An Investigation into the Dark Triad of Personality and Fear and Startle Response among Adults

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Submitted in partial fulfilment of the requirements of the BA Hons in Psychology at Dublin Business School, School of Arts, Dublin 2.

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March 2016
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Acknowledgements

I would like to thank my supervisor Dr. Rosie Reid for her time, support, and guidance throughout this process. I would also like to thank Dr. Patricia Frazer for her help and support during class, and Mike Nolan for his assistance and support using the biofeedback lab. I would also like extend my gratitude to all the participants who took the time to volunteer for the study.
Abstract

A repeated measures, within-participants experiment was conducted to ascertain whether levels of Dark Triad personality characteristics (narcissism, psychopathy, Machiavellianism) would predict a fearful and startled response to two categories of images: violence towards others, and a threat of violence towards self. A convenience sample of 29 non clinical participants (13 male, 16 female) was recruited. Personality constructs were measured by the Short Dark Triad (SD3). Fear response was measured by EEG in the left temporal lobe and startle response was measured by Galvanic Skin Response (GSR). Results showed narcissism to be a significant predictor of a fearful response to images of threat of violence towards self. There was no significant difference between the two categories of images. Strengths and limitations of the study are discussed along with future research.
1. Introduction

1.1 General Introduction

The Dark Triad of personality is characterised by the subclinical constructs of psychopathy, narcissism, and Machiavellianism and has become increasingly popular as a topic of research. Psychopathy in particular has been researched more than any other personality construct (Dindo & Fowles, 2011). There is some overlap between these three traits in things such as disagreeableness, duplicity, and aggressiveness (Paulhus & Williams, 2002) however they are seen as three distinct measures of the ‘dark side’ of human personality. Psychopathy, narcissism, and Machiavellianism were described by Paulhus and Williams (2002) as aversive but within the normal range of functioning, i.e. sub clinical narcissism and subclinical psychopathy. Each trait can contain both adaptive and maladaptive elements (Furnham, Richards, & Paulhus, 2013). For example, Jonason, Li, and Buss (2009) examined the Dark Triad from an evolutionary perspective and found that these traits can be beneficial for increased short-term mating and the reproductive benefits that occurs from this. However, this does come at the cost mate retention, which was low.

Narcissism and psychopathy are described in the DSM-IV-TR as personality disorders, and psychopathy is outlined as a “severe variant” of Antisocial Personality Disorder. According to the Health Service Executive (HSE), severe forms of personality disorders, such as these, affect less than 2% of the population. Statistics for the occurrence of narcissism, psychopathy and Machiavellianism in an Irish population were unavailable at the time of carrying out research, possibly due to a lack of research in the area in Ireland. Personality disorders are known to be underdiagnosed in clinical settings due to a lack of time to accurately diagnose, as well as a possible reluctance to diagnose as they are considered to be untreatable and are not favoured by insurance companies (Presnall &
Widiger, 2012). Both narcissism and psychopathy have similar origins in the clinical literature as they are both included in the DSM-IV-R as personality disorders. Traditionally, psychiatric classification has always been categorical. For instance, people have always been categorised as psychopaths if they exceeded a score of 30 on Hare’s (1991) Psychopathy Check List (PCL). Currently most personality assessments rely on dimensional models such as the Big Five Personality Inventory (BFI) created by John and Srivastava (1999), and use trait questionnaires as the basic modes of assessment of disorders. In contrast to older tradition, pathological traits are now viewed as extremes of normality, rather than separate constructs. With regard to the BFI, psychopathy has been viewed to be synonymous with significantly low rates of agreeableness and conscientiousness (Miller, Lynam, Widiger, & Leukefeld, 2001). Narcissism was included in the mainstream literature through the publication of the Narcissistic Personality Inventory (NPI) by Raskin and Hall (1979). This migration was identified to be relatively simpler due to the fact that the definition of the subclinical version was significantly similar to the clinical one (Morf & Rhodewalt, 2001; Campbell & Foster, 2007). The initial highly important components of NPI was characterised by entitlement, dominance, grandiosity and superiority (Corry, Merritt, Mrug, & Pamp, 2008). However, the parallel literatures have not been able to capture the vulnerable aspects of clinical narcissism (Miller et al., 2010). Psychopathy can be considered the most malevolent of the Dark Triad even at the subclinical level; characterised by low levels of empathy.

1.2 Narcissism

The construct of narcissism is relatively new and was only included in the DSM-III in 1980 (APA, 1980). It was first suggested by psychoanalytic literature; introduced by Freud (1914) in his essay ‘On Narcissism’. Narcissism is defined as a “pervasive pattern of grandiosity” (in
fantasy or behaviour), a need for admiration and a lack of empathy (APA, 2000). The diagnostic criteria include: self-importance; preoccupation with success, power, brilliance, and/or beauty; a belief that they are special; a strong sense of entitlement; the tendency to exploit others; arrogance (Presnall & Widiger, 2012). Narcissistic individuals continuously seek and obtain signs of recognition to compensate for feelings of inadequacy and so they may feel uncomfortable when accomplishments go unappreciated by others (Presnall & Widiger, 2012). Narcissism is widely regarded as an “unhealthy” or undesirable characteristic due to the interpersonal dysfunctions it gives rise to (Horton & Drwecki, 2006), for example by displaying characteristics such as avoidance, insecurity, and aggressivity (Ronningstam, 2013). As such, narcissists tend to make good first impressions but later on are regarded poorly as their negative self-enhancing characteristics and interactions with others accumulate (Paulhus, 1998). They lose their once positive reputations and their likability decreases (Rauthmann, 2012).

