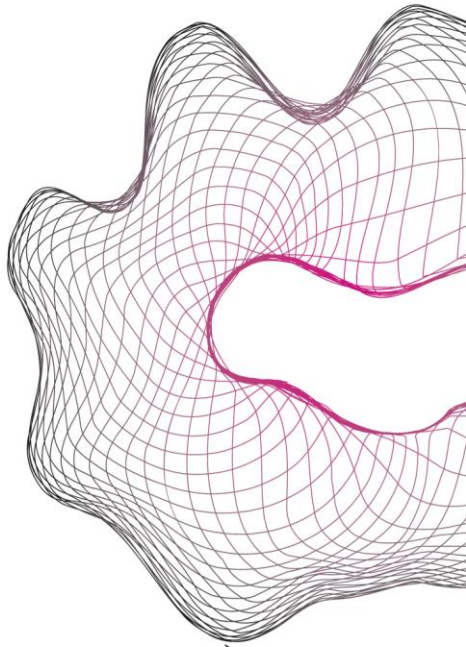


BACHELOR THESIS



THE RELATION BETWEEN NEUROTICISM, THE  
USE OF ADJECTIVES, NEGATIVE EMOTION  
WORDS, AND VIVIDNESS DURING THE  
RETRIEVAL OF SAD MEMORIES.

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## Abstract

*Introduction:* People tell stories about what they experienced every day. The way they phrase these memories seem to be related to their personality. On the basis of the fact that neuroticism is correlated with negative emotion word use the present study takes a look at a more detailed level of word use, namely the use of adjectives, and correlates this word use with the personality trait neuroticism. Furthermore neuroticism is also correlated with the vividness of a memory and vividness in turn is correlated to the use of adjectives. Vividness is found to be an influence on how memories are phrased and it seems like personality determines how vivid somebodies sad memories are. Therefore the present study is also interested in the correlation this has with personality and word use. *Method:* The respondents go through a questionnaire which asks them to talk about two sad memories. While doing this they are standing in front of a camera and are recorded by a voice recorder. After this the NEO Five-Factor Inventory (NEO-FFI) is administered. 35 respondents (57.1 % male, 42.9% female) between 18 and 39 years of age took part. The data was later transcribed and then analyzed by hand and by the Linguistic Inquiry and Word Count (LIWC). Correlation-analyses are performed as well as Wilcoxon tests and repeated measures ANOVA. *Results:* The mean score of neuroticism was 5.11. The correlations of the four research variables did not find significant results. However analysis of the differences between the first and the second sad memory did find significant results for the use of adjectives and vividness. Adjectives are used more in the second memory than in the first memory and the first memory is more vivid than the second one. Negative emotion words are used in the same amount in both memories. In all cases neuroticism had no significant relation with the difference between the word use and vividness in the first and second memory. *Discussion:* Hypothesized correlations between neuroticism and the research variables could not be found, present findings cannot be compared to previous findings, because present correlations are very experimental. There are differences in adjective use and vividness from the first to the second sad memory, which cannot be explained by neuroticism. Explanations for this might be that the respondents accommodate to the research task (higher adjectives use in second memory) and that more vivid memories came to mind quicker than less vivid memories. Implications for the practice are that the use of adjectives and vividness of a memory are not as informative about the personality as expected. The same was found for the vividness of a memory. It is advised that future studies research this in more depth, while taking into consideration various suggestions about more reliable methods and other variables that should also be the focus of research studies.

## Samenvatting

*Inleiding:* Mensen vertellen iedere dag verhalen van wat zij hebben ervaren. De manier waarop zij deze herinneringen uiten lijkt gerelateerd te zijn aan hun persoonlijkheid. Op de basis van het feit dat neuroticisme gecorreleerd is aan negatieve emotiewoorden probeert de huidige studie een meer gedetailleerd beeld te krijgen van dit woordgebruik, namelijk door het gebruik van adjectieven te onderzoeken, en correleert deze woord categorie aan de persoonlijkheidstrek neuroticisme. Daarenboven wordt neuroticisme ook gecorreleerd aan de levendigheid van een herinnering en levendigheid op zijn beurt is gecorreleerd aan het gebruik van adjectieven. Het werd vastgesteld dat levendigheid een invloed heeft op hoe herinneringen worden geuit en het lijkt als of persoonlijkheid bepaald hoe levendig iemands verdrietige herinneringen zijn. Vandaar is de huidige studie ook geïnteresseerd in de correlatie van levendigheid met persoonlijkheid en woordgebruik. *Methodes:* De respondenten volgen een vragenlijst en worden gevraagd twee verdrietige herinneringen te vertellen. Tegerlijkertijd staan zij voor een camera en worden opgenomen met behulp van een voice recorder. Daarna wordt de NEO Fijf-Factoren Inventor afgenomen. 35 respondenten (57.1% mannelijk, 42.9% vrouwelijk) tussen 18 en 39 jaar hebben meegedaan. De data werd getranscribeerd en handmatig en met hulp van de Linguistic Inquiry and Word Count (LIWC) geanalyseerd. Correlatie analyses worden uitgevoerd evenals Wilcoxon toetsen en herhaalding meetingen ANOVA. *Resultaten:* De gemiddelde score op de neuroticisme schaal was 5.11. De correlaties tussen de vier onderzoeks variabelen lieten geen significante resultaten zien. De analyse van het verschil tussen de eerste en tweede herinnering heeft echter een significant verschil gevonden voor adjectief gebruik en levendigheid. Er worden meer adjectieven in de tweede dan in de eerste herinnering gebruikt en de eerste herinnering is levendiger dan de tweede. Er is geen verschil in het gebruik van negatieve emotiewoorden in de eerste en tweede herinnering. Neuroticisme heeft geen significant relatie met het verschil in woordgebruik en levendigheid in de eerste en tweede herinnering. *Discussie:* Verwachte correlaties tussen neuroticisme en de onderzoeks variabelen zijn niet gevonden, huidige resultaten kunnen niet vergeleken worden met eerder gedaan onderzoek, omdat het een erg experimenteel onderzoek is. De verschillen in adjectief gebruik en levendigheid in kunnen niet verklaart worden door neuroticisme. Mogelijke verklaringen kunnen zijn, dat de respondenten aan de opgave moesten wennen (hoger adjectief gebruik in tweede herinnering) en dat levendigere herinneringen sneller oproepbaar zijn. Voor de praktijk kan worden gezegd dat geen informatie over de persoonlijkheid kan worden verkregen door op het gebruik van adjectieven of de levendigheid te letten. Het wordt aanbevolen dat toekomstig onderzoek hier nog verder onderzoek naar gaat doen, en ook nog andere variabelen betreft.

## Introduction

Did you ever want to be able to know what somebody is like just by paying attention to which sort of words that person uses? Who did not! Could it be easier than one assumes?

The way people express themselves while talking or writing about what they are thinking in a specific moment has been widely studied in the last couple of years. It was found that when using personal and emotional memories to study the relation between word use and personality the most significant results were obtained (Hirsh & Peterson, 2009). The researchers were able to find significant correlations between the personality traits and the words the respondents used. For example, the relation between neuroticism and the use of more negative emotion words has been found in numerous studies and the relation is stronger than the relation of other personality traits with negative word use (e.g., Hirsh & Peterson, 2009; Pennebaker, Mehl, & Niederhoffer, 2003). However Yarkoni (2010) has hinted that negative emotion words alone do not say enough about the reason why people who score high on neuroticism use this word category more often than people high on other personality traits. Based on his own research he proposed that the use of adjectives to *describe* events in a negative way might be stronger associated with neuroticism than the mere use of negative emotion words to talk about negative events. According to Yarkoni (2010) this should be a focus of further studies, because it is a more in depth analysis of which words are the reasons for this correlation between neuroticism and negative word use. The present study takes this train of thought as a cause for further studying the relationship between personality and the use of adjectives in personal memories. Furthermore the present study is also interested in the vividness of the memories and the relation this has with the use of adjectives and personality, because the vividness of a memory might also be of influence on how memories are phrased and whether somebody has more or less vivid memories seems to be related to personality (Ross & Wilson, 2002). By doing this the present study wants to contribute to the research about these sort of relationships to further strengthen and broaden the knowledge we can obtain of the personality of a person through observing that persons' word use, especially the use of adjectives.

