FACIAL AFFECT RECOGNITION DEFICITS IN STUDENTS
THAT EXHIBIT SUBCLINICAL BORDERLINE PERSONALITY TRAITS

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DEDICATION

This thesis would not have been possible without the love and support of family and friends. I dedicate this thesis to my husband, Ryan, who has stood by my side since the beginning and showered me with love and support, kind words of encouragement, and offered me well-needed breaks from cleaning the house. Thank you for lending a sympathetic ear as I overcame struggles with this project, and for taking our dog Bentley out for hours on end when I needed some distraction-free time. You are my rock and the person who brings me back down to earth when I get obsessive about my research. I couldn’t have done this without you, and I am so grateful to be called your wife!

To my parents, this certainly couldn’t have been done without you either. You have instilled so many virtues in me since I was a child that led me to where I am today. You taught me how to value hard work, overcome unexpected hardships, and to be balanced in my life and relationships (I’m still working on that). Thank you for teaching me about God, whom I have relied heavily upon during these years in graduate school. Without your teachings, my life would be very different and I wouldn’t have had the tools necessary to be who I am today. I love you!

To Sam and Ellen, thank you for the “thesis parties!” It really is such motivation to be working toward a similar goal along such intelligent, independent women. I am very fortunate to have shared these last two years with you, making memories as we reached this turning point in our lives.

A special thanks goes out to Dr. Poreh who helped me throughout this project, and taught me how to get where I want with this career. I appreciate the opportunities you have given and am very fortunate to have been able to study under your mentorship.
The research involving human participants that is reported in this thesis was conducted with the approval of the Institutional Review Board of Cleveland State University.

See Appendix B for CSU IRB approval and Appendix C for TRI-C IRB approval.
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MICHELLE E. AEBI

ABSTRACT

Intro: Borderline personality disorder (BPD) is a mood disorder that affects 2-4% of the general population, up to 20% of psychological inpatients, and 10% outpatients. It is characterized by unstable affect, behavior, mood, interpersonal relationships, and self-image, and tends to stem from a history of abuse. The DSM-5 scales are labeled as: impulsivity, affect inability, abandonment, unstable relationships, self-image, suicide, emptiness, anger, and quasi-psychotic states. A general finding shows those with BPD tend to have difficulty recognizing and reacting to negative emotions (mainly fear, anger, and disgust). Additionally, researchers have found the brain areas that relate to emotion, planning, attention, memory, and decision-making are smaller in borderlines than healthy subjects.

Objective: The purpose of this study was to examine participants with subclinical borderline features and determine the relationships between facial affect recognition deficits.

Methods: Two-hundred-and-three potential participants were screened using the Borderline Personality Questionnaire (BPQ). Thirty-five undergraduates from Cleveland State University participated in a computer-based study assessing reaction times (RT) and accuracy to Ekman’s Pictures of Facial Affect, the now-standard emotional facial stimuli.

Results: The majority of participants were Caucasian (68.8%), female (88.6%), and right-handed (94.3%). Mean age was 20.89 ± 4.75 (range= 23). There were 3 (8.6%)
subjects of Hispanic ethnicity. Sixteen (45.7%) of the 35 subjects exhibited high borderline traits, as defined as scoring at least 1.5 standard deviations above the mean on the BPQ. There were no significant differences comparing RT and accuracy between groups (all p values ≥ .124). With regard to lateralization, there is a significant difference in the relative disgust index when comparing borderlines (M= .61 ± .08) to controls (M= .73 ± .12) (t(33)=1.31, p= .002).

Conclusions: Our sample of adults with subclinical borderline features did not exhibit significant deficits in their recognition of facial affect, yet appeared to have difficulties in reacting quickly to the stimuli. Our data suggests lateralization of disgust is symptom specific. As such, it is plausible that when people with borderline traits are experiencing an episode, the lateralization changes. Therefore, we should think about the concept of facial affect recognition as a dynamic process of emotional state.

keywords: borderline personality, facial affect recognition, pictures of facial affect, personality disorder, lateralization
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CHAPTER I
INTRODUCTION

1.1 Background and purpose

To the best of our knowledge, there is limited literature analyzing the relationship between facial affect recognition in people with subclinical borderline traits and the subscales of borderline personality disorder. Borderline personality disorder is a mood disorder which inhibits many social aspects of one’s life including relationships with others and how they view the self. Typically, this disorder stems from a history of abuse. A general finding shows those with BPD tend to have difficulty recognizing and reacting to negative emotions (mainly fear, anger, and disgust). The purpose of this study was to examine participants with subclinical borderline features and determine the relationships between facial affect recognition deficits.

1.2 What is borderline personality disorder?

The term “borderline” was coined in 1938 by American psychoanalyst Adolf Stern to describe patients who fell “borderline” between psychosis and neurosis (Bhome & Fridrich 2015). However, in the past few decades the definition of Borderline Personality Disorder (BPD) changed, and is now perceived primarily as a mood disorder.
It is characterized by unstable affect, behavior, mood, interpersonal relationships, and self-image (Zeich 2008), and is a “prototypical disorder of adult social attachment” (Agrawal et al. 2004, p. 341). (See Appendix A for BPD Diagnostic Statistical Manual-5 (DSM-5) criteria.)