1.2.1 Narcissism and Empathy

Narcissism is negatively correlated with empathy (Watson et al., 1984). Ritter et al. (2010) attempted to empirically assess levels of empathy in people with Narcissistic Personality Disorder NPD. “Further studies based on the DSM-IV additionally revealed low diagnostic specificity of the criterion “lack of empathy”” According to Ritter et al. (2010), there has been weak empirical evidence to support the validity of the theoretical construct of a “lack of empathy” in narcissism yet it still remains in the diagnostic criteria and is usually associated with narcissism in colloquial terms. Their study provides evidence that NPD involves an impaired emotional empathy (“an observer’s emotional response to another person’s emotional state”), however cognitive empathy (“the ability to take another person’s perspective and to represent others’ mental states”) is unaffected.
1.2.1 Narcissism and Psychopathy

NPD overlaps with psychopathy in that they share the same features of arrogance, a lack of empathy, and exploitation of others. They differ in that narcissists are more grandiose in their behaviour while psychopathic individuals may be more underhanded in their behaviour (Presnall & Widiger, 2012). A psychopath’s exploitative behaviour is more related to material or sexual gain, whereas for narcissists, the exploitative behaviour is more passive, i.e. by seeking to attain power or enhance their self-image. Various other sources have also reported that NPD frequently occurs with psychopathy in the same individual (Widiger, 2006). This co-occurrence is known as comorbidity in medical terms. Blackburn, Logan, Donnelly, and Renwick (2003) describe comorbidity as the occurrence as two or more disorders in the same individual at the same time. Psychiatric patients rarely exhibit one disorder in isolation. This idea of comorbidity was also proposed by Freud in his (1914) paper when he said “Psycho-analytic observers were subsequently struck by the fact that individual features of the narcissistic attitude are found in many people who suffer from other disorders”. In support of the potential association between narcissism and psychopathy, Stone (1993) indicated – “[a]ll commentators on psychopathy, as the readers will note, allude to the attribute of (pathological) narcissism – whether under the rubric of egocentricity, self-indulgence, or some similar term. In effect, all psychopathic persons are at the same time narcissistic persons...” (p.292). Despite the established resemblance between the two concepts, the theoretical and empirical literature related to the topic has evolved quite distinctly (Widiger, 2006). One of the differences identified in the literature is the aspect of a psychopathic persons’ complete lack of capacity for loyalty and concern for other people. Additionally, extremely aggressive behaviour is linked to psychopathy while the antisocial behaviour of narcissistic individuals is viewed as more of a passive-parasitic form of psychopathy.
1.3 Machiavellianism

The concept of Machiavellianism derived from comparisons with the 16th century author Niccolo Machiavelli, whose writings outlined his view of people as untrustworthy, self-serving, and malevolent and was first studied by Christie and Geis in 1970. In their study, themes from Machiavelli’s writings were converted into items on a questionnaire called the MACH-IV. It contained twenty items and measured three categories: Interpersonal Tactics (use of flattery and deceit to manipulate), Cynical View of Human Nature (viewing humanity as being weak), and Disregard for Conventional Morality (Fehr, Samson, & Paulhus, 1992). Geis and Moon (1981) found that high scorers in the MACH-IV seemed to be good at some forms of manipulation, such as persuasion, and are skilled at deception.

1.3.1 Machiavellianism and Psychopathy.

According to Fehr et al. (1992), the concepts of psychopathy and Machiavellianism are very close in similarity; they both involve low emotionality and underhanded behaviour. According to a study conducted by Hare (as cited by Fehr et al., 1992), it was said that psychopaths may be high scoring Machiavellians who have simply “run up against the law”.

1.4 Psychopathy

The construct of psychopathy is considered under the heading of Antisocial Personality Disorder which is defined as a “pervasive pattern of disregard for and violation of the rights of others” (American Psychiatric Association, 2000). The diagnostic criteria for this disorder include: criminal activity, deceitfulness, impulsivity, recklessness, aggressiveness, and indifference to the mistreatment of others. These criterions overlap significantly with the Psychopathy Checklist Revised (PCL-R) devised by Hare (2003). According to Moul, Killcross, and Dadds (2012), psychopathic individuals exhibit three main cognitive and emotional deficits: deficits in fear-recognition; lower conditioned fear responses; poor
performance in stimulus-reinforcement tasks. It is the deficits in regard to fear response that the present study is investigating.

1.5 Measurement

1.5.1 Electroencephalography
Electroencephalography (EEG) is a neuroscientific tool used to measure electrical conductivity on the scalp. Important brain functions are linked with an oscillatory phenomenon which can be observed by EEG, and individual differences are predicted by features in certain EEG bands (Chi et al., 2005).

1.5.2 Electrodermal Response (EDR)
Previously known as Galvanic Skin Response or Galvanic Skin Reflex (GSR), electrodermal recording is a method of measuring the electric conductance of the skin of a person by measuring the changes in the body temperature and perspiration (Widiger, 2006). According to Boucsein (2012), the term GSR is no longer recommended since it does not reflect the complexity of electrodermal phenomena, and it suggests that EDRs are elicited as a reflex, which ignores the EDRs that may occur due to psychological stimuli. It measures emotional arousal. Electrodermal activity recordings which do not use an external current are called endosomatic, exosomatic recording involves applying direct or alternating (DC or AC) current to the skin (Boucsein, 2012). The present study used AC applied to skin therefore the correct term to use is skin admittance (SY), rather than skin conductance (Boucsein, 1992). Emotional sweating is indicated by increased sweat gland activity due to psychological and emotional states which appear in high arousal or under stress and is linked mainly with palmar sites, i.e. palms of hands (Boucsein, 2012). Hypothalamic areas in the brain are
responsible for eliciting EDAs. Stimulation of the basolateral amygdala could evoke a single EDR. The amygdala might be responsible for the elicitation of the electrodermal orienting response particularly the left temporal area (incl. amygdala). The amygdala seems to mainly contribute to the generation of EDRs to salient stimuli with acquired emotional meaning (Boucsein, 2012).

