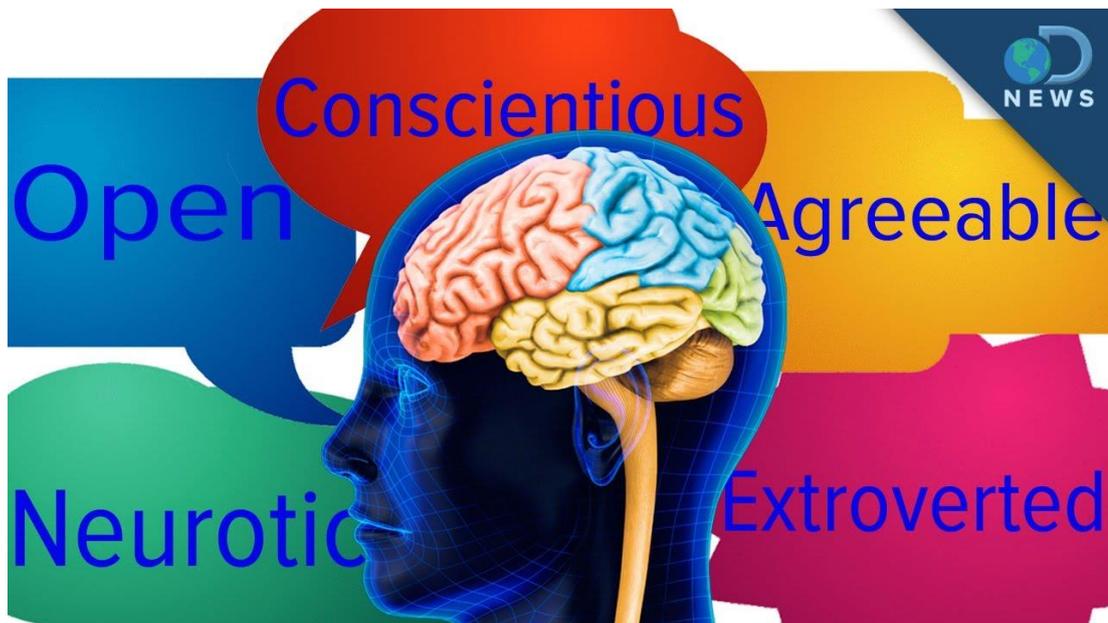**The Big Five Personality traits and their flexibility across situations**

Thorey Kristin Thorisdottir, 20116105

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Abstract

In this final thesis an interest was in researching the Big Five personality trait neuroticism and its flexibility. A theoretical framework laid the groundwork for the research question and hypotheses with a special focus on the trait neuroticism following priming. The core of the research question was if neurotic individuals could be influenced by systematic priming so that their self-perception (degree of neuroticism) would change. Moreover, if there is certain flexibility within the neuroticism spectrum. A quasi-experiment and a within subject design was used to answer the research question and test the hypotheses. The systematic priming contained questions concerning depression, anxiety & stress (DASS21). What followed these questions were questions concerning Self-Esteem, Self-Control and Self-Compassion.

The results yielded support for the research question but were quite unexpected. Neurotic individuals became a little less neurotic between measurements and those low on neuroticism became a little more neurotic between measurements. How individuals scored on DASS21 seems to influence the change that occurred among the participants. DASS21 had a weak but significant and positive correlation with the change. In addition, the scoring on the Self-Esteem scale also influenced the change. Self-Esteem had a negative correlation with the change.

Results suggest that there is certain elasticity among the personality trait neuroticism in that specific situation, i.e. in the framework of this research. One third of the participants experienced a change in that they either scored higher on neuroticism or lower on neuroticism after the systematic priming.

Content

1. Introduction

It is becoming necessary for psychologists and other health care employees to become aware of individual differences, in my opinion. Due to these differences it can be simplistic to think that one treatment works for everyone. Nettle (2007) compares personality traits to height and weight in a way that we all have height and weight but we differ in the magnitude of it. It might therefore be said that one size does *not* fit all. Mindfulness techniques can be taken as an example. They have many positive effects on well-being and have been growing in popularity as an applied method to reduce stress, anxiety or depression. However, when individual differences are taken into account, some might find it harder than others to experience the full benefits of mindfulness. The personality traits respond differently to the mindfulness techniques. Giluk (2009, p. 806) explains that due to the active nature of the extraverts and the need for stimulants and excitement it might be more demanding for them to raise awareness in routine oriented and dull tasks. This is in contrast to individuals who are more open to experience, as an example. Individuals open to experience are thought to be curious and attentive to the inner world. However, neurotics are thought to be very self-conscious, anxious and risk aversive and therefore, being mindful in stressful situations could have the opposite effect and make them even more stressful (ibid). Practicing mindfulness meditation techniques could therefore be more challenging for the anxious personality than others, such as neurotics. Inappropriate treatments underperform when trying to increase the mental well-being of patients or individuals in general. By ensuring that treatments take into account these individual differences, such as those that the Big Five model describes, better treatments can be applied and developed. Developing a deeper understanding of the Big Five personality traits, especially neuroticism due to its vulnerability to stress, anxiety and depression, can hopefully help and inspire health care employees towards more effective preventions and treatments. Additionally, do Costa & McCrae (1992, p. 6:8) talk about neurotics being more susceptible to treatment completion but often lack social support which is an important factor when individuals experience stress, for example.

Extraverts on the other hand, who are more sociable and talkative by nature, would find therapies that are on a more interpersonal level to be more beneficial than others. Miller (1991, p. 2:9) claims that the understanding he has gained about personalities has made him a better clinical psychologist since he is aware of these individual characteristics. He further empathized that patients high on extraversion seem more emotionally stable than individuals low on extraversion despite suffering from the same problems. The talkative nature of the extraverts and their positive affect[1] (or positive emotions) can deceive the therapist to see them as healthier than they really are. This can be problematic for therapist if they are unaware of this. Therefore, theoretical relevance is the aim of this thesis as well as to increase further knowledge of the Big Five personality which can hopefully be used to increase mental and physical well-being.

The reward system of extroverts is thought to be more responsive than among introverts. This could explain why these two personality traits dimensions are so different and act differently in similar situations. Individuals can however adjust to different situations and Dr. Brian Little's theory about "free traits" attempts to explain how. It describes how individuals can make temporary use of other personality traits for their own advantage by stepping out of their main trait for a short time. For example, an introvert could act as a pseudo extrovert while trying to achieve a particular goal. Other studies have also shown certain trends when it comes to changes in our personalities during the course of a lifetime. However, the results are quite conflicting on whether or not personality traits are stable throughout the lifetime, and if they are affected by such aspects as situations, internal motives and age.

John Doris (2002) in his book Lack of Character talks about the weak prediction personality traits can have on moral behavior and how situations can facilitate certain behaviors beyond the personality traits.

Moreover, personality traits can decrease, increase or change when faced with some long term challenges. According to Baldursson (2009, p. 28) numerous stress coaches have made the mistake of ignoring the fact that stress can modify people´s

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[1] Positive affect within extroverts is characterized by feelings of being, enthusiastic, active, excited, strong, self-assured, and optimistic according to Depue & Fu Yu (2013, p. 1).

personality, at least temporarily. Stress can affect memory and energy levels as well as increase the vulnerability to develop depression and anxiety if long-term. If individuals experience some form of mental illness, features of their main personality traits tends to get lower in magnitude, except for neuroticism. Neurotics that experience stress or anxiety have the tendency to become even more anxious or neurotic.

According to Grushka, Sessle & Miller (1987, p. 156) studies on pain have found that individuals suffering from chronic pain have the tendency to experience more emotional disturbances. Psychological distress among chronic pain patients occurred as a consequence of the pain, but not as the cause. A study by Sternback & Timmermans (1975, p. 177:181) further showed that patients that had been suffering from long term pain had lower neuroticism scores after pain relief surgery. This suggests that neurotic features tend to accompany chronic pain among numerous individuals.

Earlier theories and researches have suggested that the Big Five personality traits can be rather flexible across situations with neuroticism being more easily influenced than the other traits, especially when confronted with negative stimuli. This suggests some kind of elasticity in the neuroticism spectrum, where neuroticism can be affected both unintentionally and intentionally. The research question was based on such a premise. Hence a series of questions on stress, depression and anxiety were exposed to participants. Questions that followed had the focus to further enhance self-awareness with the aim of trying to influence the participants in a way that they became more self-conscious.

The analysis part relies on data that was collected as a part of a research conducted within Center for Everyday Psychology, Aalborg University. The research behind this thesis is centered on the Big Five personality categorization. Throughout the psychology study my interest for the Big Five model has grown and has therefore become my main research topic during my 4th, 9th and 10th semester.

1.1. Research question

Can neurotic individuals be influenced by systematic priming[2] so that their self-perception (degree of neuroticism) changes as well?

Is there certain flexibility within the neuroticism spectrum?

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[2] Priming is an activation of schemas or categories in our memory that can later influence our behavior unconsciously according to Hogg & Vaughan (2008, p. 644).

2. The history of earlier personality traits theories and the Big Five model

According to Nettle (2006, p. 479) individual differences have been of interest within the psychology field for over 100 years or more. Several theories have been proposed to explain human behavior and the contributions from personality researchers are no exception. Sir Francis Galton was one of the first to develop measurements on a scientific level for human behavior and found the evolution of mental traits very interesting (Nettle, 2007, p. 17: Leahey, 2004, p. 212). He further discovered that some of the human natural abilities were caused by heritance according to Leahey (2004, p. 212). However, the organization of the language of personality didn't systematically start until after McDougall´s suggestions although such work had been linked to psychologists Klages (1926) and Baumgarten (1933), both of who originated from Germany. Klages suggested that a careful analysis of language would assist in the understanding of personality, and this stimulated Baumgarten to examine personality terms commonly found in the German language Even though Baumgarten´s work didn't receive much support within German psychology it did catch Allport & Odbert´s attention in 1936. They´re work later influenced Cattell´s research in 1943 (Digman, 1990, p. 418-419).

Earlier theories on personality traits will be presented in the following chapter which then led to the development of the Big Five personality model. The Big Five personality model is thereafter briefly discussed.

2.1. Earlier personality trait theories

According to Revelle (2014) & Uher (2013, p. 4), Galton was one of the most significant psychologists of the 19th century due to his research on individual differences. Galton´s ideas about personality were quite different than those of other researchers. Galton (1884, p. 376) did not think of individuals or personality as something that is supernatural but rather something that has already existed and previous conditions were a result of that. Individuality is not something he wanted to use in line with personality since it is not as independent as we are led to believe by our self-consciousness. Individuals are something that has not been fully detached

from the parent source and is shaped by conditions. Still there is something that separates humans and points to a long term variability among individuals. Galton suggests that the cells of individuals are what contributes to the higher order of personality and its manifestation (ibid).

One of Galton's biggest contributions to the field of psychology was the lexical hypothesis that derived from personality traits by language sampling. He relied on a dictionary by counting words that expressed a number of character aspects. Roget´s Thesaurus, an English language thesaurus, was what he chose for that purpose. He studied the index and pages of it and found 1000 descriptive words of character (Galton, 1884, p. 181: John, Angleitner & Ostendorf, 1988, p. 176).

His idea was that differences in personalities are predetermined in the language of the culture. Hence individuals within the culture, used the language to describe individual's differences that were perceived salient, relevant and social in their everyday lives. The larger the individual difference was, the more likely it was that it would be encoded in one word. Patterns that were recurrent were especially important because those could predict future events when there was uncertainty. Hence these individuals would identify these recurrent patterns through their experience with the personal world. Galton was among the first to propose that different personality traits might be traced to different levels of emotional reactivity. However, it was a very modern idea at that time and faced some technical limitations, according to Nettle (2007, p. 17-19).

The reduction of the pertinent lexical repertoires down to five main dimensions received a major support in the Western scientific communities. However, despite the high importance it had, in addition to being the most widely used model within the theoretical framework of personality psychology, it was never tested (Uher, 2013, p. 2-4). According to John, Angleitner & Ostendorf (1988, p. 176) the limitations and criticism that Galton´s work received was that it was unsystematic and therefore had little influence on the field. Klages (1926) later pronounced the theoretical justification of the lexical approach and claimed that in order to understand personality it was important to study the language.

Hence Baumgarten (1933) was inspired by Klages ideas to study personality terms found in the German language and acted in response to this with a systematic study (ibid: Digman, 1990, p. 418).

Baumgarten studied Klages work and assembled 4.000 descriptive terms from the numerous dictionaries and characterologist from the German publications, and eventually his list came down to 941 trait-descriptive adjectives. Additionally, it was Baumgarten's work that later inspired Allport´s and Odbert´s empirical work on the research towards trait taxonomic (John, Angleitner & Ostendorf, 1988, p. 176).

Allport & Odbert continued Galton´s work, which contained psychophysical systems that were adaptively of the environment by defining the personality as *"the dynamic organization within the individual of those psychophysical systems that determine his unique adjustments to his environment"* (Uher, 2013, p. 5).

Allport (1937) found personality to be a difficult word in our language to conceptualize and later listed a set of 50 different meanings of it that derived from the law, theology, philosophy, sociology and psychology. Even though personality theories could not agree on what personality entailed at that time there was a common understanding that behavior was largely influenced by stable characteristics such as personality according to Mount, Barrick, Scullen & Rounds (2005, p. 448).

Raymond Cattell relied heavily on previous work on personality traits, especially the lexical approach which marked the beginning of his systematic work on personality from the years 1943-1948. His system was established by ratings of college students and peers by using factor analytical studies which narrowed it down to 16 personality model factors and 8 second order factors. The method was very complex and daunting at that time. Cattell referred to the aspect of personality as extraversion, character integration, general emotionality and neurotic syndromes that were found in clinical observation but in the unfamiliar universe they floated freely. He made sure that all aspects of personality, such as introversion and extraversion, would be on the starting list since that was very important in his opinion (Cattell, 1943, p. 482: Block, 1995, p. 192).

After two to three months of classification, a very similar synonym list was being established with regard to categories and disposal of particular words. Judges and psychologists gathered to discuss it, hence a single list of categories emerged which everyone could agree on. It became obvious that categories that were synonym varied in constituent terms. An example of synonyms clustering was the word "talkative" which was numbered 48. Those words that were in the category of

"frank" were numbered 24 and words under the word "clever" were numbered 6 and etc. (Cattell, 1943, p. 482).

The end result of the synonym grouping was to narrow the original 4000 terms into 160 odd categories, where in each category only a few representative synonyms were included. Finally, the list of personality traits had been narrowed down to 171 items. However, since the list was way too long, the terms were clustered through correlational analysis, producing around 60 clusters. To be able to shorten the list even more a correlational method was used based on the ratings from 100 adults. The ratings involved a judgement if the trait was above or below average and how it was best described. These ratings were further factor analyzed and the conclusion was that the underlying personality was primary of 12 factors (Cattell, 1943, p. 491:496, Block, 1995, p. 192).

Cattell further assumed that there were three major data sources in researches on the personality traits: L-Data which applied to life records and involved ratings from peers, Q-Data which is based on self-ratings questionnaire which allowed the participants to evaluate their own behavior, and finally a category he called T-Data where participants were not aware that their personality traits were being measured. See appendix 1 for a further description of the Cattell´s personality traits (Fehriinger, 2004: Digman, 1990, p, 419).

Hans Eysenck came shortly after Cattell and his contribution was to propose that personality theories were genetic, environmental and emerged from biological systems. He perceived personality as a sum total of behavior patterns that were actual or potential of the organism, largely determined by the heredity and environment factors. These factors were developed through functional interaction of four things; the intelligence, character, temperament and the constitution according to Nettle (2007, p. 29-30). The method that Eysenck used comprised of statistical techniques in the form of factor analysis. He used a large dataset and extracted a number of dimensions from it. From people´s rating, inventories and questionnaires he narrowed the dataset down to three major dimensions, never five. There were no factors that corresponded to the Big Five traits agreeableness, conscientiousness or openness to experience. However, the factors that related to the other remaining dimensions of the Big Five model were sociability, emotions and impulsive and un-

socialized or sensations seeking, according to Eysenck (1992, p. 669) & Boeree (2006, p. 5).