### Narrative psychology

Talking about things one has experienced can help to bring those experiences into order. A lot of people feel the urge to talk to friends and in general to people they trust when they have problems. The reason why they do this is because talking about experiences one has lives through helps people make sense of the always-changing world around them. Inhibiting the expression of emotion increases distress, verbalizing the felt emotions on the other hand reduces distress and

even promotes insight into what happened, e.g. the cause of it and what the experience stands for (Kennedy-Moore & Watson, 2001). It is said that through narratives people try to bring their life into a sort of order, talking about memories makes these experiences more clear to them. Furthermore narratives give a feeling of continuity and as having an own *'life-story'*, this could also be described as forming an identity. Through narratives we construct a world around us and we live by these stories told by ourselves and other people around us (Murray, 2008). Disclosure, thus expressing what happened, is helpful, because it helps to integrate the emotions that certain events elicit by labeling these emotional experiences (Pennebaker & Francis, 1996). Mc Adams (1996) has formulated a model with which he describes this process in more detail. This model is called "the life story model of identity" and implies that people give their lives a meaning, goal and sense of knowing who they are through developing internalized narratives of the self, also often called a narrative identity. According to Singer and Salovey (1993) self-defining memories are those memories of emotional events that form narrative identity. Life stories can be seen as a part of personality that is separate from dispositional traits, but research has shown that these two domains are related (McAdams, 2008). For example, in a study by McAdams et al. (2004) in which the Big Five traits were correlated to life narratives, relations between these two variables were found. This is why personality will be one of the main focuses of the present study.

### **Verbal expression of emotions**

The question arises how these life stories are communicated to other people and how the felt emotions are expressed. Human beings make use of language to convey their thoughts and feelings. While talking about personal memories people generally show emotional expressions of how they feel, because narratives and emotions are inseparable (Kleres, 2010). In the form of spoken language or written texts people try to express emotions and thoughts. Written words and spoken language are the medium through which researchers try to understand the cognitive processes that accompany emotional expression and the interpretation of experiences (meaning construction) (Truong, Westerhof, Lamers, de Jong, & Sools, 2013). Verbal expression of emotion is used to encode emotional experiences so they can be cognitively worked with and so that meaning can be attributed to these experiences (Truong et al., 2013).

Frijda (1986) describes emotion as a complex "relational action tendency" which could also be seen as an "action readiness" (p. 6). This means that when feeling a particular emotion a person has a heightened perception of things in the light of that emotion and is likely to approach/withdraw from things according to that emotion.

In the past a lot of research on verbal emotional expression has been done only focusing

on word count and the general negativity/positivity of the words used. Later on there were also studies concentrating on the function words, which have no meaning on their own, such as pronouns (I, she). Fast and Funder (2008) state that there is a lot of research examining the use of pronouns in relation with personality and there is not enough research focusing on word categories other than pronouns. Yarkoni (2010) also commented on this trend and on the basis of his research he proposed that rather than focusing only on demonstrating that that people scoring high on Neuroticism use more negative words, like for example sad, bad, and wrong (Pennebaker & Seagal, 1999), it should be tried to demonstrate that the association he found between neuroticism and the use of adjectival words is due to those people *describing* events in a more negative way. They do not necessarily experience more negative events than others they just depict them in more detail and therefore use more (negative) adjectives. Adjectives are defined as words which describe properties of entities. These properties can be dimensions, physical properties, color, human propensity, age, value and speed. They are used to give a more detailed description of situations or people (Thompson S. A., 1989). Due to this definition and the plausible relation hypothesized by Yarkoni (2010) the focus of the present study will lie on the verbal expression of emotions through adjectives. Given the fact that Yarkoni (2010) only found this relation based on significant correlation between negative emotion words and neuroticism the present study will try and replicate this finding as well.

## **Personality**

As was seen in the preceding paragraph personality seems to be related to how people express themselves. Since the relation of personality with the use of adjective as well as negative emotion words and vividness is going to be the focus of the present study it is important to define what personality is.

Personality is often described in terms of personality traits, which try to characterize individuals by means of stable pattern of thoughts, behavior and feelings these individuals are likely to experience (McCrae & Costa, 1999). Personality traits give a rough sketch of what a person is like in a wide range of different situations and over long period of time (McAdams & Pals, 2006). The most accepted definition of these personality traits is the five-factor model of personality, also often referred to as the Big Five. These five-factors are called *extraversion* (vs. *introversion*), *neuroticism* (negative affectivity), *conscientiousness*, *agreeableness*, and *openness to experience* (Goldberg, 1993). Due to the scope of the present study in the following text only the personality trait neuroticism is being defined in more detail and only neuroticism is related to the other research variables, because this is the personality trait that Yarkoni (2010) found the

relation with adjectives with.

Neuroticism is characterized by an overall tendency to worry a lot and to experience feelings such as anxiety, anger, envy and guilt. Furthermore neuroticism is correlated with being moody as well as being depressed (Thompson, 2008; Matthews, Deary, & Whiteman, 2003). Individuals who score high on neuroticism seem to be less able to cope with stressors and they also have a general tendency to interpret situations negatively (Carducci, 2009). This was also demonstrated by Buss, Gomes, Higgins and Lauterbach (1987) who have shown in a laboratory study that neuroticism is positively correlated with the amount of negatively labeled information. In addition to that neuroticism is also highly correlated with depression (Boyle, et al., 2010; Saklofske, Kelly, & Janzen, 1995)

In their *five-factor theory personality system* McCrae and Costa (1999) describe objective biography (e.g. emotional reactions, mid-career shifts or behavior) of a person as the output of the personality system which stands in a dynamic process with characteristic adaptations (personal strivings, attitude, self-concept) and external influences such as cultural norms and life events. In relation to self-narratives and the impact of personality on which words are chosen to describe these personal life events one could conclude that this theory gives an overview over how the process of inter-relations works. The characteristic adaptations are influenced by the five basic tendencies which are the Big Five Personality traits. Characteristic adaptations are described as the concrete manifestations of the abstract psychological potentials (the basic tendencies). These basic tendencies have impact on one's personal strivings, one's attitudes towards something and also on one's self-schemas, which, in turn, have impact on one's objective biography. In making a distinction between the basic tendencies (traits) and behavior or desires a person has, it becomes clear that according to this theory traits are "deeper psychological entities that can only be *inferred* from behavior and experience". Researchers have to take into account that self-reports of personality traits also only are inferences and are thus prone to error.

## **Verbal expression of emotions and personality**

On the basis of the definitions of personality and verbal expression of emotions one can presume that these two constructs are related to each other and that personality might influence the way people phrase what they want to say/write. This relation has indeed been widely studied in the past. It has been demonstrated that the study of natural word use patterns can give a good insight into individual's personality characteristics (Pennebaker et al., 2003). Stream-of-consciousness writing on its own has not been proven to be very powerful in giving these insights. The reason for this might be that stream-of-consciousness writing most of the times does



not have to do with personal memories/ self-narratives, because it is a process of simply writing down what goes on in ones mind at that specific time. When respondents, however, are asked to write or talk about a personal memory they have to make use of self-expression to convey what they are feeling and thinking. Writing about self-narratives seems to be more strongly correlated with personality. Research studying self-narratives has been able to show that language use is a reflection of a person's personality (Hirsh & Peterson, 2009). This sort of relation is also described by McAdams (2008) who describes life stories as a part of personality and who showed in one of his studies that life stories are correlated with personality (McAdams et al., 2004). Because of the findings described above it is chosen to study the word use of the respondents by means of analyzing sad personal memories, so that it is more likely that the respondents have to make use of self-expression.

There has been done a lot of research concentrating on pronouns in relationship with personality, but not enough research on other words categories and their relationship with personality (Fast & Funder, 2008). When the correlation of personality and word use in self-narratives was examined on the basis of other word types than e.g. pronouns, the results have not been consistent over different studies. This is why the present study wants to concentrate on a word category that has not been widely studied. The following paragraph explains which category was chose and why.

According to Hirsh and Peterson (2009) the Big Five personality traits have a significant correlation with word use patterns that are conform to what could be expected from the specific trait. Extraversion for example is correlated with words referring to other people and to social processes. Neuroticism is significantly correlated with words having to do with sadness, anxiety, anger and negative emotions (Hirsh & Peterson, 2009). Yarkoni (2010) also found that neuroticism correlates positively with these various negative emotion word categories. In the same study Yarkoni (2010) also conducted a different analysis approach, namely word-based analyses as opposed to category-based analyses. He found associations which merge with the category-based findings. For example neuroticism was still related to the use of words belonging to the negative emotion words category, such as "depressing", "bad" and "stressful". He proposes that by analyzing the word use on the word-level itself it is possible to find new associations between personality and language. He argues that neuroticism might be related to a higher adjective use in describing personal events. Based on these findings the present study concentrates on the use of adjectives and what this word use can tell us about the personality of the teller. This seems important because it is pointed out by Blagov and Singer (2004) that even though two individuals score the same on a personality screening device this does not mean that

they are equally receptive for psychotherapy. The way they express themselves while talking about experiences can give quite some crucial information about in how far they have integrated the experiences in their life story and which approach they need so that psychotherapy is most effective. Adjective use is hypothesized to be an easy way to study word use, because it would only require the psychotherapist to concentrate on in how much detail a client describes personal life events. Furthermore finding new correlations between personality and smaller word categories like adjectives can add to the general knowledge about a person which we can infer from language use. This knowledge of a person can also be helpful in various situations outside of the psychotherapists' room. It can give us hints about what the personality of a person is like which can be of use in forensic sciences, when researches want to find out what the personality of e.g. someone who wrote a threatening letter is like. It can also be useful in modern social life, where a lot of social communication and also online dating happens via texts and E-mail. Last but not least it can be useful in commercial settings, when companies want to find out what their clients are like based on how they rate a certain product (Argamon, Dhawle, Koppel & Pennebaker, 2005).