1.6 Psychopathy and Fear Response

Psychophysiological deficits have been associated with psychopathology in terms of low levels of physiological arousal or fear response (Fowles & Dindo, 2006). In a study conducted by Patrick, Bradley, and Lang (1993), it was shown that an incarcerated psychopath’s startle response to negative stimuli was lower than in non-psychopathic individuals. The stimuli presented were images that were violent in nature. This study, using the startle response methodology, has suggested that psychopaths do not portray the normal pattern of blink modulation when processing the aversive stimuli as compared to non-psychopaths (Patrick et al., 1993). In non-psychopaths and controls, the startle experiments presented with negative stimuli caused more significant blink responses compared to the ones elicited during the viewing of neutral or positive stimuli. However, this same pattern of response was not observed in psychopaths that scored high on the interpersonal and affective psychopathic features. The psychopaths blink reflex was similar when viewing both positive and negative stimuli. This suggests that negative stimuli could not elicit similar fear (defensive) responses in psychopaths as they do in non-psychopaths, as discussed by Sutton, Vitale, and Newman (2002).

According to Fowles and Dindo (2006), skin conductance hyporeactivity may reflect low fear and higher information processing deficits. Skin conductance hyporeactivity observed in the context of a fear imagery paradigm may reflect a deficit in higher level
association processes associated with Factor 2, which is related to chronic instability and antisocial tendencies. Boucsein (2012), suggested that there are at least two relatively independent central nervous system pathways that control skin conductance. The first involves limbic system (which includes the amygdala), the second involves cortical and basal ganglia influences. The present study is concerned with the first pathway which is involved in response to fear stimuli. In a meta analysis conducted by Lorber (2004), a significant association was found between adult psychopathy and skin conductance hyporeactivity to negative stimuli. Factor 1 of psychopathy is limited to hyporeactivity to negative stimuli. The deficit in startle potentiation to aversive slides observed among psychopaths was evident for prisoners with high PCL-R Factor 1 scores.

One of the interpretations of the abnormal startle response in psychopaths is that they possess appetitive response to the negative stimuli. The neurological location of the startle response and fear is found in the structures in the medial and temporal lobes, especially the left amygdala, as discussed in the study conducted by Phelps et al. (2001).

1.7 Rationale

Since it has been studied that a psychopath’s startle response to negative pictures is lower than in nonpsychopaths, the rationale for this study is to investigate if this will be the same for the other two constructs, and all together in the Dark Triad scores, where the pictures will be images of violence towards humans. How they will respond to images of threat towards themselves will also be investigated. Startle response will be measured by EDR by a GSR amp. A neutral category will also be included as a control. Levels of empathy will be assessed by recording EEG in the left temporal lobe. Gender will also be tested to see if there are any significant differences between males and females in all variables.
1.8 Hypotheses

In light of the previous research, the following hypotheses have been proposed:

1) Dark Triad and Subjective Rating scores will significantly predict EEG scores for viewing images of violence towards other people

2) Dark Triad and Subjective Rating scores will significantly predict GSR scores for viewing images of violence towards other people

3) Dark Triad and Subjective Rating scores will significantly predict EEG scores for viewing images of threat of violence towards self

4) Dark Triad and Subjective Rating scores will significantly predict GSR scores for viewing images of threat of violence towards self

5) There will be a difference in EEG scores between violence towards other category and threat of violence towards self category and neutral category

6) There will be a difference in GSR scores between violence towards other category and threat of violence towards self category and neutral category
2. Methodology

2.1 Participants

A total of thirty-one volunteers were contacted and recruited over email and Facebook via convenience sampling, or by approaching them on the DBS campus. This was a non-clinical sample. The ages ranged from 20 to 55 with the mean age being 27, the mode was . All participants volunteered for the study and no incentives were given. 24 were undergraduate students studying at DBS. Students were the preferred participant group as it has been postulated that narcissism is a developmental process that reaches its peak in the early twenties (Forster, Campbell & Twenge, 2003). It was found that younger, college going generations now are more narcissistic than older, previous generations (Twenge, Konrath, Foster, Campbell, & Bushman, 2008). Two participants’ data were excluded from the analysis as their EEG did not record correctly, so the total analysed data was 29 (13 male and 16 female).

2.2 Design

The design used in the present study was a quantitative within-participants, repeated measures true experimental design with a correlational aspect. Each participant viewed the images in a random order, different to each other participant. There was a category of neutral images, designed not to provoke a fear response, which acted as a control. For the correlational aspect of the study, Dark Triad scores (DT_Total, MeanMACH, MeanPSY, MeanNAR) and the subjective rating scores (SubRate_self, SubRate_other, SubRate_neutral) acted as the predictor variables and the EEG (EEG_self, EEG_other, EEG_neutral) and GSR (GSR_self, GSR_other, GSR_neutral) scores for both the self and other categories were the
criterion variables. For the experimental aspect, the independent variables were the self, other, and neutral image categories, and the dependent variables were the EEG and GSR scores.