Borderline personality disorder only affects 2-4% of the general population, up to 20% of psychological inpatients, and 10% outpatients (Gunderson 2011). Borderlines tend to have difficulty controlling emotions which include intense anger, chaotic relationships, impulsivity, shame, and have fears of abandonment and chronic feelings of emptiness. Seventy-five percent of individuals with borderline personality self-harm, and 10% of suicide attempts are successful (Sarkis 2013).

As borderlines have difficulty with social attachments, they usually develop highly unstable relationships. These intense attachments may suddenly shift from idealization (extreme admiration and love) to devaluation (intense anger and dislike) (American Psychiatric Association 2001, Skodol 2002). Similarly, Linehan’s (1993) research found BPD patients tend to have greater emotional sensitivity, greater emotional reactivity, and a slower return to baseline arousal. As such, borderlines are described to be highly sensitive to plans being changed at the last minute and rejection. When either of these events occur, they tend to react with anger or become distressed. Some key characteristics of borderlines include self-soothing difficulties and the tendency to perceive threats of physical safety in situations where most people wouldn't (Agrawal 2004). In other words, they perceive normal and safe situations as noxious. A key trigger for borderlines is the threat of abandonment, as they most likely will lash out with physical and/or emotional outbursts.
While some borderline diagnosed individuals may have a biological disposition to feel emotions deeper than the average person, it is readily accepted that borderline personality typically develops over time and stems from a history of sexual, physical, or emotional abuse (Minzenberg et al. 2008, National Collaborating Centre for Mental Health 2009). However, review of the literature by Paris (2008) shows that approximately a third of borderlines have a history of abuse, and only 20% of individuals with serious abuse develop serious psychopathologies as an adult. Other research offers conflicting statistics regarding borderline and past abuse. According to Haller and Miles (2004), 19% of borderlines reported one type of abuse, 19% two types, and 25% three. The researchers also broke down the abuse history into types; they found 58% of borderlines had a history of emotional abuse, 61% had a history of physical abuse, and 73% were sexually abused. Perhaps the discrepancy between studies regarding abuse is due to a reporting bias (i.e., not everybody who is borderline was open to admitting past abuse) or some didn’t consider emotional abuse as falling under the title “abuse”.

<table>
<thead>
<tr>
<th>Table 1. Subscales of the Borderline Personality Questionnaire (BPQ)</th>
</tr>
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<tbody>
<tr>
<td>BPQ Scale*</td>
</tr>
<tr>
<td>Impulsivity</td>
</tr>
<tr>
<td>Affect Instability</td>
</tr>
<tr>
<td>Abandonment</td>
</tr>
<tr>
<td>Unstable Relationships</td>
</tr>
<tr>
<td>Self-Image</td>
</tr>
<tr>
<td>Suicide</td>
</tr>
<tr>
<td>Emptiness</td>
</tr>
<tr>
<td>Anger</td>
</tr>
<tr>
<td>Quasi-Psychotic States</td>
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</table>

* Higher on each scale indicates more of the borderline trait.
1.3 Problems with diagnosing borderline personality disorder

Kernberg & Yeomans (2013) observed that nearly half of the bipolar and major depression diagnosed patients who are admitted to the personality unit of their hospital present borderline personality disorder patterns rather than their original diagnosis. This poses a major problem, as creating a complete and correct diagnosis of borderline personality disorder is difficult. The National Alliance of Mental Illnesses explains the difficulty diagnosing borderline personality disorder (in reference to the DSM-IV criteria):

“The five of nine criteria needed to diagnose the disorder may be present in a large number of different combinations. This results in the fact that the disorder often presents quite differently from one person to another, thus making accurate diagnosis somewhat confusing to a clinician not skilled in the area.” (Sarkis 2013)

Borderline personality disorder is a multidimensional disorder, and often presents in combination with dysthymia (70% of cases), major depressive disorder (60%), substance abuse (35%), eating disorders (25%), antisocial and narcissistic personality disorder (25%), or bipolar disorder (15%) (“BPD Overview” 2015). Additionally, borderline personality disorder is often diagnosed as bipolar disorder, attention deficit/hyperactivity disorder (ADHD), posttraumatic stress disorder (PTSD), and narcissistic personality (Kernberg & Yeomans 2013). For example, when a clinician is attending to a borderline patient who has a comorbidity with bipolar disorder, it can make it difficult to parse out what the symptoms of the personality disorder actually are as both types of patients present severe, chronic affective instability as well as hypompanic episodes (Gunderson et al. 2006). Since there needs to be enough time to witness the four
major areas of symptoms related to major depression, differentiation between major depression is difficult (Kernberg & Yeomans 2013). Herman (1992) wrote about a movement in the 1990s that argued BPD was actually just a misunderstood form of PTSD. With regard to people with narcissistic personality, there is a lack of an integrated identity which is similar to borderlines. Additionally, both narcissists and borderlines share similar symptoms such as impulsivity, chaotic relationships, severe breakdown with regard to work and emotional intimacy, and suicidal or self-mutilating behavior (Kernberg & Yeomans 2013).