## **Vividness**

When people talk about emotional experiences these specific experiences are often still very vivid to them. Sometimes they even can be so vivid that the audience relives that experience with the teller (Brewer, 1988). The present study is interested in how vivid an emotional memory is reported to be and the relationship this has with personality and word use, because the reported vividness of a memory seems to be of importance in the identity formation with regard to which part of our life story we still feel connected with (Ross & Wilson, 2002). Ross and Wilson (2002) state that if a person feels close to a past experience this will lead to the person also feeling close to the successes and failures he/she experienced at that time. The actual temporal distance has no impact on this, because it was found that the subjective experience of time can be different from the actual time that past. In their study Ross and Wilson (2002) also found that people have the tendency to feel further away from undesirable experiences than from desirable experiences and in a later study they argued that people do this to protect their image of the self (Wilson & Ross, 2003). For the present study this means that sadder memories are thought to be less vivid than more happy ones, because the respondents try not to identify with sad events that they had to live through. It is hypothesized that whether someone protects their self-image or not is related to personality and furthermore it is hypothesized that the manner in which memories are described

depends on the vividness of that specific memory. This is why the present study is interested in how the reported vividness is related to personality and word use

### **Verbal expression of emotions and vividness**

How a memory is verbally expressed is not only dependent on the personality of the teller but also on the vividness of the experience. Logically, if the memory is more vivid it can be described in more detail, which, according to the definition of adjectives given above (see paragraph “Verbal expression of emotions”), is done by means of describing e.g. the physical properties of an object by using more adjectives. How vivid a memory is and in how much detail it can be described is dependent on the valence of the memory. Kensinger, Garoff-Eaton and Schacter (2007) found that negative objects are remembered in more detail than neutral objects. This enhancement in memory for negative experiences originates in a more enhanced visual processing which leads to more details being remembered (Kensinger et al., 2007). Furthermore, as stated before, Frijda (1986) describes emotion as a complex “relational action tendency” which could also be seen as an “action readiness”. It is hypothesized therefore that the degree of vividness of the experiences has an impact on how vivid the felt emotions are relived and that the degree of reliving the emotions correlates with the word choice of the respondents. One has a specific “action readiness” and therefore acts accordingly through phrasing the sentences in an emotion-appropriate manner. Because of this it is theorized that the use of adjectives should be higher in more vivid memories. The present study wants to explore this relationship.

### **Personality and vividness**

Finally, the present study is also interested in how personality and vividness correlate among each other. From the definition of vividness of memories it became clear that there are tendencies to feel further away from undesirable experiences than from desirable experiences to protect the self-image (Wilson & Ross, 2003). It seems possible that this has a relation with personality. According to Ross and Wilson (2002) individuals who score high on a self-esteem scale are more easily ready to distance themselves from undesirable experiences to try and maintain their high self-esteem. It is argued that people with a low self-esteem score have a lower motivation to self-enhance and therefore do not see the benefit in distancing themselves from negative life events. In respect of the present study one can argue that individuals who score low on self-esteem, score high on neuroticism (Judge, Erez, Bono & Thoresen, 2002). Judge et al. (2002) found that neuroticism and self-esteem may be markers of the same higher order concept. This leads to the hypothesis that for those respondents that score high on neuroticism the negative

memories are more vivid than for the respondents scoring low on the neuroticism scale. This relation is a further focus of the present study.

## **Present study**

The framework of the present study is to add to the knowledge a researcher or a psychotherapist can gain about a person through analyzing that persons' word use. This will help in therapy settings when psychotherapist and the clients just met each other. If the psychotherapist is able to infer which personality the client has this can be an advantage in deciding how to best help that person (Blagov & Singer, 2004). Moreover the present study is a very experimental study with interests in relations that have not been studied before. It also makes use of a rarely used method to collect the data about the memory. On the contrary to previous studies the present study collects the data by means of orally told memories..

## **Research question**

For the present study the following research question has been formulated:

*What is the relation between neuroticism, the use of adjectives, negative emotion words and vividness during the retrieval of sad memories?*

Based on findings in the literature certain relations can be expected between neuroticism, the use of adjectives, negative emotion words and the vividness of a memory:

1. *What is the relation between neuroticism and the total percentage of adjectives used and the difference of adjectives used in the first and second memory?*

To answer this question the following hypotheses have been formulated:

- Neuroticism and the total percentage of adjectives used are positively correlated.
- The percentage of adjectives used in the first sad memory is higher than in the second sad memory.
- Neuroticism has an interaction effect on the difference between the percentage of adjectives used in the first and second memory.

2. *What is the relation between vividness and the percentage of adjectives used when the two memories are analyzed together and when they are analyzed on their own?*

To answer this question the following hypothesis has been formulated:

- Participants who report vivid sad memories use more adjectives than respondents who report less vivid memories.

3. *What is the relation between neuroticism and vividness and the difference of vividness in the first and second memory?*

To answer this question the following hypotheses have been formulated:

- Neuroticism correlates positively with the overall reported vividness of both sad memories.
- The vividness of the first sad memory is higher than the vividness of the second sad memory.
- Neuroticism has an interaction effect on the difference of vividness in the first and second memory.

4. *What is the relation between neuroticism and the percentage of negative emotion words used and the difference of negative emotion words used in the first and second memory?*

To answer this question the following hypotheses have been formulated:

- Neuroticism and the percentage of negative emotion words used are positively correlated.
- The percentage of negative emotion words is higher in the first sad memory than in the second sad memory.
- Neuroticism has an interaction effect on the difference between the percentage of negative emotion words used in the first and second memory.

## Method

### Respondents

The respondents of this study were recruited via a University platform called SONA-system, where students can sign up for different studies they want to take part in and in return get credit points for their effort. Another way of recruiting respondents was by talking to them directly and asking them if they would like to take part in an interesting study. The researchers handed out flyers on the campus and directly spoke to people who met the criteria. The inclusion criteria were that the respondents needed to be students between 18 and 30 years of age. Furthermore they needed to be Dutch, because Dutch at a mother tongue level was required to eliminate potential bias through non-native speakers talking behavior. All in all the respondents who participated were people from the University of Twente and the Saxion Hogeschool.

In total 35 respondents took part in the present study. The average age was 23.4 years of age. The respondents consist of 20 men (57.1%) and 15 women (42.9%). The average age is 23.4. 40.0% of the respondents are students of Psychology and 8.6% study Communication Sciences. These two study fields are taken together as Behavioral Sciences (see Table 1). The remaining 51.4% are students of other fields of studies, mainly technically studies such as for example Biomedical Technology of Computer Sciences. There was one respondent who did not tell a second sad memory.

Table 1. *Demographic variables of the respondents in the present study (N = 35)*

Demographic variables	N	%
<b>Average age</b>	23.40 (SD = 3.91)	-
<b>Sex</b>		
Male	20	57.1
Female	15	42.9
<b>Field of study</b>		
Behavioral Sciences	17	48.6
Other	18	51.4

*Note.* N = Number of respondents, SD = Standard deviation

## Procedure

When the respondents arrive at the research lab they are greeted by the researchers and are then asked to follow the researcher into a little room. Here they are offered a seat and then the details of the present study are explained to them. After giving them a rough overview over what is going to happen the respondents are given the time to read through the informed consent form (see Appendix A). If they agree with it and take notice of their rights they are asked to sign it. The researcher then signs it as well and then turns on the camera and voice recorder. The camera footage is not used in the present study, but the respondents are recorded by camera anyway, because the present study is part of a bigger study which later will do further analysis with the data gathered this way.