Even though Cattel´s framework of personality traits was a great contribution to the field of psychology it received a lot of criticism, the biggest one being that it was never replicated at the time. It has to be taken into consideration that perhaps it could be due to limited technology at that time. His factor analysis included errors that resulted in skewed data and therefore made it hard to replicate. Replication first started with Fiske in 1949 who carefully made an attempt to replicate his studies. Factor analysis computer programs did not exist at that time and therefore everything was done manually which made it more likely for errors to occur. According to Digman (1990, p. 419) Banks (1948) was very critical of Cattel's analysis and his contribution later became an easier analysis of Cattel's correlations.

However, Cattel's empirical research contributed to future research and later to the development of the Big Five personality traits model. Many of the 16 facets correlated with each other. Five of the factors within the factor analysis that were recurrent were known as extraversion, agreeableness, consciousness, emotional stability and intellect or openness (ibid). The results are now more or less in conjunction with the Big Five which has increased our understanding of personality (Nettle 2007, p. 29: Fehriinger, 2004).

The history of earlier theories on personalities has been a history of trying to condense a complicated reality with infinite parameters into a workable model that provides a framework to describe individualistic differences. We are all systematically different and our external environment affects us all in a different way, and having a model with a robust empirical foundation can help psychologists to provide treatments and consultation that benefits each individual. It is within the research that the Big Five model is perceived as something almost conclusive.

2.2.   *The Big Five model*

The Big Five personality traits[3] describe the central dimensions within a personality. Overall there is a common understanding for what it stands for as well as its content. The trait extroversion is mainly characterized as being social, energetic and active,

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[3] The Big Five personality traits, which are often called the *five-factor model* (FFM).

the opposite of that being introvert. Individuals that score high on agreeableness are known for being trusting, cooperative and considerate. Conscientious individuals are mainly known for being organized, resilient, persistent and dependable. Emotional stability, which is the opposite of neuroticism, is characterized as being calm, unemotional and stable. The last dimension is openness to experience which is characterized by being imaginative, intellectual, artistic and sensitive according to Mount, Barrick, Scullen & Rounds (2005, p. 449). All individuals have some of the Big Five factors but what differentiates us is our overall scoring on each of the five dimensions.

3. Flexibility of the Big Five personality traits

Theoretical constructs that can affect our behavior, like for example motivational processes, will be presented in the following chapter. There seems to be some support for that certain personality traits can be rather flexible across situations.

According to McAdams & Pals (2006, p. 207) the person-situation debate started in 1970 and it suggested that personality traits were weak predictors of human behavior. This claim resulted in increased research which turned out to further strengthen the concept of personality traits as important individual differences in observed behavior. This also applied across different situations and over time.

Research on this subject has been extensive but has been subject to criticism which will be described in the following discussion. There were and are many challenges for personality traits researchers that can influence behavior, choices and personal evaluations. Individuals not only go through life-changing moments and experiences that can influence their personality, but life situations continually change, such as relationships, work and health. Long-term research must account for all this or at least address its influences. In order to narrow a research focus down, researchers can perform short-term research or research confined to a certain situation. However, this will influence generalizability as will now be discussed.

3.1.   *Characteristic adaptions*

McAdams presents an expanded model of personality and character traits. McAdams (1995, p. 369-370) categorizes personality and individual's differences into three different levels. The first level contains personality traits which describe the person, like for example the social dominance that accompanies extraversion or the anxious personality of the neurotic. The second level contains personal strivings, defense mechanisms, life tasks, coping strategies, specific skills or values in addition to motivation, development and a place or a role. The third and the last level is the identity of the person based on their life story. If this level is not explored, limits are to a certain extent posed on the understanding of the person's ability to find purpose and meaning in life (ibid, p. 382-383).

Furthermore, explains McAdams (2006, p. 208), that these adaptions concerning personality traits include goals, motives, strivings, strategies, values, schemas, self-images, mental representations of significant others in addition to many other aspects that have to do with motivation, development and social cognitive aspects of individuals. In other words, the personality traits can be considered as one side and the other side is all of the above and could be categorized as the doing side. These latter aspects are more likely than the first to change over time, i.e. the personality trait side can be considered more stable than the other one. This could explain why human lives vary beyond the personality traits so that two individuals that are found to have a similar personality can make vastly different choices in life and be affected differently by similar situations. Additionally, Doris (2002, p. 16-17) refers to character as partly explanatory to behavior and points out what happens inside the person as in forms of emotions, motives and cognitions that can influence how individuals act.

Mount et al., (2005, p. 473) emphasizes that the personality traits not only influence the same motives but differ in how they do it. Extroversion with its social interest influences the feeling of socializing but differs from other personalities in their motivational process in doing so. Social interest might motivate an introvert person to seek out environments that contain social activities. Extroverts also seek out social surroundings but the way they act in them is different since extroverts are bolder, more dominant, energetic, active and status seeking. Certain personality traits don't predict a person's choice of surroundings but rather describe how that person will interact in a particular environment. Neuroticism is an exception since neurotics avoid certain circumstances compared to extroverts, for example. According to Paulus et al. (2003, p. 1444) the level of neuroticism and harm avoidance has found to be highly correlated.

This discussion can complicate attempts to map out how individuals behave, choose, interact and respond to different stimuli. Personality traits are something that follow us, always, and are usually found stable during the course of a lifetime. However, we are also cognitive creatures that make choices and plans, have intentions and goals and can use reason to guide us rather than relying only on instinct.

3.2.   Big Five Personality traits vs the situations

Several experiments within social psychology have demonstrated how behavior can be manipulated up to a certain degree. It has been shown that prosocial behavior can be manipulated by several different factors. One factor is a feeling of having to hurry (low, medium, high). Out of participants that were low on hurry a majority of them or 63% helped a distressed person to find her way as opposed to participants that were high on hurry, where only 10% engaged in helping the person (Doris, 2002, p. 33-34).

Another example that Doris takes is from an experiment where one group of callers in a phone booth found a dime while another group of participants did not find a dime in the phone booth. The experimenters wanted to see if there was a difference between the two groups in their willingness to help a person (experiment assistant) who dropped a folder of papers. Results showed that the participants that found a dime were more willing to help. This implies that the finding of a dime facilitated a willingness to help the person out with the papers. A total of 14 helped in contrast to only 1 individual that did not find a dime in the phone booth. See table 1 for further results of the study.

Table 1 Helping Behavior in Social Psychology

	Helped	Did not help
Found dime	14	2
Did not find dime	1	24

This small fortune seemed to improve people´s mood which then led to an increased willingness to help others, hence "feeling good" mediated the relationship. Numerous studies have found that mood can have a large impact on a wide variety of behavior like risk taking, cooperation and problem solving. Positive effect and even pleasant aromas have also been shown to increase the likelihood of prosocial behavior (ibid, p. 30-31).

Nettle (2007, p. 40-46) points out that the criticism that personality theories have faced have to do with studies that show that the situation individuals find themselves in are often an immediate and better predictor of their behavior than their personality scores. This would suggest that individuals are quite alike, an important point that further came from Cattell as well. Nettle agrees with this point of view but

points out that there are other approaches that are worth looking at, evolution being one for example. Evolution did prepare us for dangers by giving us the fear and arousal mechanisms. The essence of these mechanisms is that they are activated when we are faced with danger (increased heart rate, adrenaline, avoidance, etc.). Therefore, the circumstances that individuals find themselves in are clearly a strong predictor of their reaction (like feeling fear when being faced with a wild bear). The situation can have strong effect on people´s anxiety and how people are feeling at that moment and this may not come as a surprise. However, personality traits matter and Big Five describes something that is primarily relevant across situations (ibid). This is further discussed in the following section.

3.3.   Personality traits in prolonged and/or repeated weak situations

Strong situations, like being faced with a wild bear, are more related to the prototype that the behavior was designed for through natural selection. In weaker situations we would not be able to spot individual differences and reactions by solely considering the situation. We would have to consider personality traits. When individuals are walking through an unknown neighborhood at night, the perceiving of some cues of potential danger could be a form of a weaker situation. That specific scene could contain enough cues so that the anxiety mechanism is activated for certain individuals, and for these certain individuals the biological threshold for activation can be lower than for others. On the other hand, if the person has a higher threshold they could perhaps enjoy the walk despite some signs of danger. Both types of individuals will take the route if it is necessary for them, but their overall wellbeing is different in the situation according to Nettle (2007, p. 41).

Individuals that engage in different situations should vary in their behavior across the situations, thus demonstrating differences in their psychological features. Throughout time this should characterize individuals in specific situations. An example can be taken of a person who becomes upset when being ignored while another person is quite content with being alone. The irritated person will likely become irritated in the next situation when this happens again, since the situation activated some cognitive state or feelings. These kind of individual differences become significant in situations due to different cognitions and influences related to

them according to Mischel & Shoda (1998, p. 243). In addition to that a person might perceive that he or she is exposed to a considerable amount of negative remarks or insults. However, some individuals will respond to this with a positive attitude and even laughter while others might become paranoid or angry. Here an individual difference in thresholds for psychological mechanisms might influence the reaction (Nettle, 2007, p. 42-43).

Situations can act as a basis for behavior since they can trigger different kind of mechanisms by situational cues. This has facilitated an understanding and definition of what personality traits are; individual differences and stability designed to act in response to different kinds of situations (ibid). The personality will tend to reveal itself as certain patterns or responses to situational stimuli, but will not automatically result in certain outcomes. Nettle takes an example with the personality trait agreeableness and applies it to work situations. Individuals low on agreeableness are likelier to finds themselves in more frequent arguments since they elicit a reaction that magnifies the tendency that already accompanies low agreeableness (Nettle, 2007, p. 35) That specific person, who is low on the trait agreeableness, could experience 20 instances per day of needing something that another colleague is using. For this specific type, being low on agreeableness could hypothetically mean only a 10% probability that the person overreacts with irritability at that colleague. However, 10 instances per day with one on the average resulting in irritability, could result in one short tempered behavior a day, five per week and 200 per year. As a tool to predict overreaction in a single episode the personality trait is quite weak. However, 200 instances a year are very likely to have an effect on the person's life. The more often we observe some particular behavior through a series of instances, the more important does the personality predictor become. Individuals low on agreeableness will unintentionally make their colleagues slightly annoyed due to their regular episodes of frustration and short temper. Colleagues, who are also low on agreeableness, will act differently to a person that is short tempered. They are less likely to laugh it off and might seek opportunities for confrontations. Therefore, individuals that are low on agreeableness are likelier to experience more conflicts than the average person due to their personality trait or lack thereof. These kinds of side effects due to personality traits can be quite common (ibid). A study by Graziano, Habashi & Tobin (2007, p. 593) showed that

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individuals that were high in the trait agreeableness were more prosocial by offering more help to others through a wide variety of situations than did individuals low on agreeableness. This difference was thought to be due to their prosocial motivational levels. In their study the prosocial behavior seemed to be linked to empathic emotions rather than low personal distress.

Even though the results of the experiments within social psychology are quite interesting one cannot rule out the possibility that individual differences within the personality traits could be a factor. The behaviors that were manipulated all concern the trait agreeableness, this either being low or high. One might wonder if these 4% of the individuals that helped despite not finding the dime or the 10% in the other experiment are those who are in fact high on agreeableness. According to Doris (2002, p. 31) no additional evaluation was carried out on the participants that could further explain why those who helped versus those who did not help. Therefore, the experiment lacks direct support concerning dispositional differences. Moreover, the helping situation in the experiment does involve helping a stranger and helping and human kindness mostly entails social bonds among friends, family or co-workers (ibid, p. 35). It is worth noticing certain social experiments have been criticized, e.g. because replication did not provide similar results. Social psychologist Blevins and Murphey did replicate the phone booth experiment in 1974 and found that there was no relationship between finding a dime and helping behavior according to Miller (2009, p. 148).

3.4.   *Situation selection vs situation evocation*

According to Buss (1987, p. 1215) individuals on a normal day are not being exposed to unexpected situations. Individuals choose or avoid certain situations. It can be consciously or unconsciously by provoking different responses from the social environment.

Nettle (2007, p. 46) claims that individuals with certain types of personality traits choose situations to engage in depending on the activities they are interested in. As an example, one of the things that characterizes extroverts is that they have more casual sex than individuals who are lower on extraversion or higher on other personality traits. Introverts may perhaps want to engage in more casual sex if given

the opportunity but the difference is that extroverts seek out these situations more frequently. They might go to parties that introverts don´t attend and they get to know people more easily, hence they already make these set of choices that make the access to causal sex more readily available. This is called *situation selection*. According to Emmons & Diener (1986, p. 1014) the reason for the consistency is that individuals have the tendency to choose these situations that match their dispositions, traits and attitudes. A laboratory setting is an example of a situation where individuals perhaps don't have as many available choices as in the real world and thus it can underestimate the levels of consistency that exists.

The results of Emmons & Diener study further found support for up to nine months' consistency of selection of situations that were recreational plus the stability of choices. Additionally, their research supported Nettle´s argument that the situational choices are due to personality traits. An administration of personality scales and records showed predictions about situational choices half a year later (ibid, p. 1017).

What can be contrasted with situation selection is *situation evocation*. Situation evocation is when individuals unintentionally evoke predictable reaction from others in their social environment. Parental control can thus be stronger with children who are very active and this control is therefore evoked by the children's behavior (Buss, 1987, p. 1214: 1217).

According to Nettle (2007, p. 32-34:46-47) marriage is another good example. It is tempting to conclude that whether a marriage lasts or not is dependent on situations. However, the awareness to see if there is a disharmony in the marriage and the urge to balance it is depended on the trait agreeableness. If the marriage is not working, individuals high on extroversion are likelier to quickly find another partner and hence end the marriage. Neurotic individuals are less likely to form long term relationships because of their instability. Hence marriage survival is powerfully influenced by personality traits rather than on situations.

According to Orzeck & Lung (2005, p. 274) infidelity and general dissatisfaction has been one major reason for divorce rates in North America and the researches were therefore interested in seeing if certain Big Five personality traits could be likelier to engage in infidelity than other traits and if certain traits were more loyal than others. Results from their study did show that the participants that

had cheated rated themselves higher on the extroversion scale and their spouse lower on the extrovert scale. This suggested that the cheaters look at themselves as more outgoing and active in comparison to their spouse. The cheaters were also likelier to rate themselves low on agreeableness and low on conscientiousness. The group that had not cheated rated themselves higher on the trait agreeableness and conscientiousness in comparison to the cheater group (ibid, p. 280-281).

It is worth mentioning that behavior varies from moment to moment and depends on the context. There are examples of introverts who talk a lot and individuals high on agreeableness that get into conflicts but that's the exception. It is much more common that extroverts talk a lot across a variety of situations (Nettle, 2007, p. 48-49).

3.5.   *Character, Morality & Virtue Ethics*[4]

Doris in his book "Lack of Character" proposes that character has weak effect on moral behavior and emphasizes the enormous effect the situations can have. According to Doris (2002, p. 18-19: Miller, 2009, p. 146-147) robust traits are an example of virtues. If individuals have a robust trait they will display a trait-relevant behavior in numerous situations that are trait-relevant.

In other words, the honest person will probably behave in an honest way because of her values as forthright. Also, the good person might experience misfortune but would never act in a hateful and mean way. If the person is maintaining a value it can be expected that she would justify her behavior by using varieties of characteristic considerations but if the person has a virtue the relevant commitments might surface under. The virtue is supposed to predict what will be done as well as what will not be done (ibid). However according to Doris (2002, p. 147-148) the situations can go beyond the morality, values or the character. He takes an example a colleague who you have been exchanging flirtations with that asks you to dinner. The ethically undesirable outcome of that dinner is infidelity. If individuals in that position listen to the situationism view they will avoid the dinner. However, if

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[4] Virtue ethics has been used broadly for theories in moral philosophy that focus on the role of character and virtue somewhat to individuals doing their duty or behaving in a manner that has good consequences (Internet Encyclopedia of Philosophy, n.d.).

counting on the character and its effect on moral behavior, the person will realize in the situation that he or she had made a huge mistake. Despite how honest and righteousness individuals are when in the situation, the pressure of the situation can be overwhelming, e.g. where the wine is flowing and the candles are lit.

According to Zimbardo (1974, p. 566) we have a misconception of both personal control and personal invulnerabilities. This means that we underestimate the strength of social forces and stimulus within certain situations. These can determine our actions, and being evil or good has little to do with the course of action taken.

This discussion relates to the earlier discussion on weak and strong situations. Strong situations might not always involve imminent danger or a threat. Social pressure in a relatively harmless surrounding might trigger mechanisms that result in certain behavior, beyond the personality traits according to the situationism view.