2.3 Materials

2.3.1 The Short Dark Triad

The Short Dark Triad (SD3) (Jones & Paulhus, 2014) was used to assess levels of psychopathy, Machiavellianism and narcissism in participants. This version had twenty seven items, broken down into 9 item subscales. The benefit of using the shortened version of this scale, as opposed to longer, is that the participants are not as likely to suffer with participant fatigue that may occur with lengthy questionnaires and scales. The participants were asked to respond using a five-point likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The participants were instructed to score each statement depending on the degree to which they either agreed or disagreed with the statements presented. An example of some items: “Most people can be manipulated” (Machiavellianism); “I know that I am special because everyone keeps telling me so” (Narcissism); “People who mess with me always regret it” (Psychopathy).

The items on the SD3 have been found to be reliable and valid by studies carried out by Jones and Paulhus (2014). External validity was demonstrated by showing that the SD3 scales predicted corresponding informant-ratings. In a study using the SD3, researchers found Cronbach’s alpha reliability coefficients were .73 for Machiavellianism, .71 for narcissism, and .78 for psychopathy (Baughman, Dearing, Gianmarco, & Vernon, 2011). A study done by Egan, Chan, and Shorter (2014) found all three constructs to be reliable at alpha = .72 or
above. In the present study, two short demographic questions were added onto the SD3 questionnaire which asked for the age and gender of participant.

2.3.2 Visual Stimuli

Each participant viewed a series of 30 images in a random order, depicting 10 neutral, 10 violent towards a person and 10 threat of violence towards self (see Appendix c). Neutral images included depictions of household objects, such as an iron, as used in (Bradley et al., 1993) so as to be non-affective. The images for the visual stimuli were chosen individually by the researcher by conducting electronic searches in Google Images. The search for images for the violence towards others category consisted of using a combination of keywords including, but not limited to, “violence towards human”, “person being attacked”, and “riot violence”. The keywords used for finding images for the threat of violence towards self included, but was not limited to, “gun towards camera”, “knife towards camera”, and “terrorist towards camera”. The neutral items were taken from the International Affective Picture System (IAPS).

Other materials included a debriefing sheet outlining the research being undertaken and contact details of the researcher and their supervisor, and a sheet providing contact details for AWARE and Samaritans which could be detached, in case the experiment aroused any negative feelings. A ballpoint pen was provided for completing the questionnaire.

2.4 Apparatus

The experiment took place in Dublin Business School’s media lab in 6-9 Balfe Street, Dublin 2. The apparatus used to record the EEG activity was a Dell OptiPlex 760 Intel Core2 Duo CPU 2.8GHz (running Windows 7) desktop computer which ran ADInstruments Labchart
v7.3.7 and Labchart Reader v7.3.4 software. The operating system on the desktop computer was Windows 7, Microsoft. The biofeedback unit was an ADInstruments Powerlab 26/T unit. The electro-cap used was the ADInstruments MLAEC1 EEG medium cap with an ear electrode. To attempt to gain stronger readings from the EEG by increasing conductivity, ADInstruments MLAE11 Electro-Gel (32 oz) was dispensed into the two openings in the cap from which the reading was taken (T3 and T5). A blunted needle attached to an ADInstruments MLAE6 syringe was used to administer the gel. A baby wipe (Pampers sensitive) was given to each participant after the experiment to wipe away any gel. A cotton bud (Johnson & Johnson) was used to clean the electrodes between each participant.

The apparatus used to record the GSR activity was an ADInstruments Galvanic Skin Response amplifier with the following specifications: 75 Hz oscillator which supplies a near square wave, low-impedance, low-voltage (22 mV\text{rms}) signal to an electrode on one finger of the participant; galvanic isolation for subject safety and approval to the IEC60601-1 standard for human connection as a body protected (BF rated) instrument; automatic zeroing; supplied with GSR Finger Electrodes and adult Velcro® straps.

The apparatus used to create the experiment and run the stimuli was a Dell OptiPlex 755 Intel Core2 Duo CPU 2.4GHz desktop computer which ran SuperLab (Cedrus) Version 4.5.4 software. The operating system was Windows 7, Microsoft. Each image displayed was created as a trial, with 30 trials in total. In each trial, participants had to rate how affected they were by the image just presented to them as explained below in 2.5 Procedure. Results from the subjective affectivity rating were exported to Notepad. A Cedrus Stim Tracker was used to leave a marker on the Labchart’s EEG output to indicate which category of image each participant was viewing at a particular time.

The results from the EEG and GSR from Labchart Reader and the subjective affectivity rating from Notepad were all exported into Microsoft Excel where the scores were
averaged. The averaged scores were then exported into SPSS Version 22 on a MacBook Pro 2.2GHz laptop running OS X Yosemite for statistical analysis.

2.5 Procedure

Each participant was given a specific time and they were met by appointment at the Media lab, to which directions were given. When participants entered the lab, they were instructed to sit down at a desk the experimental procedure was fully explained to them (see Appendix d). A question and answer period was allowed at the end of the briefing to further ensure that the participant was giving informed consent. After the voluntary nature of their involvement in the study and of their right to withdraw at any time was outlined, verbal consent was obtained and The Short Dark Triad questionnaire booklet (see Appendix a) was given for them to complete.