Before the respondent is allowed to begin, the researcher says the number of the respondent out loud so the data is easy to identify. Then the respondent begins with the qualtrics questionnaire which will guide him/her through the present study. It consists of two parts. In the first part it will give “cue words” according to which the respondent has to tell a memory that fits this subject. In total the respondent is asked to tell eight memories. The questionnaire will also contain other in-between-exercises and at the end a demographic questionnaire and the NEO-FFI questionnaire. First the respondent gets a tutorial to get a feeling of what the procedure is like. During this tutorial the researcher is still present to answer possible questions. The tutorial starts with the memory cue word “very calm”. The respondent is asked to tell a memory which is very calm and which is at least one year old. The respondent is also asked to describe this memory in as much detail as possible and to talk for approximately three minutes. While talking about the specific memory the respondent has to stand on a marked area of the room. This assures that the respondents are in the frame of the camera and the video footage is standardized. The respondents are furthermore advised to look into the camera while talking. After the first “very calm” memory the respondent has to rate the memory. The respondent has to give a title to the memory and state how old the memory is. In addition to that the respondent has to give an answer to various questions on a scale from 1 to 6, with 1 meaning “not at all” and 6 meaning “absolutely”. An example for these questions is: “How vivid is this memory for you?”. Other questions like this also ask about the importance or the sadness of the memory they just told. After the rating of the first “very calm” memory the respondent is then asked to think about a second “very calm” memory. When the practicing with the two “very calm” memories is done and the respondent has no further questions the researchers leave the room. From this point on the procedure is the same for each memory. In the following the respondent is asked to talk about and rate two sad memories, two angry memories and two happy memories. In between each of the sets of different

types of memories the respondent has to talk about a neutral description of something, such as “Could you tell me in detail what your living room looks like?”. This acts like a control condition. For more details about which neutral descriptions the respondents have to give please take a look at the full questionnaire in the Appendix B.

When the respondent is finished with talking about and rating the different memories, the questionnaire requests him/her to inform the researchers about this. The researcher can then turn off the camera and voice recorder. It is no longer needed for the second part of the questionnaire. In this part of the questionnaire the respondent is asked to fill in a demographic questionnaire and the NEO-FFI. At the end of the questionnaire the respondent receives a debriefing in which the goal of the study is clarified and the respondent is given more detail about what is going to be analyzed. All in all the study takes approximately 70 minutes. In case the respondent wants to have a look at the results of this study and what the researchers made out of the collected data the respondents are also given the email addresses of two of the researchers.

When all data is collected the researchers transcribe the audio recording. The text files will then be analyzed by hand by two independent raters who count the number of adjectives used and also by the LIWC program which analyzes the use of negative emotion words.

## **Material**

*Memories:* To obtain the memories of the respondents about two sad events the respondents had to follow an online questionnaire that was constructed by the researchers themselves on qualtrics.com. While filling in the questionnaire and performing the tasks the questionnaire asked them to do, the respondents were filmed with a camera and recorded with a voice recorder. Later on the audio recordings of the memories were transcribed.

*Personality:* The personality of the respondents was assessed through the NEO Five-Factor Inventory (NEO-FFI). This questionnaire measures the five basic personality traits defined by Costa and McCrae (1989). The scales of this questionnaire are the same as the Big Five personality traits: Neuroticism, Extraversion, Openness to experience, Agreeableness and Conscientiousness. In total there are 60 items with 12 items belonging to each scale. On each item the respondent can give a response in the five-point Likert format depending on how much he/she agrees with the statement. The responses vary from “strongly agree” to “strongly disagree”. A few of the items are positively poled others are negatively poled. Per Scale the score of each statement will be summed up. A high score on a scale means that the respondent shows high scores of that particular trait. The English version of the NEO-FFI appears to be a valid, reliable and useful measure to estimate the personality of a respondent. The internal consistency of the



English NEO-FFI lies between  $\alpha = .68$  and  $\alpha = .86$  (Costa & McCrae, 1992). In addition the retest reliability lies between .86 and .90 (Robins, Fraley, Roberts, & Trzesniewski, 2001). The internal consistency of the present study is  $\alpha = .86$  for the neuroticism scale.

*Verbal emotional expression:* To be able to analyze the use of adjectives the respondents used in the two sad memories the adjectives had to be counted by hand. To do this the Linguistisch Categorieren Model (LCM) was used. Technically it is a measure to analyze interpersonal language use, but in the present study its coding-schema was used to count the number of adjectives respondents used while talking about two sad memories (Semin & Fiedler, 1991). Usually the reliability of the LCM is analyzed across the different word categories and in the manual of the LCM it is pointed out that the reliability has always been high in research using this coding-schema (Coenen, Hedebouw, & Semin, 2006). In the present study however only the adjectives are analyzed by means of this coding-schema and therefore only the interrater reliability of this category is computed to determine the consistency between raters. The interrater reliability is found to be  $Kappa = 0.503$  ( $p < 0,001$ ). This interrater reliability can be interpreted as moderate agreement between raters. The interrater reliability was analyzed by means of letting another person count the adjectives of all sad memories of the 35 respondents. The second rater also used the LCM to do this.

Table 2. *Examples for which words are coded as adjectives according to the LCM*

Word category	Example
Adjectives	There was an <u>unknown</u> , <u>young</u> lady with a <u>small</u> child beside her.
Adjectives which do not refer to a person (often adverbs)	She asked him <u>kindly</u> , but <u>energetically</u> to go away. The room was <u>very dark</u> . (very adds qualifying meaning)
Nouns	
...referring to a person	His father was a <u>thief</u> . (Thief qualifies the father)
...referring to an object/situation	The bike she got from her father is a <u>jewel</u> .

According to the LCM coding-schema adjectives refer to properties in general or characteristics of a person. Dependent on the research question adjectives can also refer to characteristics of things or situations. This is the case in the present study. Adjectives qualify people, objects, actions, situations etc. The LCM sometimes also codes nouns and adverbs as adjectives. This is the case when a noun or adverb adds a qualifying meaning to what is being

said (for an example see Table 2.). For more information and more in depth explanations see Coenen et al. (2006).

With the Linguistic Inquiry and Word Count (LIWC) it was possible to analyze the percentage of negative emotion words the respondents used when talking about the two sad memories. In the present study the Dutch version of the LIWC was used. It is a program designed to analyze great amounts of language data on their word use patterns in a short period of time. The data the LIWC generates from text documents or transcribed audio recordings consists of various categories: 4 general descriptor categories, such as total word count and how many words there are per sentence etc., 22 standard linguistic dimensions (for example: the percentage of words in the text that are prepositions, adverbs, nouns, etc.), 32 word categories that tap psychological categories (e.g., home, work, free time), 3 paralinguistic dimensions which consist of fillers, nonfluencies and assents and the last category of the LIWC consists of 12 punctuation categories (commas, full stops, etc.). The LIWC is constructed on the basis of a dictionary which contains 4.500 words and word stems. Each category mentioned above has certain dictionary words that define that specific category or scale (Pennebaker, Chung, Ireland, Gonzales, & Booth, 2007). According to Zijlstra, van Middendorp, van Meerveld and Geenen (2005) the internal consistency of the Dutch LIWC is good. The word category negative emotion words has an internal consistency of  $\alpha = .56$  and a test-retest reliability of  $\alpha = .75$ . The internal consistency of the present study is  $\alpha = .78$  for the negative emotion word scale.

*Vividness:* The vividness of each sad memory was obtained through the questionnaire the respondents had to go through. After each memory they had to answer several questions about how they feel towards the memory they just told. One of these questions was how vivid they judged the memory to be. The respondents could give an answer to this varying from 1 meaning “not at all” and 6 meaning “absolutely”.

## **Analysis**

For the analysis of the data the program Statistical Program for Social Science (SPSS) Version 21.0 is used. The means and standard deviation of the research variables are computed and shown in Tabel 3. In order to being able to analyze the data in an appropriate manner, the data is split into a score for the first and the second sad memory for each variable. Furthermore also a total score is computed for each of the research variable. With the aid of the Shapiro-Wilk test the normality of the demographic variables and the research variables is determined. Several research variable are also not normally distributed, namely the split scores for the percentage of adjectives in the first and the second sad memory as well as the split scores of the reported vividness in the

first and second sad memory. From the research variable negative emotion words the total score and the score of the first sad memory are not normally distributed. All other variables are normally distributed.

The first subquestion is analyzed in the following way: At first the correlation of neuroticism with the total percentage of adjectives used is computed. To do this a Pearson correlation is used, because both variables are normally distributed. The difference between the percentage of adjectives used in the first and second sad memory is analyzed by means of a Wilcoxon signed Rank test, because those variables are not normally distributed. In order to find out if the personality trait neuroticism has an interaction effect on the pattern of adjectives used in the first and second memory a repeated measures ANOVA is conducted. Here the percentage of adjectives in the first memory and the percentage of adjectives in the second memory act like the within-subject factor with two levels and neuroticism is the covariate.