3.6. Free trait

Dr. Brian Little has performed extensive research on the flexibility of the Big Five personality traits and how everyone could make use of this flexibility to their advantage with the usage of *free trait* (2016: 2008, p. 1236). A free trait is when we step out of our main traits because we want to advance or succeed in our core projects. It is a strategy with the aim of succeeding and is an interaction of the biogenetic[5], sociogenic[6] and idiogenic[7] sources of human behavior. According to Little (2008, p. 1235), a free trait requires that we take a break from our biogenetic trait while we engage in the free trait to accomplish our main goals. One of the examples Little takes is about himself, a highly introverted individual but a psychology professor who wants to connect better with his students and keep their interest and attention. When starting a lecture at 8 AM in the morning he has to step out of his main personality trait, introversion, and act in an extroverted manner to engage with his students. By doing this he is advancing in one of his core projects (teaching) by engaging in the enthusiasm of the extrovert person. Engaging in free

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[5] Biogenic can be unconscious and include genetic and evolutionary influences on individuals. (Little, 2008, p. 1236).
[6] Sociogenic can be unconscious and include norms, scripts and rules (ibid).
[7] Idiogenic require a certain amount of consciousness since they entail the concerns that individuals value when pursuing their plus personal constructions, commitments and core projects (ibid).

traits is supposed to improve our quality of life when used short term to our advantage.

His perspective is a social-ecological one where individuals live in conjunction from influential factors such as social, cultural, biological and the physical environment (Little, 1996, p. 340).

However, since our personality traits are considered to have a biogenic nature we have to be careful when using these free traits since it can lead to challenges for the nervous system if prolonged. Little talks about the need for withdrawing himself from the situations when he has been acting in an extroverted matter. If he does not take care of himself with solitude and stillness afterwards, he risks becoming overstimulated. Hence the emotional and physical health can suffer. Kaufman (2014) refers to fMRI and EEG studies that have shown a more active response in the brain areas among extroverts when shown a variety of rewards (humor, happy faces, pleasant emotional stimuli). Cain (2015, p. 20) talks about the tolerance for stimulation as one of the most important differential points between introverts and extroverts. She mentions results from a recent research in 2013 as support for this. That research suggested that when individuals act as pseudo extroverts long-term it can lead to a burnout, exhaustion, stress or cardiovascular diseases.

Having certain personality traits does in many ways define how we react to different stimulus and circumstances. However, it is possible to step out of the core personality trait short term and engage in a manner that differs from that personality. This should be done with caution as research suggests that such behavior can put a strain on both the mental and physical health.

4. Long term stability of the Big Five personality traits

Numerous researches have studied whether the Big Five personality traits remain stable throughout the lifetime or not. Establishing a long term correlation within the personality traits seems to be one of many controversial topics within the field of psychology. While some criticisms still remain very relevant, a lot can still be learned from the literature on personality trait stability.

4.1. Research on personality traits stability

Friedman (2000, p. 1095) has conducted one of the longest cohort studies at the time ranging from 1921-1922 until the year 2000 with a total of 1528 children from elementary school with a data collection throughout the life (childhood, late adulthood and death). Their focus was on social relations, family, mental health, physical health and cause of dying since they're main interest was personality and health. Their study was the first one to establish a link between the personality trait conscientiousness and long term stability. From early childhood it was related to better health and later survival into old age. It went beyond factors such as avoidance of risky behavior and additionally did death certificates show that individuals low on conscientiousness were likelier to die cause of accidents. Even though individuals higher on conscientiousness are less likely to overeat, drink more alcohol and smoke its effect seem to reach beyond that as well (ibid, p. 1099). What did have a large effect was the willingness to undergo and stick with a treatment or prescribed medicines. Individuals that were low on conscientiousness in the comparison group were likelier to die within the year since they had troubles committing to the prescribed treatment (ibid, 1100).

According to Friedman (2000, p. 1100-1101) neuroticism and its relation to health and longevity has been unclear. However, studies have found support for higher levels of anxiety & hostility and its link to diseases since it has been connected to the sympathetic arousal. Depression has also been linked to diseases due to its cortisol dysregulation. Numerous studies have further found that the hostility and anxiety often accompanies the Type A behavior arising in childhood due to both parental influences and temperament. Unstable homes did not predict

premature mortality or increased risk of disease among neurotics but what increased their risk of premature mortality was parental divorce. Even though neurotics seem to be at increased risk for diseases or mortality what did predict healthy longevity was a moderate degree of neuroticism. The individuals that had a moderate degree of neuroticism were likelier to be aware of some symptoms and hence engage in an appropriate treatment.

Hampson & Goldberg (2006, p.2-3) further conducted a large (N=799) longitudinal study of long-term stability within the personality traits. Their study spanned 40 years, from childhood to middle age, participants being children from Hawaii. Earlier studies have claimed that children can first be assessed at 7 years but a recent study from 2005 identified the traits extroversion, agreeableness and conscientiousness from age 5 already by using a puppet[8] interview. According to Hampson & Goldberg (2006, p. 11-14) personality stability is thought to peak in middle childhood but they found that the test-retest stability was higher in midlife than in childhood. Giving that personality is still under development in middle childhood it was not expected to be as stable as in midlife. Moreover, was the stability within the personality traits with a higher correlation when measured within childhood or within adulthood than across childhood and adulthood. When measured from childhood to adulthood there were some differences in stability measurements among the Big Five traits. The trait extroversion had the highest long term stability through adulthood and next after was conscientiousness. It did not matter which kind of methodological approach was used, the results were the same. The trait conscientiousness has been linked to longevity due to its healthy behavior patterns. Perhaps if more conscientious children continue to be conscientious adults they are likelier to gain from health-enhancing activities that further mediate the effects for longevity and healthy life.

Neuroticism did neither have a short term or long term stability in that research. What followed was agreeableness that did not show longitudinal stability.

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[8] Puppetry is the usage of an artificial figure that is manipulated by hand and represents a human or an animal. It has been used with children both as a therapeutic & communication tool in research (Epstein. et al. 2008, p. 49).

Openness to experience was somehow in the middle of the 4 traits According to Hampson & Goldberg (2006, p. 11-14)

According to Nettle (2007, p. 30) the scores on the Big Five scale seem to be rather stable over a long period of time. A long term study that spanned 12 years and encompassed three measurements over that period showed a correlation of r values of 0.68-0.85, which is rather high.

Friedman et al. (1993, p. 176:179) found that conscientiousness in childhood was a predictor of good health in old age and longevity when controlled for gender. What was further interesting was that cheerfulness and optimism which characterizes extrovert that also had the same predictions. It did predict longer and healthier life plus being controlled for gender since women are found to be third less likely to die than man in a year. Friedman et al. in 1995 (p. 701) found a further support for childhood conscientiousness as a predictor of longevity among the participants. What seemed to account for this was that children high on conscientiousness were likelier to develop healthier habits which then continued throughout lifetime. It was especially evident that children low on conscientiousness were likelier to drink alcohol and smoke cigarettes later.

However, newer research from 2016 showed that there was no significant correlation among the traits, which indicated that personalities are not long term stable. Harris, Brett, Johnson & Deary (2016, p. 862:870) conducted a research on the stability of personalities with measurements from childhood from 14 of age to 77 years. Even though the correlations indicated no significant stability, another model showed that high levels of neuroticism and conscientiousness related to personality in childhood. Hence the stability of personalities was rather low except for these two dimensions. What the researchers further found was that childhood IQ had a significant relationship with dependability in adolescence and was further an indicator of dependability in the old age.

Long term studies on stability have faced their limitations in the past. It is conceivable that the trait openness to experience is not readily available in childhood since it involves aspects of artistic and creative experience, and could therefore be difficult to observe by teachers who usually evaluate the personality traits among children. A similar problematic aspect applies for neuroticism as childhood measurements often rely on the rating of the teachers and neuroticism is often

inwards and hence problematic to rate. Here, teachers find extroversion and conscientiousness probably easier to evaluate according to Goldberg (2006 p. 3:12-14). Nonetheless do teachers have a good comparison to other children and can valuate children in a variety of broad situations plus they spend a great amount of time with children (ibid).

Hampson & Goldberg (2006, p. 763) further refer to long term researches on the stability of personality traits as an empirical issue. Several reasons can be found for why long term studies on personality traits can have their limitations. First of all, researchers cannot expect the same number of participation several years later in the follow up study. In Harris, Brett, Johnson & Deary (2016, p. 864) long term personality stability study, dropouts were mostly due to death, refusal, withdrawal, emigration, no reply and incapacitation. The total number of participants in the beginning of the study was N=1,208 versus N=174 in the follow up study. That is a good portion of dropout and one can doubt the significance of the results which suggested no significant stability.

In general, long term researches on the stability of the personalities do have to consider many factors that could interact with the stability of the traits. When measuring this early in childhood the ratings often depend on teachers and it can additionally have the effect that neuroticism scoring can be ambiguous and openness to experience hasn't really been put up to the test. McCrae & Costa (1999, p. 145) claim that the personality is still under development and first reaches its mature in adulthood. This may very well be the case but doesn't change the fact that many personality traits are difficult to observe for an outsider.

Numerous researches do start their personality inventory measurement in childhood and the research from 2016 was no exception. Personality traits were further measured in very late adulthood in the same study from 2016. It can certainly have its limitations when measurements continue into old age [9]. Furthermore, did Susan Cain use a 70-year-old research as a support that early adulthood did have a remarkable accuracy of personality traits into lifetime. According to Cain (2015, p. 36-37) that doesn't mean that we don't evolve and mature over time. It just means

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[9] According to Srivastava, John, Gosling, & Potter (2003, p. 1042) the personality in old age could change for reasons such as cognitive decline, which make the results difficult to generalize across the population.

that if an individual was ranked the 10th most introverted person in the high school class that same person will probably still be the 10th most introverted person in her/his reunion. However, it could be possible that the others classmates seem a more introverted then remembered as in quieter, less need for stimulation and more self-controlled. Perhaps they are also less neurotic, more agreeable and conscientious. All of these personality traits become more noticeable with age. This has been called intrinsic maturation among psychologists and has been found across diverse countries such as UK, Turkey, Germany and Spain, to name examples. When looking at this from an evolutionary point of view, high levels of extroversion can contribute to mating which can be one reason why the majority is more sociable during teenage and young adulthood. However, does the stability of marriage and child rearing not go so well with the constant need for stimulation and social desirability. Instead, it is more useful to take care of the home and family which accompanies perhaps more the conscientious personality trait.

To sum up, empirically evaluating personality traits and their stability over a long time can be difficult. External factors like stress seem to influence some personality traits, even some more than others. Work satisfaction and relationship satisfaction are also influential. Personality traits like agreeableness and conscientiousness seem to systematically increase with age.

4.2. *Big Five personality traits and age*

Other researches seem to suggest that neuroticism declines with age. A study from 2003 by Srivastava et al. measured individual traits from the age 20 to 60, with the mean age of 31 years. The results showed that neuroticism among women declined with age but not among men. This supports past research about neuroticism falling with age. Past research has shown the opposite for other traits, as agreeableness and conscientiousness tend to increase with age (ibid). Openness to experience showed mixed results according to Srivastava, John, Gosling & Potter (2003, p. 1041).

According to a Scollon & Deaner (2006, p. 2-3) study, neuroticism and extroversion among individuals were more likely to change when under the age of 30 compared to over 30 years. Many earlier theories have suggested that the personality is like a plaster at the age of 30, and is fully developed and unlikely to change any

further. What the results showed was that there was just as much change between the individuals under the age of 30 as in over the age of 30, thus refuting the idea that personality development slows down in young adulthood.

However, Roberts and DelVecchio (2000, p. 17) performed a quantitative review of long-term studies of temperament and personality traits ranging from childhood throughout old age yield that gave a different outcome. The review of the studies yielded that consistency within the personality traits increases from infancy to middle age and then peaks sometime after 50 years of age. The least consistency was in the earliest years of life, meaning that the lowest trait estimations were among infants and toddlers. After that it starts to increase, starting in the preschool years into the young adulthood and middle age again. Edmonds, Jackson, Fayard & Roberts (2008, p. 405-406) were interested in finding out if personality traits increase with the years. What they found out was that between the years 20-40 there was a dramatic increase in personality traits especially social dominance (part of the extroversion), emotional stability and conscientiousness. Between the ages 60-70 conscientiousness rose again but social vitality declined. Openness to experience showed a similar pattern of rising between the years 20-40 but declining again between the years 60-70. Agreeableness on the other hand increased slightly throughout the lifespan but peaked between the years 50-60.

4.3. *Factors that can influence stability in Big Five personality traits*

A Scollon & Deaner (2006) study had different aims and took into account more variables when studying the traits neuroticism and extroversion. The study spanned the years 1981-1989 with measurements taken every 2 years. One aim of their study was to see if the traits had a correlation with changes in work or romantic relationships. Previous findings had found that neuroticism among male veterans who were married had declined significantly after 12 years of marriage when compared to single male veterans. Moreover, cases were observed where the advantageousness of marriage had emotional rewards. Years in marriage predicted an increase in social responsibility which is one aspect of conscientiousness (ibid, p. 2-3). Another aim was to see if social roles could influence a change in personality traits. A decrease in neuroticism was observed as the levels of work satisfaction went

up, and as for extroversion, it became more prominent. An increase in relationship satisfaction had the same effect. Work satisfaction had a stronger correlation than relationship satisfaction, especially for the decline in neuroticism (ibid, p. 18-19).

4.4.   Long term stability vs. situational stability

Researches on the stability of personality traits can be studied in many different ways. Nettle (2007, p. 48-50) points out that behavior across a certain duration of time, say a couple of weeks, is a very powerful predictor of behavior in the next couple of weeks. In other words, consistency is highest if the situations are the same. Neuroticism can be taken as an example. It is characterized by an over activity of negative emotions and therefore it is likely that a person high in neuroticism will experience a strong reaction when there is a threat to the self. On the other hand, this assumption does not answer questions of how extensive or limited the situation can be. Should neuroticism be measured broadly or separately across relationships, through approval of colleagues or health wise? Actually, when using these types of sub-traits, the consistency is higher. Consistency further exists among different situations; they are just a little bit lower. Both measurements are good, but they are different. When measuring broad situations, even though it can be weak, we get self-consistency that the Big Five captures. However, when measuring the sub traits, the predictive power is high but limited to these specific situations.

Accounting for situation-specific circumstances can increase the repeatability of a measurement of personality traits. The same applies when only considering a short time-span. However, this leads to a limitation in the generalization of the results.

Many factors influence the personality of individuals both short-term (e.g. stressful situations) and long-term (e.g. change in work or relationship status), and how the personalities evolve over time (e.g. increased experience in human relations), and the researchers must consider this when designing their study.

4.5. Changes in the Big Five personality traits when faced with negative emotional states

It is important to take into account that when individuals experience some degree of depression, anxiety or stress it can affect their personality. The same goes for physical challenges such as long-term pain. Either can certain personality traits get repressed or the opposite, increase.

Baldursson (2009, p. 28) talks about stress and especially how it can affect personality. Individuals that have been experiencing long term stress become more vulnerable, have a higher tendency to become nervous and they can experience memory loss. Energy levels decrease and if the stress continues untreated, a risk for developing depression increases. This especially applies for neuroticism because of its vulnerability to mental disorders. Lupien & Lepage (2001, p. 138:141) support that notion that especially stress can be a source for many psychological and cognitive problems. Numerous studies on humans have verified the negative effects that stress hormones can have on memory. The stress hormones seem to have an isolated and specific influence on the hippocampus.

According to Vollrath (2001, p. 335), when faced with stressful conditions, anxiety increases as well as other negative effects. What kind of conditions matters though, neurotic tendencies increase mostly when faced with interpersonal conflicts.