When the questionnaire was completed, the participant was instructed to sit facing the Lenovo Intel desktop computer where the trials would be conducted. The participants were seated approximately half a meter away from the computer screen. They were then prepared for the EEG to measure alpha wave activity in the left temporal lobe. An electrode cap was fitted over the participants’ head and an electrode was clipped onto their left earlobe and connected to the Earth channel. The T3 and T5 (using the international 10-20 system) leads of the EEG flat electrodes (AG/AgCl) were attached to CH1 NEG and POS. The two GSR electrodes were attached onto the participants’ left hand on the middle phalanges of the first and index fingers. Both measurements were begun after baseline and zeroing levels were established. The participants were asked to keep as still as possible only moving their hands to respond to the subjective affectivity rating questions in order to obtain accurate EEG readings.
Once the equipment was set up, the participants were shown a series of 30 randomised images (trials) on the computer screen from three categories: violence_Self, violence_Other, and violence_Neutral. Each trial consisted of: viewing an image which was displayed on the screen for 5 seconds, followed by viewing a blank white screen for 5 seconds (to allow for a delay in feedback from the EEG) followed by a request to rate each image in terms of how affected they were by that image (subject affectivity rating) on a likert scale of 1 – 5, where 1 = not very affected and 5 = very affected. They indicated their level of affectivity by using the number pad on the keyboard in front of them. Once a response was given, the next trial began and the process was the same for the rest of the trials. The stim tracker left a marker on the Labchart output when a new image was presented on screen and indicated what category of image it was. During this time the experimenter was seated approximately half a meter away from them and reading notes from a notebook so as not to distract the participant, the experimenter was present in the room throughout the whole experiment.

Upon completion of the 30 trials the participants were provided with baby wipes if required and the equipment was carefully removed by the experimenter so as to ensure no damage came to the equipment. They were thanked for their participation and given the opportunity to ask questions in relation to the experiment.
3. Results

3.1 Checking Assumptions

Tests of normality were run to check that the data was normally distributed. A Shapiro-Wilk’s test indicated that the variables were normal as they were all non significant, except for the variable GSR_other (p = .027), however since the histogram for GSR_other indicated normality, inferential tests were carried out despite this result. Skewness and kurtosis were all within 2 and -2 so this also indicated normality. The histograms all indicated normality with the distribution curve sufficiently bell-shaped (mesokurtic) and was not significantly skewed in either direction, except for SubRate_neutral, which had a slight positive skew. In normal Q-Q plots, the data all fell approximately on the line, therefore this assumption of normality was also met. Boxplots were used to identify outliers and were subsequently removed. Inferential tests were conducted on the variables EEG_self, EEG_other, EEG_neutral, GSR_self, GSR_other, GSR_neutral, SubRate_self, SubRate_other, SubRate_neutral, DT_Total, MeanMACH, MeanNAR, and MeanPSY. All analyses were two-tailed and significance was set at p < .05.
3.2 Descriptive Statistics

Table 1

*Descriptive Statistics for Dark Triad Constructs*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machiavellianism</td>
<td>2.92</td>
<td>.488</td>
<td>.339</td>
<td>-.784</td>
</tr>
<tr>
<td>Narcissism</td>
<td>2.82</td>
<td>.455</td>
<td>.675</td>
<td>-.157</td>
</tr>
<tr>
<td>Psychopathy</td>
<td>2.33</td>
<td>.425</td>
<td>-.009</td>
<td>-.784</td>
</tr>
</tbody>
</table>

Table 1 gives an overview of the data collected of the Dark Triad personality constructs by showing the means and standard deviations of each variable. The skewness and kurtosis values indicate normally distributed data.

Table 2

*Descriptive Statistics for EEG Results*

<table>
<thead>
<tr>
<th>Category</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self</td>
<td>-.169</td>
<td>.412</td>
<td>-1.09</td>
<td>.65</td>
</tr>
<tr>
<td>Other</td>
<td>-.167</td>
<td>.318</td>
<td>-.85</td>
<td>.32</td>
</tr>
<tr>
<td>Neutral</td>
<td>-.191</td>
<td>.314</td>
<td>-.79</td>
<td>.66</td>
</tr>
</tbody>
</table>

Table 2 gives an overview of the data collected from the EEG in microvolts. It can be seen that the stimulus with the strongest results is the other category with -.167, although its
maximum score was lower than the self category with mean scores of .32 and .65 respectively. The neutral category had the highest maximum score but the lowest mean at .66 and -.191 respectively.

Table 3

Descriptive Statistics for GSR Results

<table>
<thead>
<tr>
<th>Category</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self</td>
<td>5.74</td>
<td>3.86</td>
<td>-.4</td>
<td>16.22</td>
</tr>
<tr>
<td>Other</td>
<td>5.85</td>
<td>4.22</td>
<td>-1.45</td>
<td>17.9</td>
</tr>
<tr>
<td>Neutral</td>
<td>5.73</td>
<td>3.93</td>
<td>-.69</td>
<td>15.66</td>
</tr>
</tbody>
</table>

Table 3 gives an overview of the data collected from the GSR. It shows that the other category has a marginally higher mean than self and other categories with 5.85, 5.74 and 5.73 respectively. It also had the highest maximum score with 17.9.

The mean for subjective rating for the other category is the highest with 3.28, compared to the self and neutral categories with 2.64 and 1.12 respectively. The maximum score was related to the other category with 5 and the minimum was related to the neutral category with 1. The SubRate_neutral category had the highest skewness of all the variables with 1.209, however was still within normality range.
Hypothesis 1

A Pearson’s correlation found that there was a small positive significant correlation between DT_Total and EEG_self (r (29) = .352, p = .031). A multiple regression was used to test whether SubRate_self and DT_Total were predictors of criterion EEG_self. The assumptions were checked and were found to comply with the test. The results of the regression indicated that the two predictors explained 10% of the variance, however this was not significant ($r^2 = .1$, $F(2, 26) = 2.6$, $p = .093$). It was found that DT_Total had a higher contribution towards predicting EEG_self and was approaching significance ($\beta = .36$, $p = .054$, 95% CI = -.003 - .32) than did SubRate_self ($\beta = -.21$, $p = .257$, 95% CI = -.37 - .1).