To answer the second subquestion the correlation between the overall reported vividness and the total percentage of adjectives used is correlated. Again, a Pearson correlation is computed, because both variables are normally distributed. Given that the reported vividness can also be split into the reported vividness for the first and second memory, the following analysis that is conducted is a more in depth correlation between the vividness of the first memory with the percentage of adjectives used in the first memory, as well as the correlation of the vividness of the second memory with the percentage of adjectives used in the second memory. Here a Spearman correlation is used, because the research variables are not normally distributed.

The third subquestion is analyzed by computing the correlation between neuroticism with the total reported vividness from both memories taken together. Since these two variables are normally distributed a Pearson correlation is used. After this the difference between the reported vividness of the first and second memory is analyzed. For this a Wilcoxon signed rank test is conducted, because the two variables are not normally distributed. A repeated measures ANOVA is conducted to analyze if neuroticism has an interaction effect on the differently reported vividness of the first and second memory. The reported vividness of the first and second memory is the within-subject factor with two levels and neuroticism is the covariate.

In order to analyze the fourth subquestion a Spearman correlation between the variables neuroticism and total negative emotion word use is conducted, because the variable of negative emotion word use is not normally distributed. The difference between the word use of negative emotion words in the first and second memory is computed by means of a Wilcoxon signed rank test. After that it is tested if neuroticism has an interaction effect on the word use in the first and second memory. For this purpose a repeated measures ANOVA is conducted, where the two

percentages of negative emotion words in the first and second sad memory are the within-subject factor with two levels and neuroticism is the covariate.

## Results

The 35 respondents in average used 295.74 words while talking about their first sad memories and 281.77 words when talking about the second sad memory. In Table 3 the average number, the standard deviation and the range of the research variable neuroticism, percentage of adjective used, reported vividness and negative emotion words are described. Furthermore the two variables importance and sadness are displayed as well to give a better picture of what the sample looked like. The sample in average scored a 5.11 on the neuroticism-scale of the NEO-FFI ( $SD = 8.5$ ). The average percentage of adjectives used during both sad memories together on average was 10.09% with a standard deviation of 2.57%. When the memories are split into two, the average percentage of adjectives used in the first memory is 9.96% ( $SD = 2.63$ ) and in the second memory this is 10.81% ( $SD = 3.28\%$ ). The degree of vividness of the sad memories was on average evaluated with a 4.04 ( $SD = 0.85$ ). The first memory is rated with an average vividness of 4.23 ( $SD = 1.23$ ) and the second sad memory with a mean vividness of 3.71 ( $SD = 1.22$ ). The respondents used on average 2.63% negative emotion words in their first sad memory ( $SD = 1.65$ ). In the second sad memory the average was 2.70% negative emotion words ( $SD = 1.42$ ). Taken together the percentage of negative emotion words was 2.67% with a standard deviation of 1.18. The importance and sadness of the memories on average was higher in the first memory, respectively 4.29 ( $SD = 1.49$ ) and 4.43 ( $SD = 1.26$ ) than in the second memory, where the average was 3.69 ( $SD = 1.39$ ) and 3.89 ( $SD = 1.43$ ), respectively.

## Subquestions

To answer the research question of how neuroticism, the use of adjectives and negative emotion words while talking about sad memories, and the reported vividness of those memories are correlated, four different subquestions are constructed:

*Subquestion 1. What is the relation between neuroticism and the total percentage of adjectives used and the difference of adjectives used in the first and second memory?*

There is no significant correlation between the neuroticism score and the total amount of adjectives used ( $r(33) = .11, p > .05$ ). This can be seen in Table 4. On the basis of earlier research the hypothesis was formulated that there is a positive correlation between neuroticism and the amount of adjectives used. This hypothesis is being rejected.

The difference between the average percentage of adjectives used in the first and second sad memory is significant with  $Z = -2.01$  and  $p = 0.02$ . The mean scores of the percentage of adjectives used in both memories are shown in Table 3. The hypothesis that the percentage of adjectives used in the first sad memory is higher than in the second sad memory can however not be confirmed, because the percentage is higher in the second sad memory.

It is hypothesized that neuroticism can explain the difference between the different percentages of adjectives used cannot be confirmed. Analysis show that there is no interaction effect ( $F(1,32) = 1.058, p = .22$ ).

Table 3. *Descriptive statistics (N = 35)*

Research variables	Memory	M	SD	Min-Max
Neuroticism		5.11	2.08	2 - 9
Adjectives (in %)	Total	10.09	2.57	5.18 – 16.55
	First	9.69	2.63	2.14 – 16.04
	Second	10.81	3.28	3.45 – 17.80
Vividness	Total	4.04	0.85	2.50 – 6.00
	First	4.23	1.23	1.00 – 6.00
	Second	3.71	1.22	2.00 – 6.00
Negative emotion words (in %)	Total	2.67	1.18	.86 – 6.35
	First	2.63	1.65	.38 - 8.96
	Second	2.70	1.42	.00 – 6.33
Importance	Total	3.99	1.03	2.00 – 6.00
	First	4.29	1.49	1.00 – 6.00
	Second	3.69	1.39	1.00 – 6.00
Sadness	Total	4.16	1.13	1.50 – 6.00
	First	4.43	1.26	1.00 – 6.00
	Second	3.89	1.43	1.00 – 6.00

*Note.* M = Mean, SD = Standard Deviation, N = Number of Respondents, Min = Minimum, Max = Maximum.

*Subquestion 2. What is the relation between vividness and the percentage of adjectives used when the two memories are analyzed together and when they are analyzed on their own?*

The vividness of the two sad memories and the total amount of adjectives used during talking about the sad memories is not correlated significantly ( $r(33) = .060, p > .05$ ) as can be seen in Table 4. When the relation between the two variables is analyzed for both memories on their own they are still not significant. The vividness of the first memory has a correlation of  $r(33) = .11$  with the percentage of adjectives use in this memory ( $p > .05$ ). In the second sad memory the correlation is  $r(33) = -.05$  ( $p > .05$ ), see Table 4. The formulated hypothesis that reported vividness does correlate in a positive way with the amount of adjectives used cannot be confirmed.

*Subquestion 3. What is the relation between neuroticism and vividness and the difference of the vividness in the first and second memory?*

The personality trait neuroticism does not have a significant correlation with vividness ( $r(33) = .12, p > .05$ ). The formulated hypothesis that neuroticism does positively correlated with the vividness of a sad memory thus cannot be confirmed.

The difference between the vividness in the first memory and the second memory is significant ( $Z = -1.73, p = .04$ ). To compare these results see Table 3. The hypothesis that the first sad memory is more vivid than the second sad memory can be confirmed.

Neuroticism has no significant interaction effect on the vividness in the first and second sad memory ( $F(1,33) = 0.01, p = .93$ ). The hypothesis that the personality trait neuroticism can explain the difference between the vividness in the first and second sad memory has to be rejected.

*Subquestion 4. What is the relation between neuroticism and the percentage of negative emotion words used and the difference of negative emotion words used in the first and second memory?*

Negative emotion words do not correlate significantly with the personality trait neuroticism ( $r(33) = -.21, p > .05$ ). The hypothesis that neuroticism is positively correlated with the percentage of negative emotion words used is being rejected.

There no significant difference between the percentage of negative emotion words in the first memory and the second memory ( $Z = -.79, p = .21$ ). The hypothesis that the percentage of negative emotion words in the first sad memory is higher than in the second sad memory cannot be confirmed. The analysis if the personality trait neuroticism has an interaction effect on the

percentage of negative emotion words used in the first and second memory is not significant as well ( $F(1,33) = 0.01, p > 0.91$ ). The hypothesis that neuroticism can explain the difference between the percentages of negative emotion words used in both memories has to be rejected.

Tabel 4. *Correlations between the four research variables neuroticism, adjectives, negative emotion words and vividness*

		Adjectives	Vividness	Negative emotion words
Neuroticism	Correlation	.11	.12	-.21
	Sig.	.21	.24	.12
Vividness	Correlation	.06		
	Sig.	.37		

Note. Sig. = Significance level.