According to Sternbach & Timmermans (1975, p. 177) neurotic tendencies have been apparent among numerous patients suffering from chronic pain and the relationship has not been clear whether it is due to the pain or the pre-existing personality trait. The aim of their study was to see if the personality trait changes or if it is already dominant in numerous patients suffering from chronic pain. The findings of the study were statistically significant and yielded a change in the personality scores among patients that had a pain relief surgery in comparison with patients that did not have surgery. Neurotic scores decreased after the surgery and the change was clinically significant as well. The reduction of pain was significantly associated with the change, which implies that individuals suffering from long term pain are affected in their psychological functioning. Hence higher scoring on neuroticism can be seen as a consequence of long term pain. However, individuals that have preexisting neurotic tendencies before suffering from long term pain will

still have some neurotic tendencies after a pain relief surgery. Meaning neuroticism will probably decline afterwards but not disappear (ibid, p. 180-181). Additionally, Tillisch (2009, p. 223) associate neuroticism with pain reports and physical symptoms. Several findings among healthy subjects contradict this and point to physiological reasons. Neuroticism in one study seems to moderate the cortical process of the pain. This was supported with EEG and electrical pain stimuli. Neurotic patients that had serious digestion problems but were functioning were connected with decreased blood pressure in addition to reported symptoms.

Furthermore, a Grushka, Sessle & Miller (1987, p. 155-156) research associated pain with burning mouth syndrome (BMS) and personality profiles. BMS is found most often among women after menopause and the pain among BMS patients was described as a chronic toothache in severity. At that time no previous studies had found causal connection between BMS and emotional distress. The findings supported that disturbances in personality were connected to BMS and came as consequence of the long term pain, as numerous studies had suggested before this study. Personality disturbance are most often associated with higher scores on the trait neuroticism but also hypochondria[10]. These changes in personality are thought to develop as the chronic pain increases and can decline again after patients have undergone treatments for the pain (ibid, p. 164-165).

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[10] Hypochondria is when individuals obsess or worry about normal physical symptoms which are taken as signs of a serious illness or disease (Colman, 2009, p. 357).

5. Big Five personality traits and their biogenic nature

Extensive research lends support for the personality traits having biological or genetic roots. The available literature on this mostly revolves around neuroticism due to its correlation and vulnerability with mental disorders. Additionally, have numerous researches tried to explain the difference between extroversion and its counterpart, introversion from a biological standpoint.

5.1. *Research on biological factors influencing personality traits*

According to Nettle (2007, p. 51-52) the Big Five personality traits should be thought of as variation in underlying brain circuits that affect different psychological and physiological functions. Interest in sex, money, competiveness and travelling are all things that belong to the extroversion dimension and it might be due to the fact that they share the same brain reward circuits (ibid). Pickering, Corr & Gray (1999, p. 358) discuss how individuals respond to different sensitivity or reactivity from the brain system. The main differences in the brain system lay in the behavioral inhibition system and the behavioral activation system.

According to Aharon et al. (2001, p. 537) the brain circuitry that processes rewards and aversive stimuli is thought to be the most important thing concerning motivated behavior. The results of their study showed that the nucleus accumbens gets activated which belongs to the reward circuitry, when passively looking at beautiful females faces.

Further did Johnson et al. (1999, p. 255-256) study reveal that increased blood flow in the frontal lobes and anterior thalamic nuclei with introversion supported Eysenck and Grays biological theories about personality, suggesting a more introspected nature. Eysenck has suggested that introverts have higher cortical activity than extroverts and according to Kumari, Williams, S.C. & Gray (2004, p. 10636) they also have lower response threshold.

Gray has claimed that there was lower activity in the inhibition area among extroverts indicating lower blood flood in several areas that concern the behavioral inhibition area especially the hippocampus and the frontal lobe. Further did the results show that the blood flow in the posterior insula was connected with

extroversion. Also, the posterior thalamus was also found to be more active. This suggests that extroverts have a larger tendency toward outward focus and high drive for sensory and stimulation. However, the blood flow in the interior insula was connected with introverts. This suggests that introverts have a tendency towards inward focus (Johnson et al. 1999, p. 255-256). Introverts further engaging in internal self-talk and inward focus was further supported by Kumari, Williams, S.C. & Gray (2004, p. 10640) study.

Ruffle et.al (2015, p. 252-253) study had a different focus on the biological difference between the personalities. What the results from their study yielded was that individuals high in extroversion had higher pain threshold than individuals low on extroversion but the measurement was no significant. Perhaps with a bigger sample, significant results can be obtained. Nonetheless did the results show different brain areas activity when measuring pain, depending on the extrovert scores. The results therefore imply that there are different brain areas involved in the visceral pain.

Moreover, does Nettle (2007, p. 480) discuss how the serotonin and dopamine transmitters-receptors within individuals generate different emotional responses to the environment. The mid brain structure that controls our rewards system has a number of structures in and underneath the cortex of the brain which contain neurons that rely on the dopamine and can have an impact on decision making. Since dopamine has been considered the brain´s reward chemical, a number of drugs that can have stimulating effect on dopamine can induce feelings of pleasure and euphoria and are therefore very addictive. The psychological responses that those drugs can have on individuals have been found to be related to the scoring among extroverted. There is physical support for what makes an extrovert an extrovert so to speak, and it is connected to this responsiveness in the dopamine-brain areas.

The extrovert's emotional reactivity is directed towards the class of rewards or pleasant stimuli but not negative ones. On the other hand, neuroticism has a different metabolic activity in response to negative images, according to Nettle (2007, p. 94) & Larsen and Ketalaar (1991, p. 135) According to Perkins (2015) neuroticism has been linked to having risk-aversive tendencies and perceived as more sensitive to threats than other personality traits. A psychologist by the name Jeffrey Gray showed that neurotic individuals avoided certain kind of jobs that were

associated with risks and preferred jobs that were more safe, like analytical jobs opposed to physical jobs. A study by Augustine & Larsen (2011, p.401:406:410) further lend support for that individuals high in neuroticism were not as likely to take risk with a possible outcome of gain but it was different when it was to avoid a loss. Then they were more likely to take risks in comparison with individual's low on neuroticism. The results of their study further yielded that negative priming (negative words such as depression or sad) was more effective among individuals high on neuroticism. Neurotics interact more with state unpleasant effect than individuals low on neuroticism.

Extroversion is known to have higher levels of positive emotions while neuroticism is considered to have higher levels of negative emotions[11] according to Nettle (2007, p. 92-95) & Larsen and Ketalaar (1991, p. 132) extroverts vary in their responsiveness. High scores of extroversion means greater responsiveness hence those individuals are more eager to work hard because they react with a more buzz towards their reward like social status and money for example. Lower scores of extroversion indicate lower positive emotion and therefore less responsive towards rewards. Thus it effects the motivations among the introverts. There are studies that have supported this theory. One study consisted of writing about an experience, either a positive or a negative one. The extroversion scoring was supposed to predict the mood of the participants after writing about a positive experience. The higher the score on the extroversion scale the more positive effect on the mood afterwards. Even brain images have supported these kinds of studies. MRI scanning showed an increase in the extrovert's metabolic activity when confronted with positive images such as of a puppy or a happy couple. For those with lower score on the extroversion scale, the metabolic activity after viewing positive images was much lower than for those high on the extrovert scale.

According to Little (2016) extroverts need stimulation and they seek out situations that get their arousal levels up. They thrive best when they have to respond quickly to stimuli unlike the introvert who is more likely to find himself in situations that act in a way to reduce stimulation. Little further explains that this can also apply

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[11] Often associated with neuroticism and consists of alienation, stress reaction, anxiety, feeling of being victimized & resentfulness (Larsen & Ketalaar, 1991, p. 132).

to inner stimulation, like for example coffee. The extroverts respond better to caffeine drinks than introverts. When an extrovert enters the office saying he really needs a coffee, he really means it. A highly introverted person like professor Little can't even have a cup of coffee after 3 PM and expect to fall asleep in the evening. According to Little, this is due to his biogenic nature as an introvert.

Overall we do not fully understand how different physiological traits influence an individual's personality. Researches suggests that the reward system in the brain is more active in certain individuals than others, and that those certain types of individuals are going to have the tendency to be more drawn to rewarding activities.

The Big Five model nonetheless seems to contribute valuable information about individuals and how they seek different satisfactions, according to McAdams (1995, p. 374).

6. Fluctuating selection & it´s relation to Big Five

Nettle (2007, p. 69-77) argues that the Big Five personality traits fit the fluctuating selection[12] rather than the fitness-indicator for several reasons. One being that it can be quite easy to detect when a high level of specific trait is useful and also the opposite, harmful. When some personality trait is at its highest scoring it can often be quite pathological.

In fluctuating selection, it can be an advantage in certain situations to have more of specific traits but it can also be the opposite, a disadvantage when compared to the competitors. It all depends on the conditions. Nettle takes an example from the animal world. If a female finch mates with a thick-beaked male, it can be an advantage if there is a drought coming up but a disadvantage if there is a wet year coming up. Peahen on the other hand should always mate with the most elaborate one no matter what (ibid).

When trying to identify personality traits among animals, researchers have to rely on observations. An example can be taken with the fish species guppy. Their variation was observed in how they behaved when being close to a predator. When put in a tank with a predator, some of the guppies stayed closer to the predator than others. This was found consistent through repeated trials. In one study they were assigned to three groups, high caution, medium caution and low caution. After labelling them, the groups were put separately into the tank with the predator. Results showed that after 36 hours there was a big difference among the groups concerning survival, with high caution performing best of all. In order to explain the results and why this variation existed, another experiment with guppies was performed and this time the fish were selected through the amount of experience they had with predator's vs no experience. The results showed that the different levels of caution must be due to a heritable variation. Some are simply more guarded than others. This kind of variation can also be found among humans (ibid). Neuroticism being the personality trait most cautious and risk aversive.

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[12] Fluctuating selection is when selection is sufficient to be responsible for the degree of variation within the behavior characteristic of the entity of this species according to Simons (2009, p. 1987).

Del Giudice (2012, p. 48) agrees that fluctuating selection can be an explanation for the genetic variation in personality but he states that the source of the personality traits in the fluctuating selection can arrive from short lived aspects of the sex ratio. He hypothesized that the sex ratios adapt to various social processes that influence mating and child rearing. Furthermore, numerous personality traits are thought to have its influence on mating and child rearing and therefore variations in the sex ratio can have their effect on the selection on personality. Especially when the fluctuations in the environment are persistent, it is more likely to have its effect on a variety of traits. These environmental factors include some life history events and can be dangers in the environment, resources availability or predictability. As an example, dangerous environments more likely support traits such as fearfulness and high anxiety. Numerous researchers talk about the environmental factors within the physical environment but given the importance of social interactions it is interesting to focus on that as well. The results from Del Giudice (2012, p. 56-57) theory when applying it to human was that personality traits and how they vary can be partly explained by the sex ratio since it fluctuates by nature. Though his theory needs some more empirical support it did provide some clues that fluctuations are most problematic in small populations, for example since little variation is evident in the sex ratio. Migration, temporal variation and spatial clustering are also important and can have an effect on the maintenance of the genetic variety. Another factor was the mating part. The most effective way for fluctuating selection is when there are generations overlapping and several life stages which can be short term shielded from the effects of the sex ratio.

To sum up, the hypothesis does add an interesting perspective to the personality theories from an evolutionary standpoint. The sex ratio is a factor of the social environment from the reproducing species. Further might the connection between the sex ration and the strategies of the life history aid to the logic of the selection within the personality traits. According to Bell (2010, p. 87:95) the environment does change throughout time which affects the environmental variance. The severity and direction of the natural selection also fluctuates over time which leads to a divergence in the phenotypic. Moreover, life conditions continue to change on all time-scales. This supports long-term changes in environment, changes in both

biotic and physical situations of life that further strengthen specific selection on the populations.

This could be an explanation for why the Big Five personality traits are likely to evolve and perhaps be affected in terms of flexibility. Moreover, there might be subtypes of certain traits within the Big Five personality traits due to the environmental changes throughout the years. This could be an important insight into long-term developments of personality traits in different societies. Studies on changes in personality traits within an individual's lifespan might provide a clue. Neurotics – the most careful guppies among men – seem to be ensuring a sufficiently long life with their caution in order to gain experience with dangers and how to approach them. While these speculations are not yet supported with research, Nettle's stand on personalities as fluctuating selection is worth further considerations.

7. Background for research proposal & hypothesis

What we have learned from the literature review is that there seems to be a certain degree of elasticity within the neuroticism spectrum. Personality traits can be quite flexible in certain situations. Personalities can influence behavior so that certain personalities rather than others seek out certain situations, are more exposed to conflict or are more risk aversive, to name a few examples.

Furthermore, specifically neurotic individuals seem particularly vulnerable, especially in situations which induce fear or stress. For example, we learned that some physical & mental challenges such depression or pain can increase neurotic tendencies among neurotics. It is therefore suggested that neurotics can be affected when confronted with their problems in forms of questions concerning depression, anxiety and stress. Will there be a shift in their scoring during such confrontation? And if yes, what can be documented about that change in their scoring?

In the following section, the design of the questionnaire will be discussed. The basic design involves measuring the degree of neuroticism among the participants, exposing them to a series of questions, including questions on depression, anxiety and stress in addition to questions that induce self-awareness and then re-measure the degree of neuroticism among the participants.

The hypotheses then become:

There is variability in neuroticism, which can be identified in measurement of personality between two neuroticism measurements.

We can document about the change that there seems to be differences within the neuroticism spectrum

8. Method

The aim of this study was to measure potential flexibility within the neuroticism spectrum. Hypotheses were constructed and tested to see if support for such flexibility could be found. An interest was to see if systematic priming could influence neurotic individuals so that they would change their scoring on the neuroticism scale between measurements. Data was accumulated via a quasi-experiment which was used to obtain quantitative materials.

In the following chapters a brief description is given of the quasi-experimentation, design, measurements tools, implementation, data collection and the statistical analysis procedures that were used.

8.1.   Experimentation

An experiment is traditionally described as tests that include design that has the aim to reach a causal explanation. Variables in experiments are very important in addition to manipulation of the variables. Selecting the variables in an effective manner is often what differentiates between a good and a poor experiment. The independent variable is the one that is being manipulated while the dependent one is being observed (Elmes, Kantowitz & Roediger, 2006, p. 134: 138).

Factors such as priming and randomizing are further significant in experimentation. Randomizing is frequently used in between-subject experiments with the aim to minimize differences among the subjects in numerous treatment groups (treatment group & control group for example) (ibid, p. 194).

A quasi-experiment is a variant within experimentation. Here, randomizing is not used since there is an interest in exposing the participants to the exact same systematic priming. A quasi-experiment was used with the purpose to test the causal consequences of the variables in the study. Variables were selected in a specific order so that the priming was systematic.

Quasi experiments do have some advantage compared to other experiments and are perceived stronger for causal inference in a descriptive way. Under some conditions, causal inferences are superior, one being that the causal hypothesis have multiple empirical implications under testing. This happens when the quasi

experimental design has a dependent variable that can change due to the treatment and another dependent variable that does not change according to theory according to Cook (2015, p. 1-2).

8.2. Design

A within person design was chosen since it is often more efficient than a between-subject experiment. It requires fewer participants since a control group is not needed. According to Elmes, Kantowitz & Roediger (2006, p. 196-197) a within subject design is further considered more effective since the participant´s performance is compared across different measurements since all participants are exposed to the same condition.

In a within-subject experiment, the participants' performance is compared across different experimental conditions. According to Coolican (2009, p. 68-69) it is ideal when looking at individual differences, which is the case here. Repeated measurements are frequently used in a within design.

One of the risks that a within subject design faces are the carryover effects[13]. When applied to this research the aim was to demonstrate an effect. The real risk was that participants would get tired since the questionnaire was quite long, but that was taken into consideration in the very beginning. Hence the recruitment goal was set to min. 300 participants.

8.3. Implementation

The main idea in the current experiment was to measure the scoring on the neuroticism scale and then expose participants systemically to a different set of scales and then measure neuroticism again. The differences that the participants experience are usually caused by the manipulation of the independent variable, according to Elmes, Kantowitz & Roediger (2006, p. 196-197).

Systematic exposure or priming is what all the participants were subject to. The measurement had two components. One had the aim to measure psychological

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[13] Carryover effects: When participants can carry the effect of one experiment with them to the next according to Cleophas (1999, p. 25).

state by exposing the participants to the presence of problems (DASS21) which could then create a negative state within certain participants, the neurotic ones especially. The other component of the measurement was about inducing self-awareness. Within that component were three scales; Self-Control, Self-Esteem and Self-Compassion. The main idea was to extend the influence that DASS21 had on participants by inducing self-awareness. The order of the scales is shown below to get a clearer idea of the exposure:

1. Background questions
2. Self-help
3. The first 20 items from IPIP 50 (IPIP20)
4. Stress Scale
5. DASS21
6. Self-Control
7. Self-Esteem
8. Self-Compassion
9. The last 30 items from IPIP 50 (IPIP30)

Self-Control, Self-Esteem and Self-Compassion are not negatively loaded and can enhance self-reflection among individuals. The design was exceptional because within the design there was a demonstration of changed self-awareness. By using this kind of design it was possible to induce a change within the neuroticism spectrum indicating a level of flexibility within that trait. To my best knowledge this has never been done before and is therefore a new experiment within the field of psychology.