Since the DT_Total predictor was approaching significance for the criterion EEG_self, and the Pearson’s correlation was significant, another multiple regression was used to investigate which one of the separate constructs within the DT_Total, i.e. MeanMACH, MeanNAR, and MeanPSY, were predictors of criterion EEG_self and if one or more were better predictors. A Pearson’s correlation found that there was a moderate positive correlation between MeanNAR and EEG_self (r (29) = .462, p = .006), but no significant correlation with MeanMACH and EEG_self (r (29) = .108, p = .288) or MeanPSY and EEG_self (r (29) = .158, p = .206). The results of the regression indicated that the three predictors explained 13% of the variance, however this was not significant ($r^2 = .13$, $F(3, 25) = 2.38$, $p = .094$). However, when examined separately, it was found that MeanNAR was significant ($\beta = .45$, $p = .02$, 95% CI = .07 - .75).

Hypothesis 2

A multiple regression was used to test whether SubRate_self and DT_Total were predictors of criterion GSR_self. The assumptions were checked and met. The results of the regression
indicated that the two predictors explained 4% of the variance and this was also not
significant \( r^2 = .04, F (2, 26) = 1.62, p = .217 \).

A Pearson’s correlation was used to test whether there were any correlations between the
constructs MeanMACH, MeanNAR, MeanPSY, and GSR_self. It found that there were no
significant correlations between any construct MeanMACH \( r (29) = -.224, p = .121 \),
MeanNAR \( r (29) = -.065, p = .37 \), MeanPSY \( r (29) = -.259, p = .088 \) and GSR_self.

*Hypothesis 3*

A multiple regression was used to test whether SubRate_other and DT_Total were predictors
of criterion EEG_other. The assumptions were checked and met. The results of this
regression indicated that the two predictors explained 5% of the variance, and this was not a
significant result \( r^2 = .05, F (2, 26) = .29, p = .753 \).

A Pearson’s correlation was used to test whether there were any correlations between
the constructs MeanMACH, MeanNAR, MeanPSY, and EEG_other. It found that there were
no significant correlations between any of the constructs MeanMACH \( r (29) > .000, p = .5 \),
MeanNAR \( r (29) = .034, p = .43 \), MeanPSY \( r (29) = -.198, p = .151 \) and EEG_other.

*Hypothesis 4*

A Pearson’s correlation found that there was a moderate positive significant correlation
between SubRate_other and GSR_other \( r (29) = .421, p = .011 \) but no significant correlation
between DT_Total and GSR_other \( r (29) = -.271, p = .077 \). A multiple regression was used
to test whether SubRate_other and DT_Total were predictors of criterion GSR_other. The
results of the regression indicated that the two predictors explained 16% of the variance and
the result was significant \( r^2 = .16, F (2, 26) = 3.71, p = .038 \). It was found that
SubRate_other made a bigger contribution towards predicting GSR_other and was significant
(β = .39, p = .035, 95% CI = .15 – 3.67) more so than DT_Total, which was not significant
(β = -.21, p = .233, 95% CI = -2.58 - .66).

Hypothesis 5

A repeated measures ANOVA, using the Greenhouse-Geisser correction, showed that the
EEG results did not differ significantly between the three image categories (F (2, 46) = .04, p
= .934) with an effect size of .002. Therefore, the null hypothesis must be accepted. Although
there was no significant difference found, as can be seen from Figure 1, the neutral category
did provoke a lower response than the other two categories, as predicted.

Fig. 1 Error bar chart of EEG results between image categories

Hypothesis 6

A repeated measures ANOVA, using the Greenhouse-Geisser correction, showed that the
GSR results did not differ significantly between the three image categories (F (2, 50) = .87, p
= .417) with an effect size of .03. Therefore, the null hypothesis must be accepted.

Males and Females

An independent samples t-test was used to test whether there was a significant difference
between males and females in the following variables: EEG_self, EEG_other, EEG_neutral,
GSR_self, GSR_other, GSR_neutral, SubRate_self, SubRate_other, SubRate_neutral, MeanMACH, MeanNAR, MeanPSY, DT_Total. The test found that there was no significant difference between males and females in any of these variables. The scores for males (M = 2.33, SD = .43) and females (M = 2.33, SD = .43) in the MeanPSY category were least significant (t (27) = .04, p = .966, CI (95%) -.32 - .34).

**Narcissism**

Since it was shown that MeanNAR was a significant predictor of EEG_self, a simple linear regression was conducted to see if MeanNAR significantly predicted EEG_other. The results of this simple regression showed that it was not significant (F (1, 27) = .032, p = .86, r² = .04)(EEG_other, β = .034, p = .86, CI (95%) -.25 - .3). Another simple linear regression was conducted to see if MeanNAR significantly predicted EEG_neutral. The results of this simple regression indicated that this was not significant (F (1, 27) = .573, p = .456, r² = .01)(EEG_neutral, β = -.14, p = .456, CI (95%) -.37 - .17).
4. Discussion

4.1 General

The aim of this study was to investigate the links between the Dark Triad of personality and fear response by testing whether Dark Triad (narcissism, Machiavellianism, and psychopathy) scores would predict EEG and GSR scores. More specifically, this study attempted to support findings of Patrick, Bradley, and Lang (1993). It also attempted to compare EEG and GSR results between three categories of stimuli (images of violence towards other people, images of threat of violence towards self and neutral images of household items).