## Discussion

The relationship between personality and word use is interesting for various different areas. Knowledge about this relation can help in therapy to get a gist of a person's personality only by listening to the words he or she uses, but it can also help in modern social communication which often takes place online. It is an advantage to know what the person you are talking to is like. Until now this relation has been studied concerning neuroticism and negative word use and this relation has been found often. In order to go into more detail the present study also wanted to address a more specific word category, namely adjectives. It was proposed that adjectives are correlated to neuroticism, because people who score higher on neuroticism describe negative events in a more detail fashion. Furthermore it was also proposed that neurotic people have more vivid negative memories, because their personality characteristics make them prone to having these sorts of memories more ready at hand. Research proposed that the use of adjectives is also influenced by the vividness of a memory. Negative memories are remembered more vividly and this leads to respondents being able to describe what happened in more detail. On the basis of these findings the following research question was formulated: *What is the relation between neuroticism, the use adjective, negative emotion words and vividness during the retrieval of sad memories?*

## **Relation between neuroticism and adjective use**

In the present study the relation between neuroticism and the amount of adjectives used was analyzed, but the expected relation could not be found. The present study found no support for the hypothesis that neuroticism has a significant positive relation with the amount of adjectives used when talking about a sad personal memory. The hypothesis that was enunciated by Yarkoni (2010) that neuroticism is correlated with a higher degree of adjective use due to the fact that they describe events more negatively than other people who score high on other personality traits can be rejected. One explanation for this could be that there is only a moderate agreement between the two raters which counted the adjectives in the transcribed texts. This might have led to the poor correlation in the present study. In addition Yarkoni (2010) used a much bigger sample size. He analyzed 694 blogs compared to 35 respondents in the present study. Since the sample also consists of online blogs that are analyzed on their word use and does not consist of specific narratives about sad memories this has to be stated as an important difference between Yarkoni's sample and the sample used in the present study. Blogs can be about everything. People talk about things they are interested in but not necessarily about emotional events they had to live through in the past. Yarkoni's (2010) hypothesis was also based on data obtained through analyzing written texts. In the present study however the respondents had to tell their sad memories orally. This could have led to a difference in word use pattern, because the respondents had different amounts of time to think about how to phrase what they wanted to say. Another reason why this correlation was not found might be that the hypothesis put up by Yarkoni (2010) was very experimental and was not researched before, as far as could be seen while studying the previous research literature.

The present study did find a difference between the percentage of adjectives used in the first and second sad memory. However the hypothesis that the respondents will use more adjectives in the first than in the second memory cannot be confirmed. This was hypothesized because it was assumed that the first memory will be a sadder, more important and also more vivid memory than the second memory. When looking at the sample in more detail it can be seen that this is indeed the case. The first memory is reported to be a sadder, more important and more vivid memory than the second one, but the adjective use is higher in the second memory. Kensinger et al. (2007) found that the valence of a memory determines in how much detail a specific memory is being remembered. They argued that more emotional memories are more detailed because of visual enhancement in that specific moment. The present study can give no proof for this hypothesis. As a matter of fact the present study found the exact opposite. Sadder and more important memories are described with fewer adjectives. An explanation could be that



the respondents had to get used to their task of describing a specific memory as detailed as possible. Being asked to stand in front of a camera and to talk about emotional experiences can require some time to accommodate to that task and getting comfortable with it. It might be that this is the reason why the respondents used more adjectives in the second memory. For a more detailed description of the relation between vividness and percentage of adjectives used please take a look at the following paragraph.

The difference between the percentage of adjectives used in the first and second memory cannot be explained through the personality trait neuroticism. This means that respondents scoring higher on neuroticism have no bigger difference between the percentages of adjectives used than respondents scoring lower on the neuroticism scale. It can be concluded that there has to be another reason for the difference in adjective use, possible explanations for the difference in adjective use are described above.

### **Relation between vividness and adjective use**

The relation between the vividness of the sad memories and the amount of the total percentage adjectives used to describe them was analyzed, but the expected relation could not be found. When the two memories were analyzed on their own on how the reported vividness of each memory correlates with the percentage of adjectives used in that memory, it could be seen that the correlations still were not confirming the hypothesis. There does not seem to be a strong relation between these two variables, which would mean that independent of how present the sad memory is for the respondent, he/she uses the same amount of adjectives to describe it. The opposite was expected, because it was assumed that with the degree of vividness being higher, the respondents could more easily put themselves back into the situation they found themselves in at that time and feel the same emotions they felt back then. This was inferred from Frijda (1986) who described emotions as an “action readiness” which leads to interpreting situations according to the felt emotion. If the mean scores on both variables of the two memories in the present study are compared it can be seen that in those memories that were reported to be more vivid, less adjectives were used. The opposite can be observed in less vivid memories. Here the respondents used more adjectives. It was also found by Kensinger et al. (2007) that negative memories are described in more detail, because of enhanced visual processing. The findings of the present study contradict this. More vivid memories are apparently not described by means of more adjectives. Since the relation *between* the variables vividness and adjective use was not researched before the present findings cannot be compared to previous findings and also cannot be explained by analyzing the differences between different studies. Ultimately, the present study can give no

proof for the hypothesis that was set up and due to the lack of previous research the only conclusion that can be made is that the hypothesized relation was not found.

### **Relation between neuroticism and vividness**

The expected positive relation between neuroticism and vividness of sad memories could not be found. The present study cannot give proof for the hypothesis that the degree of neuroticism correlates with how vivid a negative memory is. This hypothesis was constructed, because it was expected that neuroticism has a connection with how good sad memories are held in memory. Wilson and Ross (2003) found that there are differences in the tendency to identify with undesirable experiences. They found that this has to do with the personality of the respondent. Respondents with a high self-esteem are more likely to self-enhance their image of the self by not identifying with negative experiences in the past (Ross & Wilson, 2002). These people then feel further away from these failures or other sorts of negative feelings they experienced. It was found in previous literature that self-esteem is strongly correlated with neuroticism (Judge et al., 2002) and because of this the findings from Ross and Wilson (2002) were expanded to neuroticism as well. In addition to this neuroticism is widely characterized as a trait that describes the tendency of people to worry a lot (Thompson, 2008; Matthews et al., 2003) and to label information and experiences negatively (Buss et al., 1987). The fact that neuroticism has a strong correlation with depression (Boyle et al., 2010; Saklofske et al., 1995) makes it even more possible that people scoring high on neuroticism might have negatively labeled memories more vividly at hand than people scoring lower on neuroticism. Unfortunately, the relation between neuroticism and vividness of sad memories was not researched before and because of this the present findings cannot be compared to other previous found results. On the basis of the results of the present study it can be said that higher neuroticism scores seemingly have no relation with how vivid somebody's sad memories are.

The present study did find a difference between the vividness of the first and second sad memory. The first memory is reported to be more vivid than the second memory. When taking other variables like the importance or sadness of a memory into account, it can be seen that the more vivid memory is also reported to be sadder than the less vivid one. The respondents do not seem to make use of the hypothesized self-enhancement that was expected by Ross and Wilson (2002), which would assume that the sadder memory is reported to be less vivid, because the respondents try not to identify themselves with the sad event. In the present study the respondents do seem to have vivid sad memories. The following step was to analyze if neuroticism has a relation with the difference between reported vividness. This does not seem to be the case. The

personality trait neuroticism does not seem to have a relation with how different two sad memories are reported to be in their vividness. Since this kind of relation has not been studied before the present findings cannot be compared to previous studies, but it can be assumed that there needs to be another reason for why the vividness differs. This reason could be that the respondents' first memory is the memory that is more vivid, because it came to their mind faster than the second one. That is why the second memory is reported to be less vivid.

### **Relation between neuroticism and negative emotion words use**

In the present study the relationship between neuroticism and the percentage of negative emotion words was analyzed as well, but the present study was not able to replicate previous findings that neuroticism does positively correlate with the use of negative emotion words (e.g., Hirsh & Peterson, 2009, Pennebaker et al., 2003). This analysis was conducted, because the present study was interested in studying the relationship between neuroticism and adjective use which was hypothesized to be correlated by Yarkoni (2010) on the basis that he also found a correlation between neuroticism and negative emotion words. In his analysis Yarkoni examined this correlation in more detail and hypothesized that the use of more negative emotion words in people who score higher on neuroticism was due to the fact that those people use more adjectives to describe events (Yarkoni, 2010). Because the correlation between neuroticism and negative emotion words was not found in the present study this could also be a reason why there was not found to be a relationship between neuroticism and the percentage of adjectives used. It might be that if the one correlation does not exist than the other correlation cannot exist either. The negative emotional words were counted with the LIWC, which makes it unlikely that the same bias that might be responsible for not finding a relation between neuroticism and adjective use (low interrater reliability) is responsible for this insignificant finding. The studies who did find a correlation between neuroticism and negative emotion words use all made use of written memory accounts, instead of verbally described memories like in the present study. This might be a reason as to why the results are different in the present study.