8.4.   Measurements

In the following subsections, relevant measurements or tests that were used in the data analyses will be presented. The remainder of the scales will not be represented as they were not of usage in the current thesis.

8.4.1.   Psychological tests

Psychological tests are a procedure that is systematic and has the aim to compare behavior between two or more individuals. What is thought to be appealing is its

generality (Furr & Bacharach, 2008, p. 5). According to Coolican (2009, p. 172) psychological tests or scales are measuring instruments. In the personality inventory it includes statements on a Linkert response scale where individuals chose from strongly disagree to strongly agree. Only a small aspect is measured through each item as the items are a part of a whole construct, for example neuroticism. Tests and scales are considered scientific measurements while a questionnaire is more about gathering certain information.

8.4.2.   *International Personality Item Pool (IPIP 50)*

The full version of IPIP was assembled by Dr. Lewis R. Goldberg and contains 2,413 items (IPIP Home page, 2016). Goldberg was the one to deliver the first public presentations of the IPIP scale in 1996. The IPIP scale was embraced by numerous researches and since then it has grown in popularity worldwide. The IPIP home page offers over 40 different translations of the scale. In addition, the IPIP home page offers an estimation of the Cronbach alpha reliability for all the IPIP scales. In the current study a shorter version of the IPIP was used, named IPIP50. The shorter version was used due to the length of the questionnaire in order to minimize missing values that could be caused by fatigue. It measures extraversion, agreeableness, neuroticism, conscientiousness and openness to experience.

The scoring system within the scale contains both – (negative) five keyed and + (positive) five keyed items, with the purpose to increase the validity of the scale by keeping the participant's attention on the questions. There is a risk that participants would think that the measurements were of the same kind if all the items were either negative or positive. By using both negative and positive statements the aim is to further stimulate the participants and their concentration (IPIP Home page, 2016: Goldberg et, al. 2006, p. 88).

The IPIP50 was divided in a way that participants answered the first part of the IPIP50 (IPIP20) in the beginning of the questionnaire and the second part (IPIP30) in the end of the questionnaire. See appendix 2 for a full version of the IPIP50 scale and the scoring system.

8.4.3. *Depression, Anxiety & Stress Scale (DASS21)*

The DASS21 was developed by Fernando Gomez and the original scale contains a 42-item questionnaire and three self-report scales containing 14 items. The DASS21 scale is not used as a diagnostic instrument since three of the subscales evaluate dimensional mechanisms of anxiety and depressive disorders. It is rather considered as a distress measure but a measure of common causes within anxiety and depression while stress is categorized as a distinct syndrome according to Osman et al. (2012, p. 1322).

What the depression scale measures is dysphoria, hopelessness, lack of interest or involvement and anhedonia. Measurements of anxiety focus on skeletal muscle effects, subjective experience of anxious affect and situational anxiety. The last measurement is stress and it measures nervous arousal, how easily upset/agitated, irritable/over reactive, impatience and nervous arousal levels (Psychology Foundation of Australia, 2014).

Different settings have shown high internal consistency within the DASS21. Therefore, the scale is considered appropriate for both groups and individuals when conducting a research. Furthermore, DASS21 has been used by clinicians to measure emotional disturbances (ibid). See appendix 3 for more detailed information about the scale and its scoring system.

8.4.4. *Self-Control*

In the study a 10-Item Self-Scoring Self-Control Scale was used where individuals were asked to read each of the statements carefully and check the box from a 5-point Likert scale. The response options were from "not at all like me" to "very much like me". See appendix 4 for more detailed description of the scale.

The items within the scale measurer constructs concerning impulsive behavior and school performance. It also contains elements measuring interpersonal relationships since a good amount of self-control is thought to improve relationships and provide more harmonious interactions according to Tangey, Baumeister & Boone, 2004, p. 272-274).

8.4.5.   Self-Esteem

The Rosenberg Self-Esteem scale was developed by Morris Rosenberg and has been known for both good reliability and validity. The scale contains ten statements with four answering options on a Likert scale from strongly agree to strongly disagree. The statements give 0-3 points with a total score range from 0-30 points, 30 being the highest score indicating high self-esteem and vice versa. See appendix 5 for a more detailed descriptions of the scale.

8.4.6.   Self-Compassion

Kristin Neff developed the Self-Compassion scale which originally contained 26 items (long version). A shorter version of the scale was used in the thesis, which contains 12 items. The shorter version correlates almost perfectly with the long version. The main structures that are being measured are; self-kindness, common humanity and mindfulness. The scale has a very good test-retest reliability according to Neff (2003, p. 239). See appendix 6 for further information about the scale.

8.5.   Data Collection

The data collection took place in October 2016. In order to maximize the number of participants, both a Danish and English version of the scales was used in the recruitment process. Since most of the scales were in English except one, a backward translation was used to have them in Danish and vice versa.

Survey Monkey was the main data collection tool and after entering all the scales and background questions in the Survey Monkey the recruitment process began. The Survey Monkey was later published on the social media Facebook and shared by the extended network of the researchers.

Recruitment was also performed at the University library since the recruitment goal was 300 participants at least. After three weeks of data collection the Survey Monkey was closed down and all the data was transferred into the Statistical program SPSS.

Numerous items within the Big Five questionnaire had to be reversed since some items on the Likert scale answers indicated 1 as a high score while others

indicated 1 as a low score. This process was necessary before starting the analyzing part.

8.6. Participants

The survey consisted of 323 participants, 246 women and 77 men. There was a missing value of 101. See figure 1 for further information of the participants.
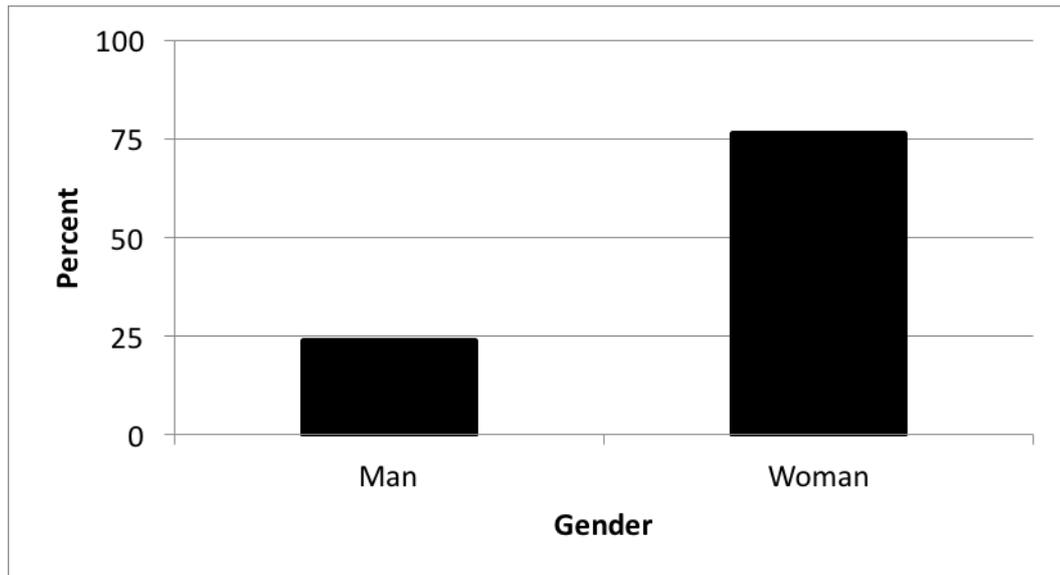
Figure 1 Gender of the participants

When looking at the nationality of the participants it can be seen on figure 2 that it is quite diverse.
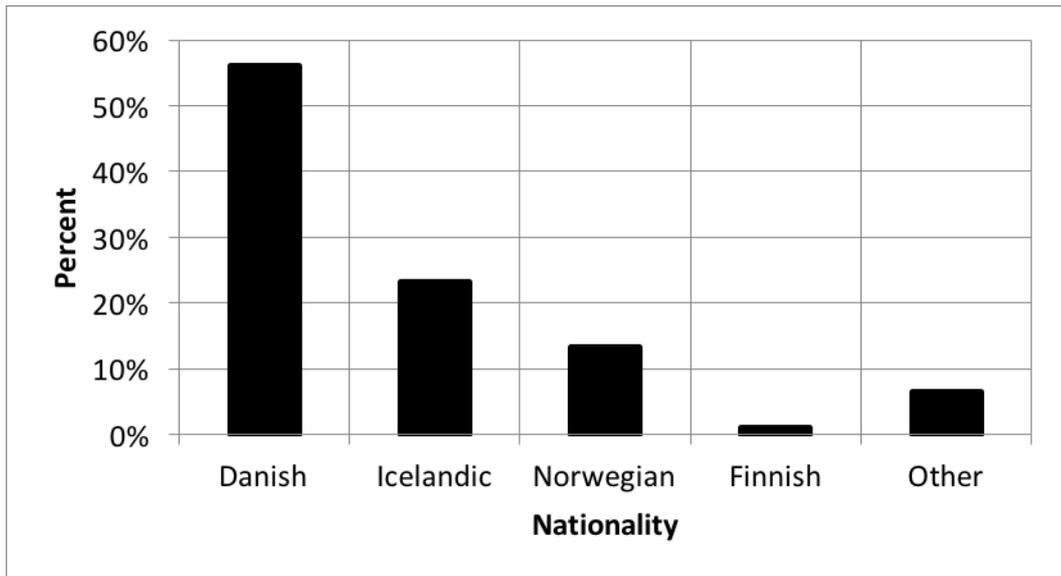
Figure 2 Participant´s nationality

When breaking the participants down into occupational groups it can be seen that almost half of the participants were students or 44% of the total sample. The second most shared occupation was office or administration work (15%). See figure 3 for further information about the participant´s occupation.
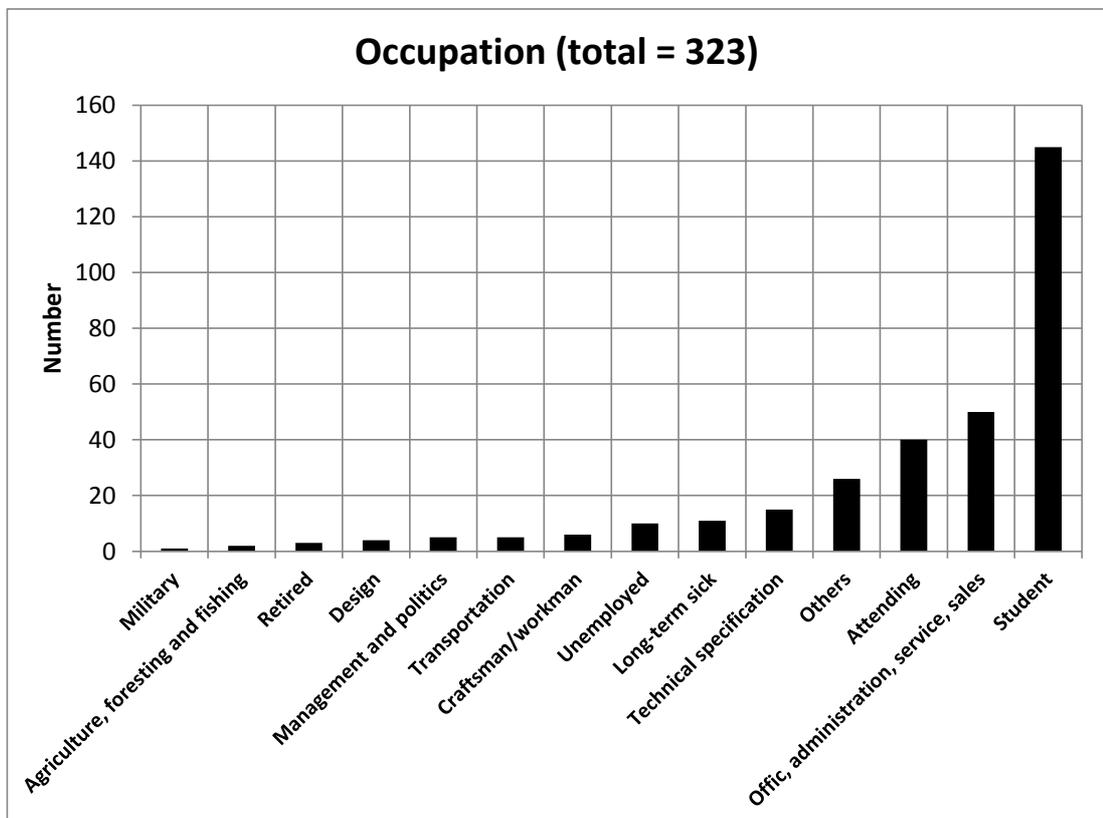
Figure 3 Participant's occupation

9. Analysis & Results

In selecting a method for the statistical analysis of a given dataset, many theoretical and practical aspects must be kept in mind. To see if the systematic priming worked and a change occurred among the participants a descriptive statistic of the scales was applied by using SPSS. A subtraction of the scales was then made with the purpose to test the first hypothesis:

There is variability within neuroticism, which can be identified in measurement of personality between two neuroticism measurements.

A correlation analysis followed to see if there were certain scales that influenced the change among the participants. In addition, an ANOVA study was performed to identify some main effects that could explain the change if any and test the second hypothesis:

We can document about the change that there seems to be differences within the neuroticism spectrum

After all the items had been reversed and before starting the analysis part, a Cronbach´s alpha reliability test of the main neuroticism scale was made. This was done to see if there had been any mistakes in the reversing process. According to Brace, Kemp & Snelgar (2006, p. 331-332) a reliability coefficient should have the minimum 0.70 of Cronbach´s alpha. Cronbach´s alpha was fairly good or .786, see appendix 7 for further information of the reliability analysis.

9.1. Descriptive Statistics

Descriptive statistics of the first part of the IPIP 50 (IPIP 20) are presented below. table 2 shows that N=243 and the mean is 11.97. Standard deviation was 3.22, meaning that the average score on the scale was 3.22 away from 11.97 (mean).

The lowest number the participants could score on the scale was 4 indicating very high neuroticism since the scale was reversed (emotional stability). The highest number a participant could score was 20, indicating very low neuroticism. According to table 2there were individuals with the lowest score possible (4) and certain individuals had also scored the highest score possible (20).

Table 2 Descriptive Statistics of IPIP 20

Statistics		
Neuroticism (measurement 1)		
N	Valid	243
	Missing	80
Mean		11.9753
Std. Deviation		3.22430
Minimum		4.00
Maximum		20.00

Figure 4 shows the participant´s scoring distribution on the first part of the IPIP 50 scale. The majority lies in the middle of the scale with a scoring from 8-16 or 72.3% of the participants. There were a couple of participants that had a very low score on the scale indicating very high neuroticism or 4-9. Those who scored very high on the scale were 56 total or 33.7% (low neuroticism).
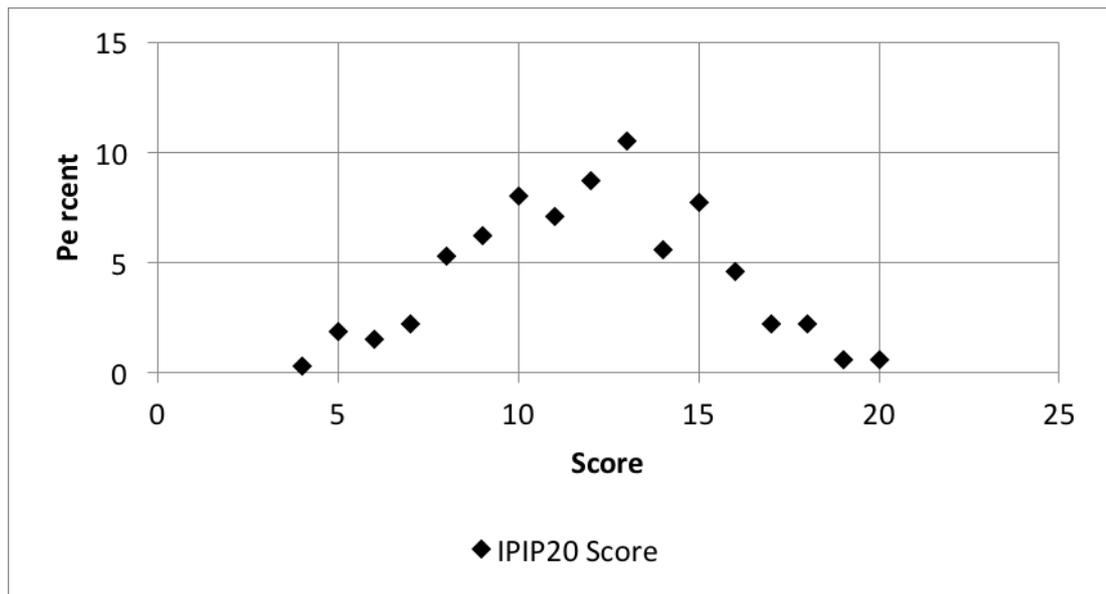
Figure 4 Percent of the IPIP 20 Scoring

Descriptive statistics of the second part of the IPIP 50 (IPIP30) are shown in table 3. As the table shows, N= 222 with a mean of 20.47. The standard deviation was 3.51, meaning that the scoring can vary 3.5 from 20.47 (mean). The lowest score the participants got was 13 and the highest score was 28. The lowest score you could get on the second part of the IPIP30 was 6 (high neuroticism) and the highest score you could get was 30 (low neuroticism). There were no participants with the lowest

score possible as the lowest score was 13 according to table 3. Neither did any of the participants have the highest score possible, since it was 28.