From the two repeated measures ANOVAs conducted, the study found no statistically significant difference between the three image categories in either EEG or GSR scores which suggests that the stimuli produced a similar reaction in the brain and physiologically. It can be seen in Figure 1 that there was a small decline in EEG scores for the neutral category, which was expected, however this was not significant. Therefore, hypotheses 5 and 6 were rejected; there is no

Hypotheses 1 to 3 were all rejected as the results were non-significant. According to the multiple regression that was conducted, Dark Triad scores and Subjective Rating scores did not predict EEG or GSR scores for viewing images of violence towards other people, nor did they predict EEG scores for viewing images of threat of violence towards self. Another multiple regression was conducted for hypothesis 1 to further test the separate constructs within the Dark Triad and found that Narcissism significantly predicted EEG scores for the threat of violence towards self category. This is in agreement with the theoretical definition of narcissism in that they look out for themselves. A linear regression showed that Narcissism
does not predict EEG scores for the violence towards others condition. This result is in support of research which suggests that narcissists are more concerned with their own safety as opposed to the safety of others. Another linear regression indicated that Narcissism did not predict EEG scores for the neutral condition, as expected. It is interesting to note that even though both of these were not significant, the neutral condition received a higher probability score than the violence towards other condition. This seems to reinforce the notion that narcissists don’t care much about others and supports the research which suggests that narcissists are low on empathy (Watson et al., 1984).

Hypothesis 4 was statistically significant and showed that the subjective rating for the violence_Other category significantly predicted galvanic skin response rates.

There was found to be no significant difference between males and females, contrary to previous research done on this topic, particularly in terms of psychopathy (Forouzan & Cooke, 2005). This result challenges to notion that psychopathy and NPD are more prevalent in males.

4.2 Limitations and Strengths

It is important to consider the limitations that may have affected the results of this study. These limitations relate to the stimuli utilised, equipment used for measurement and facilities available, and sample size. With regard to the facilities, the lab used to conduct the experiment was not sound-proofed. This room was adjacent to a classroom which was frequently occupied and so this meant that auditory stimuli could not be fully controlled for. There is research to suggest that extraneous noise could affect the results of EEG (Junghöfer, Elbert, Tucker, & Rockstroh, 2000). It should be noted that for future research, noise cancelling earplugs could be used to control for auditory stimulus and thus help to avoid confounding the results.
As there was no difference between the three categories, it can be said that another limitation involves the type of stimuli used, i.e. they were not effective and producing an affective fearful or startle response. There is research to suggest that repeated exposure to both real life violence and violence in entertainment may lead to an alteration in cognitive, affective and behavioural processes, i.e. desensitisation to violence (Funk, Baldacci, Pasold, & Baumgardner, 2004). According to Funk et al. (2004), desensitisation to violence is a subtle process which may occur due to repeated exposure to both real-life violence and media violence. Since the images used for this study were acquired from an online search engine, it was likely that they reflected the content of many general news outlets which the participants would generally be familiar with. This desensitisation to the images of violence could lead to less physiological arousal and may not be a true indication of an individual’s empathy to another human being attacked or fear for their own safety. Also, according to (Grillon & Baas, 2003), the startle reflex is highly sensitive to habituation and sensitisation processes.

With regard to the SD3 questionnaire, since the questions are provocative in nature and do not reflect positive themes overall, it is possible that the participants’ answers could have been affected by a social desirability response bias. However, Jonason, Li, and Teicher (2010) suggest that the because the SD3 composes all three traits and is not broken down into subscales for the participant, the bias might not be as effective as a single scale removes the possibility that different scales have different response biases. A short version is also beneficial as it addresses the issue of respondent fatigue, i.e. if a participant is bored with the questionnaire, their engagement with it and thus more mistakes may be made and the variance of error could increase (Hess, Hensher, & Daly, 2012).

Another limitation for this particular study may be the sample size. The sample size used was relatively small and this leads to low statistical power. A low statistical power may lead to an increased likelihood of making type 2 errors, i.e. when the null hypothesis is false
and you fail to reject it. Also, the hypotheses were two-tailed so this may lead to low power. However, since this study had a repeated measures within-participants design, this indicated a higher power level as each participant acted as their own control.

There are some strengths associated with a small sample size. It is more cost effective and avoids spending too many resources such as time and finances. Also it is easier to recruit a smaller group of participants. However, future studies may want to consider a larger sample size to increase the statistical power. This study adds to a growing body of research within the recent development of the Dark Triad of personality, and is unique as it has conducted this type of experiment on an Irish population.

4.3 Further Research and Conclusion

The present study extends the body of research that exists within the area of personality psychology, particularly in the study of narcissism. It failed to support the findings of Patrick et al. (1993), possibly due to a small sample size of non clinical people and the desensitisation towards violence that occurs due to repeated exposure to violent media. Future replication of this study could benefit from using more provocative stimuli to combat this desensitisation to violence that was exhibited. For example, instead of using still images, short clips of

This study investigated the influence of the Dark Triad of personality on Irish adults’ fear and startle responses. Personality was measured by the Short Dark Triad (Jones & Paulhus, 2014), fear response was measured by EEG activity in the left temporal lobe and startle response was measured by GSR.
References


Twenge, J. M., Konrath, S., Foster, J. D., Keith Campbell, W., & Bushman, B. J. (2008). Egos inflating over time: a cross-temporal meta-analysis of the Narcissistic Personality Inventory. *Journal of personality, 76*(4), 875-902.