On the basis of the subquestions and the hypothesis the research question can be answered as follows: Due to the fact that the subquestions did not constitute significant results and the hypotheses were rejected, it has to be assumed that there is no relation between neuroticism and the percentage of adjectives, negative emotion words used and the vividness of sad memories.

## **Strengths, limitations and recommendations for future studies**

The present study has several strengths. The first strength is that the method used by the present study is a rather new and rarely used approach to studying memories of respondents. Most of the time memories are researched by letting the respondents write about their memories. In the present study however the respondents were asked to talk about their specific memories while standing in front of a camera and being recorded with a voice recorder. This is a strength because the word use is more natural and intuitional when talking about memories than when you write it down. While writing the respondent has the time to think about what he/she is going to write and which words he/she wants to use to describe a certain situation and this might influence the words chosen. A second strength is that the sample has a good variation. The sample of the present study has respondents between 18 and 39 of age. Furthermore there are also approximately the same number of men and women in the present study. Other than what was expected the respondents of the study were not only psychology students, but there were also 60% respondents from other branches of study. The third strength of the present study is that the combination of the four research variables is not yet researched on a great scale. The use of adjectives and how it is correlated to neuroticism has been researched before, but the correlation between adjectives and the vividness of the memory has not yet been the focus of a lot of research. By analyzing four different variables with each other the present study also is broader than earlier research which only correlated personality to word use. The fourth strength of the present study is that we incorporated an opportunity to practice the procedure of thinking about a certain memory, talking about it and afterwards judging it based on certain questions. The respondents often had a lot of trouble with the two practice exercises. Quite a few questions were asked to the researchers on what they exactly were supposed to do and if what they told was long enough. After the two practice opportunities most of the respondents could carry on without having any more questions.

Besides strengths there are also limitations of the present study. These limitations can be responsible for the fact that the present study was not able to find significant results and why the results were different from what was expected based on previous research literature. Based on these limitations several recommendations can be given for future studies. The first limitation is that the respondents probably were influenced by the camera. The respondents were filmed due to the fact that the present study was a part of a bigger research study. It can be expected that the respondents felt uncomfortable standing in front of a camera and knowing that they are being recorded. This makes it less likely that they openly express their feelings, because they feel like they are being watched and this might lead to less emotions being displayed in the present study. The camera can also be the reason for socially desirable answers which would have a strong

impact on how true the told memories or how real the way the memory is told is. In the present study the camera was not necessary at all, so future studies trying to research the same variables can leave the camera out.

The second limitation is that the researchers of the present study were all German, but the respondents were Dutch and therefore also spoke Dutch. When the researchers transcribed the spoken memories into a text file this might have led to bias, because the researchers were not able to understand certain words that native Dutch speakers would have easily understood. The same limitation also influences the counting of the adjectives in the present study. It was sometimes difficult to determine if a word was an adjective in this context or not. It is assumed that native Dutch speakers would not have this problem as foreign people. The recommendation for future studies that arises from this is that the researchers and the respondents should be of the same nationality. If the researcher and the respondents have the same nationality bias that occurred due to the researcher not being able to understand words properly can be eliminated.

A third limitation is the fact that the decision of deciding which words to code as adjectives was experienced as very hard by the two raters. According to the LCM also nouns that give a qualification of a situation or a person have to be coded as adjectives. This is pretty unusual and therefore the raters rate themselves as especially prone to mistakes in that word category. Future studies should try and make the counting of the adjectives more reliable by constructing a more detailed model on which words to count as adjectives. They could also make use of another coding schema that either does not count nouns that qualify other people etc. as adjectives or they could split these categories into two so that the two categories can then be compared to each other to see if there is a difference between them and so that the counting of nouns as adjectives does not affect the counting of the common adjectives.

Furthermore the fourth limitation is that there are some missing values. Some respondents did not fill in the questionnaires like they were supposed to or did not describe a memory. Because of the missing data the words the respondents might have used are missing in the dataset, which could have been important for the present study. A recommendation for future studies to prevent missing values is to make the instructions of the questionnaire as clear as possible. It should be stated at each step what the respondents have to do and that, as long as they want to continue to participate, they should try and give an answer even though they might have the feeling that their answer is not good enough. By doing this missing values like in the present study might be overcome.

That 40% of the respondents were psychology students is the fifth limitation. Psychology students might be familiar to the NEO-FFI and know which item measures which personality trait. They might try to be judged by others in a positive light and therefore give socially desirable answers. This social desirability might bias the data of the present study. The reason for the fact that so many respondents are psychology students arises from the following sixth limitation, namely that the sample was collected by the researchers themselves at the University of Twente and therefore a lot of psychology students agreed to take part in this study and the collecting of respondents was not random. Future research should be trying to randomly select respondents to study and to make sure that the sample is evenly spread over age, social economic status etc. to make sure to get a representative sample. This would also prevent social desirability arisen by reason of a big amount of the sample being too familiar with the measurements. A representative sample is important to being able to generalize the results to the whole population.

The last limitation of the present study is that it did not make use of a control group. Comparing the use of adjectives or the reported vividness from sad memories with neutral memories would have analyzed in a more reliable manner if there is a difference between the use of e.g. adjectives in the two different sort of memories. This would really test whether the word use changes when talking about emotional memories. Due to the already rather big scope of the present study this was not done. Future studies however should try and make use of a control group.

### **Implications for the practice**

The present study has some implications for the practice e.g. in the field of therapy. Based on the fact that the expected relation between neuroticism and the use of adjectives was not found, it can be supposed that concentrating on adjective use in therapy does not give valuable information about clients. The same needs to be said about the other relations. It does not seem useful to pay attention to the vividness of a memory when trying to gain information about the personality of a client. The adjective use also does not seem to reveal information to the therapist about how vivid a given memory is for the client. Overall it also became clear that the personality trait neuroticism does not seem to have an effect on possible variation in the use of adjectives or vividness from one memory to the other.

However, since there were some methodological limitations to the present study and since the hypothesized relations were rather experimental it also needs to be pointed out that more research is needed to be able to give reliable advice for the practice based on this sort of research. Replication of the present study should not be totally discarded. It is necessary that the relations

studied in the present study are analyzed in a more reliable manner to see if the same results are obtained. When doing this the recommendations given above should be taken into consideration. During the present study it was noticed that it would also be interesting to relate adjective use to the other Big Five personality traits, because the use of adjectives to verbally express emotion is such a new focus that those relations have not been studied before, either.

Another area that stood out due to lack of research concerning this particular relation was the relation between vividness of memory and the words used to talk about this memory. As far as the present study was able to see the context in which this relation has been studied before was always very different from the context in the present study. In contrast to sad personal memories researched in the present study the focus of earlier studies was on memories of frightening objects. It was studied in how much detail the objects could be described and it was found that more frightening objects were more vivid and described in more detail (Kensinger et al., 2007). To be of more use for the therapeutic practice future studies should study this relation in the context of personal memories of the respondents.

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## Appendices

### Appendix A: Informed Consent

#### GEÏNFORMEERDE TOESTEMMING

##### Het ophalen van herinneringen

Ik, ..... (naam proefpersoon)

Stem toe mee te doen aan een onderzoek dat uitgevoerd wordt door

Jasmin Plesse, Nikka Golena, Ylva Gerke, Lisa Stahlkopf, Sarah Kettendörfer en Sarah Kurney

Ik ben me ervan bewust dat deelname aan dit onderzoek geheel vrijwillig is. Ik kan mijn medewerking op elk tijdstip stopzetten en de gegevens verkregen uit dit onderzoek terugkrijgen, laten verwijderen uit de database, of laten vernietigen.

*De volgende punten zijn aan mij uitgelegd:*

1. Het doel van dit onderzoek is inzicht te verkrijgen in hoeverre herinneringen opgehaald worden.
2. Het onderzoek duurt ongeveer 60 minuten.
3. Aan het begin wordt een vragenlijst over de demografische gegevens afgenomen. Daarna zal aan mij gevraagd worden een blijde, een verdrietige/boos en een neutrale herinneringen op te halen en te vertellen. Daarnaast worden drie vragenlijsten afgenomen die telkens persoonlijkheid (NEO-FFI), alexithymie (TAS) en het omgaan met herinneringen (RFS) meten.
4. Je mag altijd stoppen als je niet op je gemak voelt of een vraag niet wilt beantwoorden.
5. Er behoort geen stress of ongemak voort te vloeien uit deelname aan dit onderzoek.
6. De gegevens verkregen uit dit onderzoek zullen anoniem verwerkt worden en kunnen daarom niet bekend gemaakt worden op een individueel identificeerbare manier.
7. De onderzoeker zal alle verdere vragen over dit onderzoek beantwoorden, nu of gedurende het verdere verloop van het onderzoek.