Table 3 Descriptive Statistic of IPIP 30

Statistics		
Neuroticism (measurement 2)		
N	Valid	222
	Missing	101
Mean		20.4730
Std. Deviation		3.51940
Minimum		13.00
Maximum		28.00

According to figure 5, there were 5 participants with the lowest score of 13 (high neuroticism), a total of 8 who scored 14 points and 10 who scored 15. The majority of the participants had a score between 17-24 (low to moderate neuroticism) or 49.9% of all participants.
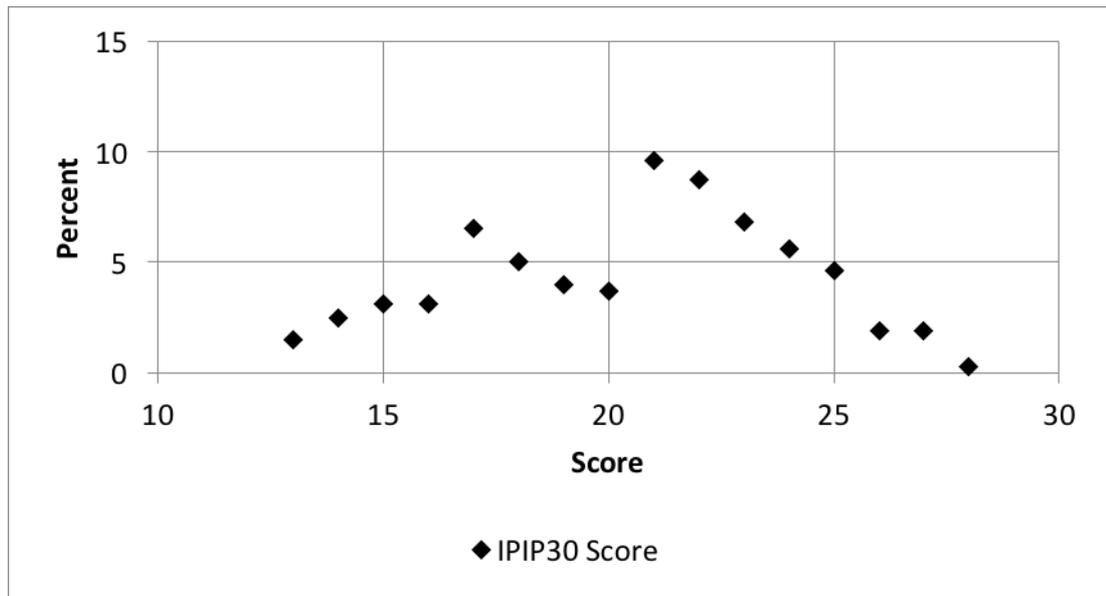
Figure 5 Percent of the IPIP30 Score

Figure 6 shows the difference between the two IPIP-scale measurements in one graph. Since the number of questions was unequal between the scales (IPIP20 & IPIP30) the comparison is not accurate enough but still provides some clues about the change between the measurements.
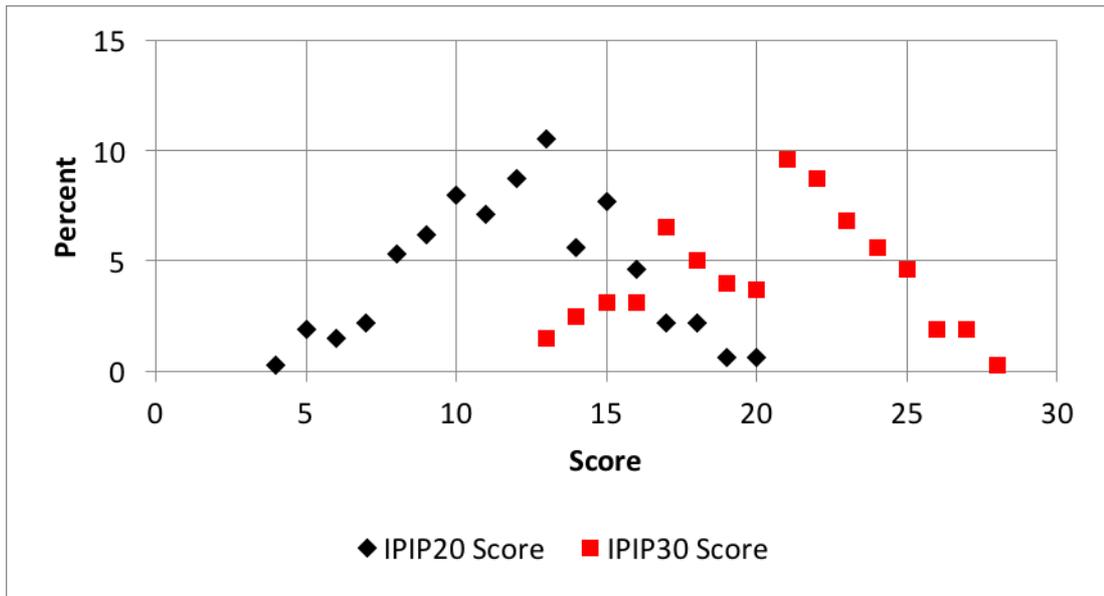
Figure 6 Difference between IPIP20 & IPIP30

The IPIP20 scale contained 20 questions and the IPIP30 contained 30 questions. In order to compare the two, both scales are converted into a scale from 0-10 (percentages) in order to obtain an accurate comparison.

The formula that was used to convert the scales into a 10 number was:

$$\frac{(N \text{ (items)} - \text{(scale value)}) \times 10 \times 10}{\text{(maximum value)}}$$

Now the change between the measurements (IPIP20 & IPIP30) will be presented after the ten format. To be able to identify the change a subtraction was done between the first measurement (IPIP 20) and the second measurement (IPIP30). This was done to see if the systematic priming worked.

According to table 4 the lowest value was -3.41 and the highest value was 4.64. The mean was 0.89 and the standard deviation was 1.54.

Table 4 Statistic of the Change

Statistics		
The Change		
N	Valid	222
	Missing	101
Mean		.8977
Std. Deviation		1.54828
Minimum		-3.41
Maximum		4.64

The graph on figure 7 indicates that the change is relatively small (most values being in the middle) but there are still certain individuals that fall in stability while others increase. There is one individual that falls by -3.41 in stability and one person that increases in stability by 4.64. There are 15.3% that change in a negative direction, when taking the standard deviation into account. Meaning they fall in stability. Certain individuals seem to increase in stability or 18%, the standard deviation was also taking into account here. A total of 33% of the participants experience a change after going through all the questionnaires. For more detailed descriptions of the calculations see appendix 8.
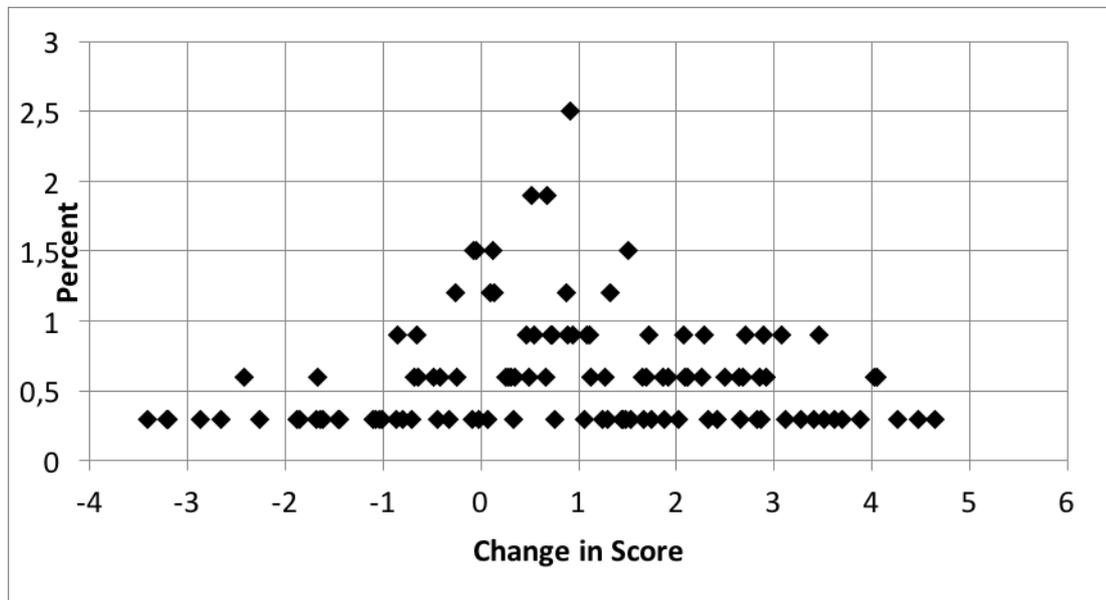
Figure 7 The change between IPIP20 and IPIP30

Results show that there is an observable flexibility in the situation that was created through systematic priming. Third of participants showed an either increased

stability or a decreased stability while the remainder of the participants did not change significantly.

A majority of the individuals that did show reaction when confronted with the negative questions (DASS21) did change to a positive direction. Meaning that there was a slight tendency to change in a positive way, hence neurotic individuals did become a little more stable after answering DASS21. There were also some changes to the negative direction meaning that a small number of the emotionally stable individuals did become a little more neurotic.

Results do show that neurotics did not become more neurotic when confronted with negative stimuli. The change cannot be explained through fear or the anxious personality of the neurotic since the change is a positive one. There was a tendency that individuals changed positively, hence became more emotionally stable. Certain amount of emotional stability was induced and thereby documented. This was not a reactive reaction but more likely something within the personality traits that could possibly explain this.

9.2.   *Correlation Analysis*

The second part of the analysis is a correlational study. According to Elmes, Kantowitz & Roediger (2006, p. 114) a correlational analysis allows us to determine the degree and direction of the relationship if any. The aim here was to further investigate the relationship between both the measurements (IPIP20 & IPIP 30) and the change. There was also an interest to see which scales could have influenced the priming if any.

A Pearson correlation study[14] was performed on the variables IPIP20 and the change. According to table 5 there was a significant negative correlation between IPIP20 and the change (r = -.686, N = 222, p < 0.01, two-tailed). This means that a higher score on the neuroticism scale (low neuroticism) before answering DASS21 gives a lower score on the change.

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[14] A Pearson r is one form of correlation coefficient, which provides a statistical index of the two variables and its degree of association (Shultz & Whitney, 2005, p. 420).

Table 5: Correlation between IPIP20 and the change

		IPIP20	Change
IPIP20	Pearson Correlation	1	-.686**
	Sig. (2-tailed)		.000
	N	243	222
Change	Pearson Correlation	-.686**	1
	Sig. (2-tailed)	.000	
	N	222	222
**. Correlation is significant at the 0.01 level (2-tailed).			

According to table 6 there was a significant but low correlation between IPIP30 (second neuroticism measurement) and the change between the two groups (r = .169, N = 222, $p < 0.05$, two-tailed), which means a low linear association between IPIP30 and the change between measurements.

Table 6: Correlations between IPIP30 and the change

		Change	IPIP30
Change	Pearson Correlation	1	.169*
	Sig. (2-tailed)		.011
	N	222	222
IPIP30	Pearson Correlation	.169*	1
	Sig. (2-tailed)	.011	
	N	222	222
*. Correlation is significant at the 0.05 level (2-tailed).			

The results indicate that individuals scoring high on neuroticism did not increase their scoring after answering questions related to depression, anxiety or stress. Individuals who scored higher on neuroticism in the first measurement (IPIP20) scored lower on neuroticism in the second measurement (IPIP30) and vice versa. Those who scored lower on neuroticism in the first measurement (IPIP20) scored higher in the second measurement (IPIP30).

In what follows, all the scales that were of importance concerning the systematic priming are compared through a correlational analysis to see if any of them had any significant effect on the change.

Table 7 shows that there were two scales that were significantly correlated with the change, DASS21 & Self-Esteem. DASS21 had a positive significant

correlation with the change or +.227. Self-Esteem on the other hand had a significant negative correlation with the change or -.166.

Table 7 Correlation Analysis

Correlations						
		The Change	DASS21	Self-Compassion	Self-Esteem	Self-Control
The Change	Pearson Correlation	1	.227[**]	-.080	-.166[*]	.051
	Sig. (2-tailed)		.001	.238	.013	.453
	N	222	222	222	222	222
DASS21	Pearson Correlation	.227[**]	1	-.366[**]	-.359[**]	-.255[**]
	Sig. (2-tailed)	.001		.000	.000	.000
	N	222	228	222	227	228
Self-Compassion	Pearson Correlation	-.080	-.366[**]	1	.682[**]	.377[**]
	Sig. (2-tailed)	.238	.000		.000	.000
	N	222	222	222	222	222
Self-Esteem	Pearson Correlation	-.166[*]	-.359[**]	.682[**]	1	.320[**]
	Sig. (2-tailed)	.013	.000	.000		.000
	N	222	227	222	227	227
Self-Control	Pearson Correlation	.051	-.255[**]	.377[**]	.320[**]	1
	Sig. (2-tailed)	.453	.000	.000	.000	
	N	222	228	222	227	228
**. Correlation is significant at the 0.01 level (2-tailed).						
*. Correlation is significant at the 0.05 level (2-tailed).						

The results from the correlational analysis indicate that there were two scales that influenced the participant's stability. The less self-esteem certain individuals had, the less neurotic they became after the systematic priming. The reverse is observed for the scoring on the DASS21 scale. The higher certain individuals scored on DASS21 the less neurotic they became. Even though the correlation was quite low the relationship was significant and does therefore provide us with some clues what could be interacting with the change.

9.3. ANOVA

In this section an ANOVA study was used since its main advantage is doing statistical analysis with numerous variables. According to Elmes, Kantowitz & Roediger (2006, p. 229) it further corrects for correlations with the predictor

variables. By using this method, it is possible to test models for exactly what kind of variables can have predictive value on behavior.

There was a certain association with the change and in what follows an ANOVA study will be presented to see if there are any main effects that are interacting with the stability among the participants. The variable change was simplified (3 division) so that it would be easier to work with the data in SPSS.

According to table 8 the relationship with the change and DASS21 was not significant or $F_{(42.88)} = 1.234$, $p > .0005$ and the same goes for all the other variables, Self-Control & Self-Compassion. Self-Esteem came close to having a significant effect or $F_{(22.88)} = 1.500$, $p > .0005$, however it was not significant.

Table 8 Tests of Between-Subject Effects

Tests of Between-Subjects Effects					
Dependent Variable: 3 Division The Change					
Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	70.688[a]	133	.531	1.163	.224
Intercept	142.211	1	142.211	311.312	.000
DASS21	23.676	42	.564	1.234	.203
Self-Control	14.475	27	.536	1.174	.283
Self-Esteem	15.071	22	.685	1.500	.095
Self-Compassion	15.261	37	.412	.903	.628
Error	40.200	88	.457		
Total	979.000	222			
Corrected Total	110.887	221			
a. R Squared = .637 (Adjusted R Squared = .090)					

Another ANOVA analysis was performed with the same variables but now controlling for age and gender, to see if these variables were of importance.

