extraverts and neurotics. For a period of 1 week, participants were asked to report at the end of each day the frequency, intensity and duration of the positive and negative emotions they experienced earlier that day. Correlational analyses revealed that extraversion is positively related to the frequency, intensity and duration of positive emotions whereas neuroticism is positively related to the frequency and duration of negative emotions. Regression analyses and a comparison of effect sizes further showed that the duration of positive emotions is the strongest predictor of extraversion whereas the frequency of negative emotions is the strongest predictor of neuroticism.

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1. Introduction

Even though almost all people occasionally smile or shed a tear, some people tend to feel good most of the time whereas others are especially prone to negative feelings (e.g., Diener & Larsen, 1984). This reflects individual differences in trait affect which has been defined as people's disposition to experience certain emotions and moods across situations and over time (Watson, Clark, & Tellegen, 1988). This construct is broad and encompasses several components. Schimmack, Oishi, Diener, and Suh (2000) distinguished three different aspects of trait affect: frequency, intensity and duration. The authors defined *frequency* as the number of times an affect is elicited, *intensity* as the intensity of an affective experience at any moment in time, and *duration* as the time an affect is present after elicitation until it ceases to be present. Across aspects, individual differences are largely independent (Larsen & Diener, 1987; Schimmack & Diener, 1997). Within aspects, individual differences partially generalize across emotions; people who experience often positive emotions also experience often negative emotions (Schimmack, 2003; Schimmack et al., 2000), those who experience intense positive emotions also experience intense negative emotions (Schimmack, 2003; Schimmack & Diener, 1997), and those who experience long positive emotions also experience long negative emotions (Schimmack, 2003).

One important advantage of distinguishing between aspects of trait affect is that it allows for a fine-grained analysis of the

affective components of global personality traits (Schimmack, 2003). In previous research five major personality traits have been identified: agreeableness, conscientiousness, extraversion, neuroticism and openness (McCrae & Costa, 1991). Two of these, extraversion and neuroticism, have repeatedly been shown to contain a strong affective component (e.g., DeNeve & Cooper, 1998) and their relationship with the aspects of trait affect has been examined. In particular, for frequency small positive correlations were found between extraversion and the frequency of positive emotions whereas small to moderate positive correlations were found between neuroticism and the frequency of negative emotions (Carstensen, Pasupathi, Mayr, & Nesselroade, 2000; Schimmack, 2003). For intensity moderate positive associations were found between extraversion and the intensity of positive emotions whereas moderate positive associations were found between neuroticism and the intensity of negative emotions (Schimmack & Diener, 1997; Williams, 1989). For duration the picture is less clear. Schimmack (2003) found a significant small positive correlation between neuroticism and the duration of negative emotions but no significant correlation between extraversion and the duration of positive emotions. In two studies Verduyn, Delvaux, Van Coillie, Tuerlinckx, and Van Mechelen (2009) also examined the relation between extraversion, neuroticism and emotion duration but their findings were inconsistent across studies.

Limitations of the studies of Schimmack (2003) and Verduyn, Delvaux et al. (2009) may have caused this ambiguous pattern. In the study by Schimmack, duration was measured with a scale ranging from 0 to only 30 min, which is rather short in view of theoretical claims on emotion duration by leading scholars (e.g., Frijda,

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2007) and empirical work which revealed that emotions may last from only a few seconds up to several hours or even longer (Scherer, Walbott, & Summerfield, 1986; Sonnemans & Frijda, 1994; Verduyn, Van Mechelen, & Tuerlinckx, 2011). Hence, to measure emotion duration, one should either make use of an open-format response scale or an interval scale which has a sufficient broad range to cover all possible durations. In the studies by Verduyn, Delvaux et al. (2009) the sample sizes may have been rather small to reliably examine correlates of individual differences in emotion duration (Study 1: $N = 59$; Study 2: $N = 43$). In sum, whereas ample evidence is available that extraverts experience positive emotions frequently and intensely, and, neurotics experience negative emotions frequently and intensely, evidence on the relation between both personality traits and emotion duration is inconclusive. This is troublesome as emotion duration is a central parameter of an emotional response (Frijda, 2007) and, consequently, any description of individual differences in affect is incomplete when no reference to duration is made (Van Mechelen, Verduyn, & Brans, *in press*). Moreover, as the duration of negative emotions plays a role in the development of various types of somatic disease such as cardiovascular illness (e.g., Brosschot, Gerin, & Thayer, 2006) and is characteristic for several mental disorders according to the DSM-IV (American Psychiatric Association, 2000), it is important to investigate which dispositional dimensions are related to emotion duration to identify which person-types run a risk of developing such diseases.