Handtekening onderzoeker: .....  
.....

Datum:

Handtekening proefpersoon: .....  
.....

Datum:

## Appendix B: Questionnaire

The first part of the questionnaire:

### - Oefening 1: heel kalm -

Het eerste woord is om te oefenen. Het woord is: 'heel kalm'. Denk hier aan een situatie waar u bijvoorbeeld heel ontspannen was.

Neem eerst even de tijd om u in te leven. Als u een concrete en specifieke herinneringen heeft opgehaalt, beschrijf dan zo concreet mogelijk wat er gebeurde. Voordat u begint om uw herinneringen te beschrijven, neem plaats op het kruisje op de grond met u gezicht in de richting van de camera. Praat hardop en duidelijk in de camera. Ga daarna door naar de volgende stap.

Denk aan vragen als: (ook dit gedeelte werd bij elk vraag getoond in de originele vragenlijst, maar omdat het anders niet overzichtelijk is in dit document wordt het alleen maar hier getoont.)

- Waar was u?
- Hoe zag de omgeving eruit?
- Wat deed u?
- Wat dacht u?
- Wat voelde u?
- Wat had u aan?
- Wie was erbij?
- Wat werd er gezegd?

### Beoordeling van de herinnering

Welke titel zou u deze herinnering geven?

Hoe lang geleden vond deze herinnering plaats (in aantal jaren)? Mocht de herinnering korter plaats gevonden hebben dan een jaar, dan vult u 0 in.

Wij zouden u nu willen vragen om de herinneringen te beoordelen.

Bij de volgende vragen kunt u aangeven in welke mate de vragen van toepassing zijn op een schaal van 1 tot 6. 1 betekent helemaal niet en 6 betekent helemaal wel.

(de volgende schaal wordt in dit document niet in elk beoordeling opnieuw weergegeven, dat is in de eigenlijke vragenlijst natuurlijk anders):

	1	2	3	4	5	6
Hoe levendig is deze herinnering tegenwoordig voor u?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hoe belangrijk is deze herinnering tegenwoordig voor u?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hoe blij voelt u zich tegenwoordig over deze herinnering?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hoe verdrietig voelt u zich tegenwoordig over deze herinnering?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hoe boos voelt u zich tegenwoordig over deze herinnering?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hoe kalm voelt u zich tegenwoordig over deze herinnering?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**- Oefening 2: heel kalm -**

Kunt u nog een tweede herinnering vertellen over heel kalm? Neem weer plaats op het kruisje op de grond en praat duidelijk en hardop in de richting van de camera.

**Beoordeling van de herinnering**

Welke titel zou u deze herinnering geven?

Hoe lang geleden vond deze herinnering plaats (in aantal jaren)? Mocht de herinnering korter plaats gevonden hebben dan een jaar, dan vult u 0 in.

Ik zou u nu willen vragen om de herinneringen te beoordelen.

Bij de volgende vragen kunt u aangeven in welke mate de vragen van toepassing zijn op een schaal van 1 tot 6. 1 betekent helemaal niet en 6 betekent helemaal wel.

SCHAAL

**- Neutrale beschrijving –**

We doen nog een kleine tussenoefening voordat we echt beginnen.

Beschrijf nu zo gedetailleerd mogelijk hoe u hier naartoe gekomen bent.



**- Heel verdrietig 1 -**

Kunt u hier een specifieke herinnering bij oproepen die ouder is dan een jaar?

Neem eerst even tijd om u in te leven. Voordat u begint om uw herinneringen te beschrijven, stel u op het kruis in de richting van de camera. Als u een concrete en specifieke herinneringen heeft opgehaald, beschrijf dan zo concreet mogelijk wat er gebeurde. Praat hardop en duidelijk in de camera. Ga daarna door tot de volgende stap.

**Beoordeling van de herinnering**

Welke titel zou u deze herinnering geven?

Hoe lang geleden vond deze herinnering plaats (in aantal jaren)? Mocht de herinnering korter plaats gevonden hebben dan een jaar, dan vult u 0 in.

Ik zou u nu willen vragen om de herinneringen te beoordelen.

Bij de volgende vragen kunt u aangeven in welke mate de vragen van toepassing zijn op een schaal van 1 tot 6. 1 betekent helemaal niet en 6 betekent helemaal wel.

SCHAAL

**- Heel verdrietig 2-**

Heeft u nog een tweede herinnering over heel verdrietig die ouder is dan een jaar?Neem eerst weer even tijd om u in te leven en beschrijf dan zo concreet mogelijk wat er gebeurde.



**Beoordeling van de herinnering**

Welke titel zou u deze herinnering geven?

Hoe lang geleden vond deze herinnering plaats (in aantal jaren)? Mocht de herinnering korter plaats gevonden hebben dan een jaar, dan vult u 0 in.

Ik zou u nu willen vragen om de herinneringen te beoordelen.

Bij de volgende vragen kun aangeven in welke mate de vragen van toepassing zijn op een schaal van 1 tot 6. 1 beteket helemaal niet en 6 beteket helemaal wel.

SCHAAL

**- Neutrale beschrijving -**

We doen weer een kleine tussoefening voordat we naar het volgende woord gaan.

Zou u me gedetailleerd kunnen beschrijven hoe uw keuken eruit ziet?

**- Heel boos 1-**

Kunt u hier een specifieke herinnering bij oproepen die ouder is dan een jaar?

Neem eerst even tijd om u in te leven.

Kunt u de herinnering zo gedetailleerd mogelijk vertellen?

**Beoordeling van de herinnering**

Welke titel zou u deze herinnering geven?

Hoe lang geleden vond deze herinnering plaats (in aantal jaren)? Mocht de herinnering korter plaats gevonden hebben dan een jaar, dan vult u 0 in.

Ik zou u nu willen vragen om de herinneringen te beoordelen.

Bij de volgende vragen kun aangeven in welke mate de vragen van toepassing zijn op een schaal van 1 tot 6. 1 betekent helemaal niet en 6 betekent helemaal wel.

**SCHAAL**

**- Heel boos 2 -**

Heeft u nog een tweede herinnering over heel boos?

Neem eerst weer even tijd om u in te leven en beschrijf dan zo concreet mogelijk wat er gebeurde.

**Beoordeling van de herinnering**

Welke titel zou u deze herinnering geven?

Hoe lang geleden vond deze herinnering plaats (in aantal jaren)? Mocht de herinnering korter plaats gevonden hebben dan een jaar, dan vult u 0 in.

Ik zou u nu willen vragen om de herinneringen te beoordelen.

Bij de volgende vragen kun aangeven in welke mate de vragen van toepassing zijn op een schaal van 1 tot 6. 1 betekent helemaal niet en 6 betekent helemaal wel.

**SCHAAL**

**- Neutrale beschrijving -**

We doen weer een kleine tussenoefening voordat we naar het volgende woord gaan.

Zou u me gedetailleerd kunnen beschrijven hoe uw (woon)kamer eruit ziet?

**- Heel blij 1 -**

Het derde woord is heel blij.

Kunt u hier een specifieke herinnering bij oproepen die ouder is dan een jaar?

Neem eerst even tijd om u in te leven.

Kunt u de herinnering zo gedetailleerd mogelijk vertellen?

**Beoordeling van de herinnering**

Welke titel zou u deze herinnering geven?

Hoe lang geleden vond deze herinnering plaats (in aantal jaren)? Mocht de herinnering korter plaats gevonden hebben dan een jaar, dan vult u 0 in.

Ik zou u nu willen vragen om de herinneringen te beoordelen.

Bij de volgende vragen kun aangeven in welke mate de vragen van toepassing zijn op een schaal van 1 tot 6. 1 betekent helemaal niet en 6 betekent helemaal wel.

SCHAAL

**- Heel blij 2-**

Heeft u nog een tweede herinnering over heel blij?

Neem eerst weer even tijd om u in te leven en beschrijf dan zo concreet mogelijk wat er gebeurde.

**Beoordeling van de herinnering**

Welke titel zou u deze herinnering geven?

Hoe lang geleden vond deze herinnering plaats (in aantal jaren)? Mocht de herinnering korter plaats gevonden hebben dan een jaar, dan vult u 0 in.

Ik zou u nu willen vragen om de herinneringen te beoordelen.



Bij de volgende vragen kun aangeven in welke mate de vragen van toepassing zijn op een schaal van 1 tot 6. 1 betekent helemaal niet en 6 betekent helemaal wel.

SCHAAL

**EIND EERSTE GEDEELTE**

U bent nu klaar met het eerste gedeelte van het onderzoek. De onderzoekers zullen u nu naar een andere kamer begeleiden waar u alstublieft nog een vragenlijst mag invullen.