As can be seen in table 9 there was no significant effect between the change and DASS21 ($F = (26, 57) = 1.071$, $p > .0005$) when controlling for age and gender. The same applies for the other variables, Self-Control, Self-Esteem & Self-Compassion.

Table 9 Tests of Between-Subject Effects

Tests of Between-Subjects Effects					
Dependent Variable: 3 Division The Change					
Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	57.621[a]	114	.505	1.036	.448
Intercept	11.056	1	11.056	22.671	.000
DASS21	13.578	26	.522	1.071	.403
Self-Control	12.890	26	.496	1.017	.464
Self-Esteem	15.705	21	.748	1.534	.102
Self-Compassion	14.375	32	.449	.921	.591
Age	.067	1	.067	.138	.711
Gender	.499	1	.499	1.022	.316
Error	27.797	57	.488		
Total	734.000	172			
Corrected Total	85.419	171			
a. R Squared = .675 (Adjusted R Squared = .024)					

The overall results from the ANOVA did not show any significant main effect between the change and DASS21, Self-Control, Self-Esteem or Self-Compassion. The same happens when controlling for age and gender, with no significant effect. Meaning that the change that one third of the participants experienced cannot be explained through these main effects.

10.   Discussion

The results will now be discussed. The purpose is to interpret the importance of the findings in conjunction with earlier theories and researches. New insights into the Big Five personality traits will be further discussed and how these findings can open doors for future research. At the end of the discussion chapter, limitations of the study will be briefly mentioned.

The hypotheses were as follows:

There is variability in neuroticism, which can be identified in measurement of personality between two neuroticism measurements.

What we can document about the change is that there seems to be differences within the neuroticism spectrum

The literature review among earlier theories suggests that there is certain flexibility among the personality traits. The results from the experiment yielded support for that in addition to answering the research questions and hypotheses. It was documented that one third of the participants reacted to the systematic priming. It was demonstrated through the within subject design that there is a certain elasticity within the neuroticism spectrum. However, a difference among the neurotic participants and how they reacted was measured. Individuals high on neuroticism were measured to be a little bit more stable in the second personality measurement while individuals low on neuroticism measured a bit more neurotic. This came as a surprise and is quite interesting and thought provoking. Especially since previous research has shown that neurotics have the tendency to respond with more distress towards negative stimuli in addition of being more sensitive to threats and negative priming according do Perkins (2015) & Augustine & Larsen (2011, p. 410). It was further surprising that certain individuals low on neuroticism became a little bit less stable since extroverts, for example, are known for their positive feelings and for reacting more strongly to positive images rather than negative ones (Larsen & Ketalaar, 1991, p. 135). Individuals who are high on conscientiousness are further believed to be more resilient than other personalities (Mount et. Al. 2005, p. 449) and therefore do the results concerning both the groups come as a surprise.

What seems to contribute to the change among the participants was how they scored on the DASS21 and the Self-Esteem scales. Individuals who scored high on the DASS21 scale became a little bit more stable. The higher a participant scored on DASS21 the more stable he or she became since the correlation was positive. The lower a participant scored on the Self-Esteem scale the more stable the participant became since the correlation in this case was negative. This suggests that this flexibility that was documented is dependent on how individuals are. It could lend support for Galton´s idea that personality traits and their distinct differences are due to their levels of emotional reactivity (Nettle, 2007, p. 18-19). According to Nettle (2007, p. 94) neurotics have different metabolic activity when responding to negative images.

Self-esteem, while not being a Big Five personality trait, is an emotional evaluation of one self that can play a role. Costa and McCrae (1992) explain how depression can negatively affect one´s self-esteem especially among neurotics rather than extroverts. Since neurotics were the groups that became less neurotic one can wonder if they were also the ones that had lower scoring on the self-esteem scale.

Individuals are different and one can speculate that when experiencing some hassles these individual differences become less as in the gap between individuals becomes smaller. The flexibility is not just elastic but also a directional one, meaning that certain circumstances can make neurotics more stable and vice versa with the emotionally stable group.

This supports Dori´s ideas about character, and that it does have meaning in situations. Additionally, Nettle talks about the important role of personality and situations and how a combination of the two plays a role, his standpoint being an evolutionary standpoint and was described in the example about the bear and our survival mechanism in connection to the automatic responses. However, it is the personality traits that set the frame for how individuals react in numerous situations as different personality traits can be more sensitive to certain situations. This further explains why measurements across situations are less consistent, because there is more context within the personality traits.

We are what we are but we can take note of the circumstances around us and become aware of how personality traits influence each and one, and how they set the frame for how we react in numerous situations.

10.1. Suggestions for Future Research

The research study opens some doors to future research, especially since the results are quite new to my knowledge. Perhaps the Big Five personality traits are evolving or perhaps there are subtypes under one of the most complicated personality trait of them all; neuroticism. If so it is important to research this further since people respond differently to different kinds of treatments. Moreover, if individuals who are emotionally stable become less emotionally stable by series of systematic priming perhaps that could indicate that in general it takes less to set these individuals off. Young people are becoming less resilient, which seems to be a growing problem in the United States according to Gray (2015). This also applies to young people in Denmark. It is necessary to research why. What causes this? Are efforts to reduce stress and increase emotional stability misguided?

Since the results were quite unexpected it could strengthen the outcome and deepen our understanding further to replicate the experiment. By using the same within subject design but using a controlled experiment with a larger sample it might be possible to provide some further insights into the neuroticism spectrum.

10.2. Limitations of the study

One of the limitations of the research study is the generalizability over the Danish population since the participant's nationality was very broad. The sample does not represent the target population due to the diversity of the nationalities. There were also some signs of carryover effects in the form of fatigue, i.e. of participants losing patience with the survey due to its length.

The internal validity is also higher when doing controlled experiments. In this case the participants were recruited mostly through the social media Facebook instead of being recruited randomly in the university area where there is access to experimentation rooms. On the other hand, it would have been harder to recruit over 300 participants for such a setting. These are considerations that were discussed in the beginning and there is a possibility that the results would have been more accurate if controlled experiments had been carried out.

Another consideration is that participants could answer the questionnaire in their own convenience, online. Undoubtable, some chose to answer the questions in

their workplace while others did so in the comfort of their homes. This might affect the results as some situations are more stressful than others.

11.   Conclusion

This final thesis used a quasi-experiment with a within subject design with the aim to provide new insights into the flexibility within the personality traits. The dataset consisted of over 300 participants. Neuroticism is one of the most complex personality traits and earlier research have indicated that neurotics are more vulnerable to negative stimulus due to both their anxious personality trait and their genetic vulnerability.

An interest was in testing two hypotheses that originated from the theoretical part:

There is variability in neuroticism, which can be identified in measurements of personality between two neuroticism measurements.

We can document about the change that there seems to be differences within the neuroticism spectrum

The participants were exposed to systematic priming. First they were asked a series of negatively loaded questions concerning depression, anxiety and stress, and secondly with a series of questions that could induce self-awareness (Self-Esteem, Self-Control & Self-Compassion). By putting the first part of IPIP50 (IPIP20) in the beginning of the questionnaire and then putting the second measurement (IPIP30) in the end, after the scales that were to evoke self-reflection, it was possible to measure how it affected the participants.

Both hypotheses were supported. Results showed that there was a change to both directions between measurements, a positive one and a negative one. This means that neurotic individuals became a little bit more stable and low neurotics became a little bit less stable. The positive change was bigger than the negative one, implying that stability can be induced and that there is some kind of situational flexibility within the Big Five personality traits depending on individuals.

What seemed to be interfering with the change among the participants were scores on two scales, DASS21 and Self-Esteem. DASS21 was positively correlated with the change while Self-Esteem was negatively correlated with the change. The correlation was weak but significant.

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Appendix 1   Cattell´s 16 Personality Factor Model

Table 1. Primary Factors and Descriptors in Cattell's 16 Personality Factor Model (Adapted From Conn & Rieke, 1994).

Descriptors of Low Range	Primary Factor	Descriptors of High Range
Reserve, impersonal, distant, cool, reserved, impersonal, detached, formal, aloof (Sizothymia)	Warmth	Warm, outgoing, attentive to others, kindly, easy going, participating, likes people (Affectothymia)
Concrete thinking, lower general mental capacity, less intelligent, unable to handle abstract problems (Lower Scholastic Mental Capacity)	Reasoning	Abstract-thinking, more intelligent, bright, higher general mental capacity, fast learner (Higher Scholastic Mental Capacity)
Reactive emotionally, changeable, affected by feelings, emotionally less stable, easily upset (Lower Ego Strength)	Emotional Stability	Emotionally stable, adaptive, mature, faces reality calm (Higher Ego Strength)
Deferential, cooperative, avoids conflict, submissive, humble, obedient, easily led, docile, accommodating (Submissiveness)	Dominance	Dominant, forceful, assertive, aggressive, competitive, stubborn, bossy (Dominance)
Serious, restrained, prudent, taciturn, introspective, silent (Desurgency)	Liveliness	Lively, animated, spontaneous, enthusiastic, happy go lucky, cheerful, expressive, impulsive (Surgency)
Expedient, nonconforming, disregards rules, self indulgent (Low Super Ego Strength)	Rule-Consciousness	Rule-conscious, dutiful, conscientious, conforming, moralistic, staid, rule bound (High Super Ego Strength)
Shy, threat-sensitive, timid, hesitant, intimidated (Threctia)	Social Boldness	Socially bold, venturesome, thick skinned, uninhibited (Parmia)
Utilitarian, objective, unsentimental, tough minded, self-reliant, no-nonsense, rough (Harria)	Sensitivity	Sensitive, aesthetic, sentimental, tender minded, intuitive, refined (Premsia)

Trusting, unsuspecting, accepting, unconditional, easy (Alaxia)	Vigilance	Vigilant, suspicious, skeptical, distrustful, oppositional (Protension)
Grounded, practical, prosaic, solution orientated, steady, conventional (Praxernia)	Abstractedness	Abstract, imaginative, absent minded, impractical, absorbed in ideas (Autia)
Forthright, genuine, artless, open, guileless, naive, unpretentious, involved (Artlessness)	Privateness	Private, discreet, nondisclosing, shrewd, polished, worldly, astute, diplomatic (Shrewdness)
Self-Assured, unworried, complacent, secure, free of guilt, confident, self satisfied (Untroubled)	Apprehension	Apprehensive, self doubting, worried, guilt prone, insecure, worrying, self blaming (Guilt Proneness)
Traditional, attached to familiar, conservative, respecting traditional ideas (Conservatism)	Openness to Change	Open to change, experimental, liberal, analytical, critical, free thinking, flexibility (Radicalism)
Group-oriented, affiliative, a joiner and follower dependent (Group Adherence)	Self-Reliance	Self-reliant, solitary, resourceful, individualistic, self sufficient (Self-Sufficiency)
Tolerated disorder, unexacting, flexible, undisciplined, lax, self-conflict, impulsive, careless of social rues, uncontrolled (Low Integration)	Perfectionism	Perfectionistic, organized, compulsive, self-disciplined, socially precise, exacting will power, control, self sentimental (High Self-Concept Control)
Relaxed, placid, tranquil, torpid, patient, composed low drive (Low Ergic Tension)	Tension	Tense, high energy, impatient, driven, frustrated, over wrought, time driven. (High Ergic Tension)

Appendix 2　　　IPIP 50

How Accurately Can You Describe Yourself?

Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are, and roughly your same age. So that you can describe yourself in an honest manner, your responses will be kept in absolute confidence. Indicate for each statement whether it is 1. Very Inaccurate, 2. Moderately Inaccurate, 3. Neither Accurate Nor Inaccurate, 4. Moderately Accurate, or 5. Very Accurate as a description of you.

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		Very Inaccurate	Moderately Inaccurate	Neither Accurate Nor Inaccurate	Moderately Accurate	Very Accurate	
1.	Am the life of the party.	O	O	O	O	O	(1+)
2.	Feel little concern for others.	O	O	O	O	O	(2-)
3.	Am always prepared.	O	O	O	O	O	(3+)
4.	Get stressed out easily.	O	O	O	O	O	(4-)
5.	Have a rich vocabulary.	O	O	O	O	O	(5+)
6.	Don't talk a lot.	O	O	O	O	O	(1-)
7.	Am interested in people.	O	O	O	O	O	(2+)
8.	Leave my belongings around.	O	O	O	O	O	(3-)
9.	Am relaxed most of the time.	O	O	O	O	O	(4+)
10.	Have difficulty understanding abstract ideas.	O	O	O	O	O	(5-)
11.	Feel comfortable around people.	O	O	O	O	O	(1+)
12.	Insult people.	O	O	O	O	O	(2-)
13.	Pay attention to details.	O	O	O	O	O	(3+)
14.	Worry about things.	O	O	O	O	O	(4-)
15.	Have a vivid imagination.	O	O	O	O	O	(5+)
16.	Keep in the background.	O	O	O	O	O	(1-)
17.	Sympathize with others' feelings.	O	O	O	O	O	(2+)
18.	Make a mess of things.	O	O	O	O	O	(3-)
19.	Seldom feel blue.	O	O	O	O	O	(4+)
20.	Am not interested in abstract ideas.	O	O	O	O	O	(5-)
21.	Start conversations.	O	O	O	O	O	(1+)
22.	Am not interested in other people's problems.	O	O	O	O	O	(2-)

		Very Inaccurate	Moderately Inaccurate	Neither Accurate Nor Inaccurate	Moderately Accurate	Very Accurate	
23.	Get chores done right away.	O	O	O	O	O	(3+)
24.	Am easily disturbed.	O	O	O	O	O	(4-)
25.	Have excellent ideas.	O	O	O	O	O	(5+)
26.	Have little to say.	O	O	O	O	O	(1-)
27.	Have a soft heart.	O	O	O	O	O	(2+)
28.	Often forget to put things back in their proper place.	O	O	O	O	O	(3-)
29.	Get upset easily.	O	O	O	O	O	(4-)
30.	Do not have a good imagination.	O	O	O	O	O	(5-)
31.	Talk to a lot of different people at parties.	O	O	O	O	O	(1+)
32.	Am not really interested in others.	O	O	O	O	O	(2-)
33.	Like order.	O	O	O	O	O	(3+)
34.	Change my mood a lot.	O	O	O	O	O	(4-)
35.	Am quick to understand things.	O	O	O	O	O	(5+)
36.	Don't like to draw attention to myself.	O	O	O	O	O	(1-)
37.	Take time out for others.	O	O	O	O	O	(2+)
38.	Shirk my duties.	O	O	O	O	O	(3-)
39.	Have frequent mood swings.	O	O	O	O	O	(4-)
40.	Use difficult words.	O	O	O	O	O	(5+)
41.	Don't mind being the center of attention.	O	O	O	O	O	(1+)
42.	Feel others' emotions.	O	O	O	O	O	(2+)
43.	Follow a schedule.	O	O	O	O	O	(3+)
44.	Get irritated easily.	O	O	O	O	O	(4-)
45.	Spend time reflecting on things.	O	O	O	O	O	(5+)
46.	Am quiet around strangers.	O	O	O	O	O	(1-)
47.	Make people feel at ease.	O	O	O	O	O	(2+)
48.	Am exacting in my work.	O	O	O	O	O	(3+)
49.	Often feel blue.	O	O	O	O	O	(4-)
50.	Am full of ideas.	O	O	O	O	O	(5+)

Note. These five scales were developed to measure the Big-Five factor markers reported in the following article:

Goldberg, L. R. (1992). The development of markers for the Big-Five factor structure.

Psychological Assessment, 4, 26-42.

The numbers in parentheses after each item indicate the scale on which that item is scored (i.e., of the five factors: (1) Extraversion, (2) Agreeableness, (3) Conscientiousness, (4) Emotional Stability,

or (5) Intellect/Imagination) and its direction of scoring (+ or -).

These numbers should not be included in the actual survey questionnaire.

For further information on scoring IPIP scales, click the following link: Scoring Instructions.