One further limitation of previous research on aspects of trait affect is that typically only one or two aspects were studied at a time. As a result, it is unclear which of the three aspects is most characteristic for the emotional life of extraverts and neurotics. It remains, for example, uncertain whether extraverts experience especially frequently positive emotions or whether their positive emotions are especially intense or long. Insight in the relative strength of these relationships would refine our understanding of the affective component of extraversion and neuroticism, and would further reflect to what degree both personality traits can be predicted by the three aspects of trait affect. So far, only in one study (Schimmack, 2003), information on extraversion, neuroticism and the three aspects of trait affect was collected simultaneously but the distinctive contribution of each aspect to the prediction of neuroticism and extraversion was not examined and, as mentioned above, the assessment of emotion duration was not optimal.

In the present study we aimed to contribute to a better understanding of the emotional life of extraverts and neurotics by examining how these traits are related to aspects of trait affect. In line with previous studies (Carstensen et al., 2000; Schimmack, 2003; Schimmack & Diener, 1997; Williams, 1989), we hypothesized that extraversion is positively related to the frequency, intensity and duration of positive emotions whereas neuroticism is positively related to the frequency, intensity and duration of negative emotions. Due to a lack of prior research incorporating all three aspects of trait affect, no specific a priori hypotheses were made regarding the relative predictive value of each aspect.

We collected information on emotion frequency, intensity and duration by means of a daily diary approach (Kahneman, Krueger, Schkade, Schwartz, & Stone, 2004). By aggregating the collected data within participants across days for each aspect separately, we reduced situational variance which allowed us to obtain information regarding affect-related traits (Diener & Larsen, 1984; Schimmack & Diener, 1997). Furthermore, in order to overcome the limitations of the studies by Schimmack (2003) and Verduyn, Delvaux et al. (2009), information on emotion duration was collected from a rather large number of participants using a free response format. The set of emotions included both negative (anger, fear, sadness, guilt, shame, disgust and depression) and

positive emotions (joy and relaxed) as we expected neuroticism and extraversion to be related to aspects of negative and positive emotions, respectively. Furthermore, emotions were selected such that the set included both high and low arousal emotions of both valences which occur frequently (Scherer et al., 1986).

2. Method

2.1. Participants

Participants were 100 students from the University of Leuven. They were selected from an initial sample of 439 first-year psychology students based on two criteria that are of no direct relevance for the present manuscript: (a) their score on a depression questionnaire in order to cover the whole range of depression scores with gradual oversampling of extreme scores to maximize variability, and (b) their medical history as individuals suffering from cardiovascular disease and/or taking medication affecting the cardiovascular or central nervous system were excluded. Two participants never completed the daily questionnaire, leaving a final sample of 98 participants; 37 men and 61 women with a mean age of 19 ($SD = 1.3$). Overall, compliance was good as participants filled out the questionnaire on average 6.2 times during the 1 week study period. The measures reported here were completed as part of a larger study, for which participants received payment of €70.

2.2. Procedure

On the first day of the study participants were invited to the psychology department. They were informed that they were taking part in a study on emotional experience that would last seven consecutive days. They were further told that they would have to complete a questionnaire before going to bed each evening that would ask them about the emotions they experienced earlier that day. To ensure that they provided information regarding emotional episodes rather than moods, participants were asked to focus on experiences that were clearly elicited by specific internal or external events (Beedie, Terry, & Lane, 2005). Furthermore, as the end of an emotional episode can be defined in several ways (Van Mechelen et al., *in press*), participants were explained that an emotional episode was defined to end as soon as the emotion was no longer felt for the first time (i.e., the point in time at which the intensity of the emotion is again zero); if the emotion was experienced again later on, they were asked to consider this a new episode (Verduyn, Delvaux et al., 2009; Verduyn et al., 2011). These instructions were repeated each day of the study. At the end of this session participants received the web address where the daily questionnaire could be found. Finally, 2 days later participants returned to the department to complete a number of personality questionnaires, including the neuroticism and extraversion scales.

2.3. Materials

2.3.1. Daily questionnaire

To obtain information on the frequency, intensity and duration of emotion episodes, a daily questionnaire was developed which was highly similar to the questionnaire used by Verduyn, Delvaux et al. (2009) and Verduyn et al. (2011). In particular, the daily questionnaire was divided into nine blocks, each block corresponding to one of the nine emotions we examined. Block order was randomized for each participant on each day.

2.3.1.1. Emotion frequency. During each block, participants were first asked how many times they experienced the target emotion that day (fear, anger, sadness, disgust, shame, guilt, depressed, joy or relaxed, depending on which prompt was randomly presented

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