Appendices

(a) Questionnaire booklet

Dear participant,

I am studying for a BA in Psychology at Dublin Business School and I invite you to take part in a study I am conducting which examines startle response and brain activity and their relationship to ‘Dark Triad’ personality traits. The results of this study will hopefully lead to more understanding in this area and will be used in my final year project and thesis.

I have enclosed a questionnaire which will ask you to respond to a series of 27 statements and questions which relate to narcissism, Machiavellianism and psychopathy. There are no right or wrong answers so please just answer as honestly as you can.

Participation in this study is entirely voluntary and all efforts to protect your identity and keep the information confidential will be taken. The data will be stored on a password protected computer. By completing this questionnaire, you will have consented to participate. Once completed, it will not be possible to retrieve your results as they will not be linked to you in any way.

Contact details for AWARE and SAMARITANS have been included on the last page of this questionnaire in case any of the questions arouse feelings of distress or discomfort.

Please contact me if you have any questions about my research. Your participation is greatly appreciated.

Aisling Coney
10034506@mydbs.ie

My supervisor:
Dr. Rosie Reid
Rosie.reid@dbs.ie

Please indicate your age and gender.
Age: _____

Please circle: Male / Female

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<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neither Agree nor Disagree</td>
<td>Agree</td>
<td>Strongly Agree</td>
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Please indicate how much you agree or disagree with the following statements by filling in the appropriate number from the scale above:

1. It is not wise to tell your secrets _____
2. Generally speaking, people won’t work hard unless they have to _____
3. Whatever it takes, you must get the important people on your side _____
4. Avoid direct conflict with others because they may be useful in the future _____
5. It’s wise to keep track of information that you can use against people later _____
6. You should wait for the right time to get back at people _____
7. There are things you should hide from other people as they don’t need to know _____
8. Make sure your plans benefit you, not others
9. Most people can be manipulated
10. People see me as a natural leader
11. I hate being the centre of attention
12. Many group activities tend to be dull without me
13. I know that I am special because everyone keeps telling me so
14. I like to get acquainted with important people
15. I feel embarrassed if someone compliments me
16. I have been compared to famous people
17. I am an average person
18. I insist on getting the respect I deserve
19. I like to get revenge on authorities
20. I avoid dangerous situations
21. Payback needs to be quick and nasty
22. People often say I’m out of control
23. It’s true that I can be mean to others
24. People who mess with me always regret it
25. I have never gotten into trouble with the law
26. I like to pick on losers
27. I’ll say anything to get what I want

This is the end of the questionnaire
Please feel free to detach and keep this page.

**AWARE**

72 Lr. Leeson St.,
Dublin 2.
Tel: 01 - 661 7217

The Aware Support Line is for individuals who are seeking support and information to cope with, manage or recover from depression, anxiety and related conditions.

**Aware Support Line 1890 303 302**

**SAMARITANS**

Samaritans Ireland,
4-5 Usher’s Court,
Usher’s Quay,
Dublin 8.
Tel: 01 - 671 0071

Samaritans is available 24 hours a day to provide confidential emotional support for people who are experiencing feelings of distress or despair, including those which may lead to suicide.

**Samaritans Support Line 116 123**
(b) Scoring for SD3 Questionnaire

Reverse the scoring on all the reversals items (11, 15, 17, 20, 25). Then calculate the mean of the 9 items within each subscale.
(c) Visual Stimuli

Other 1

Other 2

Other 3

Other 4

Other 5

Other 6
(d) Dialogue and Protocol

**Show participant into room and show them to a seat in front of the computer.**

“Thank you for agreeing to participate. You can withdraw at any time until the end of the experiment. When the experiment is over it will not be possible to retrieve your data as it will be anonymous. The data will be submitted for grading as part of my undergraduate degree and will be presented in a symposium format in the next few months. It may also be presented for publication.

You will first be asked to view 20 images on the screen in front of you. They will be violent in nature and if you wish to stop, you can. However, they have been taken from the public domain and are similar in nature to what you might see in many new outlets so you will likely have seen images of similar content in daily life.

I will be attaching a device to your finger which will measure your skin conductance and placing a cap on your head which will measure electrical currents in your brain. You will view each image for 5 seconds. After each image there will be a subjectivity rating where you will rate the image on a scale of 1-5 in terms of how it has affected you. Please be honest in your answers, there is no right or wrong.

After this section you will be asked to fill in a short questionnaire which I will explain afterwards. Have you any questions so far?” … Answer questions…

“Are you right handed or left handed?” Attach GSR device on opposite hand to which they write with so they can use the mouse. Attach EEG cap on their head. “You may start when you are ready”

After they have finished, move them over to a desk and hand out the questionnaire booklet and a pen.
“This questionnaire is designed to assess levels of narcissism, Machiavellianism and psychopathy in individuals. The results will not be linked to you in any way so please answer honestly and if the questions arouse any negative feelings, there are details of support at the back of the booklet which you may take with you. Have you any questions?” … Answer questions…

“Please begin when you are ready”

**After they have finished**

“The purpose of this study is to see whether scores on this questionnaire correlate with scores for skin conductance and brain electrical activity in response to the images viewed. Thank you for your participation and feel free to ask any more questions” … Answer questions…

**Show them out of the room**