Big-Five Factor Markers

Factor I (Surgency or Extraversion)

	10-item scale (Alpha = .87)
+ keyed	Am the life of the party.
	Feel comfortable around people.
	Start conversations.
	Talk to a lot of different people at parties.
	Don't mind being the center of attention.
− keyed	Don't talk a lot.
	Keep in the background.
	Have little to say.
	Don't like to draw attention to myself.
	Am quiet around strangers.

	20-item scale (Alpha = .91)
+ keyed	Am the life of the party.
	Feel comfortable around people.
	Start conversations.
	Talk to a lot of different people at parties.
	Don't mind being the center of attention.
	Make friends easily.
	Take charge.
	Know how to captivate people.
	Feel at ease with people.
	Am skilled in handling social situations.
− keyed	Don't talk a lot.
	Keep in the background.
	Have little to say.
	Don't like to draw attention to myself.
	Am quiet around strangers.
	Find it difficult to approach others.
	Often feel uncomfortable around others.
	Bottle up my feelings.
	Am a very private person.
	Wait for others to lead the way.

Factor II (Agreeableness)

	10-item scale (Alpha = .82)
+ keyed	Am interested in people.
	Sympathize with others' feelings.

Have a soft heart.
Take time out for others.
Feel others' emotions.
Make people feel at ease.

– keyed   Am not really interested in others.
Insult people.
Am not interested in other people's problems.
Feel little concern for others.

20-item scale (Alpha = .88)

+ keyed   Am interested in people.
Sympathize with others' feelings.
Have a soft heart.
Take time out for others.
Feel others' emotions.
Make people feel at ease.
Inquire about others' well-being.
Know how to comfort others.
Love children.
Am on good terms with nearly everyone.
Have a good word for everyone.
Show my gratitude.
Think of others first.
Love to help others.

– keyed   Insult people.
Am not interested in other people's problems.
Feel little concern for others.
Am not really interested in others.
Am hard to get to know.
Am indifferent to the feelings of others.

Factor III (Conscientiousness)

10-item scale (Alpha = .79)

+ keyed   Am always prepared.
Pay attention to details.
Get chores done right away.
Like order.
Follow a schedule.
Am exacting in my work.

– keyed   Leave my belongings around.
Make a mess of things.
Often forget to put things back in their proper place.

Shirk my duties.

	20-item scale (Alpha = .88)
+ keyed	Am always prepared.
	Pay attention to details.
	Get chores done right away.
	Like order.
	Follow a schedule.
	Am exacting in my work.
	Do things according to a plan.
	Continue until everything is perfect.
	Make plans and stick to them.
	Love order and regularity.
	Like to tidy up.
– keyed	Leave my belongings around.
	Make a mess of things.
	Often forget to put things back in their proper place.
	Shirk my duties.
	Neglect my duties.
	Waste my time.
	Do things in a half-way manner.
	Find it difficult to get down to work.
	Leave a mess in my room.

Factor IV (Emotional Stability)

	10-item scale (Alpha = .86)
+ keyed	Am relaxed most of the time.
	Seldom feel blue.
– keyed	Get stressed out easily.
	Worry about things.
	Am easily disturbed.
	Get upset easily.
	Change my mood a lot.
	Have frequent mood swings.
	Get irritated easily.
	Often feel blue.
	20-item scale (Alpha = .91)
+ keyed	Am relaxed most of the time.
	Seldom feel blue.
	Am not easily bothered by things.
	Rarely get irritated.
	Seldom get mad.

– keyed	Get stressed out easily.
	Worry about things.
	Am easily disturbed.
	Get upset easily.
	Change my mood a lot.
	Have frequent mood swings.
	Get irritated easily.
	Often feel blue.
	Get angry easily.
	Panic easily.
	Feel threatened easily.
	Get overwhelmed by emotions.
	Take offense easily.
	Get caught up in my problems.
	Grumble about things.

Factor V (Intellect or Imagination)

	10-item scale (Alpha = .84)
+ keyed	Have a rich vocabulary.
	Have a vivid imagination.
	Have excellent ideas.
	Am quick to understand things.
	Use difficult words.
	Spend time reflecting on things.
	Am full of ideas.

– keyed	Have difficulty understanding abstract ideas.
	Am not interested in abstract ideas.
	Do not have a good imagination.

	20-item scale (Alpha = .90)
+ keyed	Have a rich vocabulary.
	Have a vivid imagination.
	Have excellent ideas.
	Am quick to understand things.
	Use difficult words.
	Spend time reflecting on things.
	Am full of ideas.
	Carry the conversation to a higher level.
	Catch on to things quickly.
	Can handle a lot of information.
	Love to think up new ways of doing things.
	Love to read challenging material.
	Am good at many things.

– keyed

Have difficulty understanding abstract ideas.
Am not interested in abstract ideas.
Do not have a good imagination.
Try to avoid complex people.
Have difficulty imagining things.
Avoid difficult reading material.
Will not probe deeply into a subject.

Appendix 3   DASS 21

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A Guide to the Depression, Anxiety and Stress Scale

(DASS 21)

By Fernando Gomez- Consultant Clinical Psychologist
</td></tr>
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Introduction

The DASS 21 is a 21 item self report questionnaire designed to measure the severity of a range of symptoms common to both Depression and Anxiety. In completing the DASS, the individual is required to indicate the presence of a symptom over the previous week. Each item is scored from 0 (did not apply to me at all over the last week) to 3 (applied to me very much or most of the time over the past week).

The essential function of the DASS is to assess the severity of the core symptoms of Depression, Anxiety and Stress. Accordingly, the DASS allows not only a way to measure the severity of a patient's symptoms but a means by which a patient's response to treatment can also be measured.

The DASS and Diagnosis

Although the DASS may contribute to the diagnosis of Anxiety or Depression, it is not designed as a diagnostic tool. Indeed, a number of symptoms typical of Depression such as sleep, appetite and sexual disturbances, are not covered by the DASS and will need to be assessed independently. The DASS is not meant to replace a comprehensive clinical interview.

Suicide

Suicidality is not assessed by the DASS. Accordingly, the clinician will need to address directly this important symptom of Depression in their clinical interview.

How often to use the DASS?

Although the DASS can provide a comparison of symptoms from week to week, it is best given on first presentation and again after a period of time has lapsed long enough for the chosen treatment to have effect. In the case of antidepressant medication, the second administration should be between the 2-4 week period after the individual has commenced taking the medication. This period is long enough for most antidepressants to be expected to show some change in the patient.

Appendix 4   Baumeister Self-Control Scale

10-Item Self-Scoring Self-Control Scale

Adapted from
Tangney, J.P., Baumeister, R.F., Boone, A.L. (2004). High Self-Control Predicts Good
Adjustment, Less Pathology, Better Grades, and Interpersonal Success. *Journal of Personality*,
271-324.

First, please read the following 10 statements and for each, check the box that best represents you.

	Not at all like me	A little like me	Some what like me	Mostly Like Me	Very much like me
I have a hard time breaking bad habits.	5	4	3	2	1
I get distracted easily.	5	4	3	2	1
I say inappropriate things.	5	4	3	2	1
I refuse things that are bad for me, even if they are fun.	1	2	3	4	5
I'm good at resisting temptation.	1	2	3	4	5
People would say that I have very strong self-discipline.	1	2	3	4	5
Pleasure and fun sometimes keep me from getting work done.	5	4	3	2	1
I do things that feel good in the moment but regret later on.	5	4	3	2	1
Sometimes I can't stop myself from doing something, even if I know it is wrong.	5	4	3	2	1
I often act without thinking through all the alternatives.	5	4	3	2	1

Next, add up all the points for the checked boxes and divide by 10. The maximum score on this scale is 5 (extremely self-controlled), and the lowest scale on this scale is 1 (not at all self-controlled).

Appendix 5   Rosenberg Self-Esteem Scale (RSES)

Scale: Instructions Below is a list of statements dealing with your general feelings about yourself. Please indicate how strongly you agree or disagree with each statement.

1. On the whole, I am satisfied with myself.
2. At times I think I am no good at all.
3. I feel that I have a number of good qualities.
4. I am able to do things as well as most other people.
5. I feel I do not have much to be proud of.
6. I certainly feel useless at times.
7. I feel that I'm a person of worth, at least on an equal plane with others.
8. I wish I could have more respect for myself.
9. All in all, I am inclined to feel that I am a failure
10. I take a positive attitude toward myself.

Appendix 6   Kristin Neff´s Self-Compassion Scale

Short Form (SCS–SF) 1 To Whom it May Concern:

Please feel free to use the Self-Compassion Scale – Short Form in your research (12 items instead of 26 items). The short scale has a near perfect correlation with the long scale when examining total scores. We do not recommend using the short form if you are interested in subscale scores, since they're less reliable with the short form. You can e-mail me with any questions you may have. The appropriate reference is listed below.

Best wishes,

Kristin Neff, Ph. D. e-mail: kristin.neff@mail.utexas.edu

Reference: Raes, F., Pommier, E., Neff,K. D., & Van Gucht, D. (2011). Construction and factorial validation of a short form of the Self-Compassion Scale. *Clinical Psychology & Psychotherapy. 18*, 250-255.

Coding Key: Self-Kindness Items: 2, 6 Self-Judgment Items: 11, 12 Common Humanity Items: 5, 10 Isolation Items: 4, 8 Mindfulness Items: 3, 7 Over-identified Items: 1, 9

Subscale scores are computed by calculating the mean of subscale item responses. To compute a total self-compassion score, reverse score the negative subscale items - self-judgment, isolation, and over-identification (i.e., 1 = 5, 2 = 4, 3 = 3, 4 = 2, 5 = 1) - then compute a total mean.

SELF-COMPASSION SCALE–Short Form (SCS–SF) 2

HOW I TYPICALLY ACT TOWARDS MYSELF IN DIFFICULT TIMES

Please read each statement carefully before answering. To the left of each item, indicate how often you behave in the stated manner, using the following scale:

Almost never always 12345

1. When I fail at something important to me I become consumed by feelings of inadequacy.

2. I try to be understanding and patient towards those aspects of my personality I don't like.

3. When something painful happens I try to take a balanced view of the situation.

4. When I'm feeling down, I tend to feel like most other people are probably happier than I am.

5. I try to see my failings as part of the human condition.

6. When I'm going through a very hard time, I give myself the caring and tenderness I need.

7. When something upsets me I try to keep my emotions in balance.

8. When I fail at something that's important to me, I tend to feel alone in my failure

9. When I'm feeling down I tend to obsess and fixate on everything that's wrong.

10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.

11. I'm disapproving and judgmental about my own flaws and inadequacies.

12. I'm intolerant and impatient towards those aspects of my personality I don't like.

Appendix 7   Cronbach's Alpha Reliability

The Cronbach´s Alpha estimates the reliability of the internal consistency of all the 10 items within the scale. According to table 19 the Cronbach´s Alpha was .786 which is a fairly good reliability.

Table 10 Reliability of the Neuroticism

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.788	.786	10

Appendix 8   The Change

The Change between measurements				
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-3,41	1	0,3	0,5	0,5
	-3,22	1	0,3	0,5	0,9
	-3,2	1	0,3	0,5	1,4
	-2,87	1	0,3	0,5	1,8
	-2,66	1	0,3	0,5	2,3
	-2,42	2	0,6	0,9	3,2
	-2,26	1	0,3	0,5	3,6
	-1,88	1	0,3	0,5	4,1
	-1,86	1	0,3	0,5	4,5
	-1,69	1	0,3	0,5	5
	-1,67	2	0,6	0,9	5,9
	-1,65	1	0,3	0,5	6,3
	-1,62	1	0,3	0,5	6,8
	-1,46	1	0,3	0,5	7,2
	-1,44	1	0,3	0,5	7,7
	-1,11	1	0,3	0,5	8,1
	-1,08	1	0,3	0,5	8,6
	-1,04	1	0,3	0,5	9
	-1,01	1	0,3	0,5	9,5
	-0,87	1	0,3	0,5	9,9
	-0,85	3	0,9	1,4	11,3
	-0,8	1	0,3	0,5	11,7
	-0,71	1	0,3	0,5	12,2
	-0,68	2	0,6	0,9	13,1
	-0,66	3	0,9	1,4	14,4
	-0,64	2	0,6	0,9	15,3
	-0,49	2	0,6	0,9	16,2
	-0,45	1	0,3	0,5	16,7
	-0,42	2	0,6	0,9	17,6
	-0,33	1	0,3	0,5	18
	-0,26	4	1,2	1,8	19,8

The Change between measurements					
		Frequency	Percent	Valid Percent	Cumulative Percent
	-0,24	2	0,6	0,9	20,7
	-0,09	1	0,3	0,5	21,2
	-0,07	5	1,5	2,3	23,4
	-0,05	5	1,5	2,3	25,7
	-0,02	1	0,3	0,5	26,1
	0,07	1	0,3	0,5	26,6
	0,09	4	1,2	1,8	28,4
	0,12	5	1,5	2,3	30,6
	0,14	4	1,2	1,8	32,4
	0,26	2	0,6	0,9	33,3
	0,28	2	0,6	0,9	34,2
	0,31	2	0,6	0,9	35,1
	0,33	1	0,3	0,5	35,6
	0,35	2	0,6	0,9	36,5
	0,47	3	0,9	1,4	37,8
	0,49	2	0,6	0,9	38,7
	0,52	6	1,9	2,7	41,4
	0,54	3	0,9	1,4	42,8
	0,66	2	0,6	0,9	43,7
	0,68	6	1,9	2,7	46,4
	0,71	3	0,9	1,4	47,7
	0,73	3	0,9	1,4	49,1
	0,75	1	0,3	0,5	49,5
	0,87	4	1,2	1,8	51,4
	0,89	3	0,9	1,4	52,7
	0,92	8	2,5	3,6	56,3
	0,94	3	0,9	1,4	57,7
	1,06	1	0,3	0,5	58,1
	1,08	3	0,9	1,4	59,5
	1,11	3	0,9	1,4	60,8
	1,13	2	0,6	0,9	61,7
	1,25	1	0,3	0,5	62,2
	1,27	2	0,6	0,9	63,1

The Change between measurements				
		Frequency	Percent	Valid Percent	Cumulative Percent
	1,29	1	0,3	0,5	63,5
	1,32	4	1,2	1,8	65,3
	1,44	1	0,3	0,5	65,8
	1,46	1	0,3	0,5	66,2
	1,48	1	0,3	0,5	66,7
	1,51	5	1,5	2,3	68,9
	1,53	1	0,3	0,5	69,4
	1,65	2	0,6	0,9	70,3
	1,67	1	0,3	0,5	70,7
	1,69	2	0,6	0,9	71,6
	1,72	3	0,9	1,4	73
	1,74	1	0,3	0,5	73,4
	1,86	2	0,6	0,9	74,3
	1,88	1	0,3	0,5	74,8
	1,91	2	0,6	0,9	75,7
	2,02	1	0,3	0,5	76,1
	2,07	3	0,9	1,4	77,5
	2,09	2	0,6	0,9	78,4
	2,12	2	0,6	0,9	79,3
	2,26	2	0,6	0,9	80,2
	2,28	3	0,9	1,4	81,5
	2,33	1	0,3	0,5	82
	2,42	1	0,3	0,5	82,4
	2,49	2	0,6	0,9	83,3
	2,64	2	0,6	0,9	84,2
	2,66	1	0,3	0,5	84,7
	2,68	2	0,6	0,9	85,6
	2,71	3	0,9	1,4	86,9
	2,82	1	0,3	0,5	87,4
	2,85	2	0,6	0,9	88,3
	2,87	1	0,3	0,5	88,7
	2,89	3	0,9	1,4	90,1
	2,92	2	0,6	0,9	91

The Change between measurements				
		Frequency	Percent	Valid Percent	Cumulative Percent
	3,08	3	0,9	1,4	92,3
	3,11	1	0,3	0,5	92,8
	3,27	1	0,3	0,5	93,2
	3,41	1	0,3	0,5	93,7
	3,46	3	0,9	1,4	95
	3,51	1	0,3	0,5	95,5
	3,62	1	0,3	0,5	95,9
	3,69	1	0,3	0,5	96,4
	3,88	1	0,3	0,5	96,8
	4,02	2	0,6	0,9	97,7
	4,05	2	0,6	0,9	98,6
	4,26	1	0,3	0,5	99,1
	4,47	1	0,3	0,5	99,5
	4,64	1	0,3	0,5	100
	Total	222	68,7	100	
Missing	System	101	31,3		
Total		323	100		