1.4 What is affect recognition?

Facial expression is one of the main non-verbal ways to convey emotion and intentions, and allows emotion to be expressed faster than one can verbalize (Tian et al. 2001). Evolutionarily, being able to rapidly recognize emotions is extremely important, as one needs to easily detect the motivation and emotional state of another person or animal to determine if they are friend or foe (Darwin 1872, Hawkins 2015). Therefore, being able to correctly identify the small nuances of micro expressions (or “action units”) that make up a facial expression is key (Ekman 1977).

The six emotions of happiness, sadness, fear, anger, surprise, and disgust show on people's faces universally (See Fig. 1) (Darwin 1872). A deficit in affect recognition, therefore, is the inability to correctly distinguish between the facial features of the different emotions. If a person has difficulty deciphering the difference between facial expressions, social skills would most suffer and consequently, relationships would as well.
The literature documents individuals who suffer from personality disorders such as schizotypal, schizophrenia, antisocial, ADHD, and borderline personality commonly have facial affect deficits (Poreh et al. 1997; Mandal et al. 1998; Marsh & Blair 2008; Boakes et al. 2008; van't Wout et al. 2007). Because of this, in the past, researchers have included their own versions of affect discrimination tests in these various populations.

Current affect recognition research investigates the physiological components of facial affect. EEGs and fMRIs are preferred, since changes of facial expression elicit an electrocortical response of the N240 and P300 waves of an event-related potential (Anokhin et al. 2010).

1.5 Emotional development in children

The ability to recognize emotions starts from a very young age. Emotions are
initially learned by watching parents’ expressions and reactions (Castro et al. 2014). Regulating emotions develops rapidly and starts around 7 months in infancy, and continues through young childhood and the adolescent years (Kopp 1989; Ichikawa & Yamaguchi 2014). It is well known that infants can discriminate between emotions (Watling et al. 2012; Caron et al. 1988; Phillips et al. 1990; Caulfield 1996) and can even decipher and respond differently to inauthentic emotional communication (Walle & Campos 2014). Unfortunately, poor emotional regulation in children has been linked to future psychopathology (Calkins & Keane 2009; Suveg & Zeman 2004; Han & Shaffer 2013). Additionally, children of adults who internalize and mask their emotions have to work harder to recognize emotions (Castro et al. 2014). Lastly, it has been found that abused and neglected children later grow up to have problems processing emotional stimuli overall. More specifically, abuse predicted facial affect accuracy, such that physically abused children identified less neutral stimuli accurately and sexually-abused and neglected children identified less positive stimuli accurately (Young & Widom 2013).

1.6 Facial affect recognition research and borderline personality disorder

Given that facial affect recognition is the building block of social competency, it has been widely hypothesized that individuals who suffer from emotional problems might exhibit deficits in this domain, although recent research regarding facial affect deficits and borderline personality disorder is conflicting (Gardner et al. 2010). Domes et al. (2008) found no general deficit on facial affect recognition tasks in borderlines, and they even showed an enhanced learning curve over the course of the experiment. They also found BPD patients are accurate in perceiving facial emotions, but are probably more
sensitive to familiar facial expressions since there was a bias toward the perception of anger but not fear when cues are ambiguous. Dyck et al. (2009) found borderlines showed a deficit in affect recognition in fast discrimination of negative and neutral facial expressions. However, when time was unlimited, BPD patients performed as well as healthy subjects. BPD patients tended to interpret neutral stimuli as negative or threatening, according to research by Donegan et al. (2003). Wagner and Linehan (1999) found controls were less accurate when it came to identifying fear than women with BPD. In contrast, Levine, Marziali, and Hood (1997) found BPD patients were less accurate at recognizing angry, fearful, and disgusted facial expression. Gardner et al. (2010) suggest low effortful control predicts difficulty in borderlines decoding anger. Effortful control is the ability to inhibit automatic responses and regulate responses to stimuli. Borderlines are also known to suppress both positive and negative emotions. Belbo et al. (2013) state this act of suppression is in fact a “maladaptive emotion regulation strategy and is related to psychopathology” (p. 505).

Lis et al. (2007) found borderlines show less activation in the emotional control centers of the brain, as well as the parts that control aggressive impulses. Additionally, less activation is shown in areas that allow people to understand context of a situation, which would create difficulty in social circumstances. Similarly, Koenigsberg et al. (2009) found the parts of the brain that relate to reflexive actions and alertness were activated in borderlines when viewing negative emotional pictures. This finding was not found in those without the disorder. These neural activations could be an insight to why borderlines react quickly, impulsively, and with anger to emotional cues.

Physiological brain research shows the amygdala is a part of the brain’s limbic
system and is considered the center for emotions. As there are known issues in the amygdala in borderlines (Driessen et al. 2000; Hall et al. 2010), the result is inappropriate, intensified, or diminished emotions in situations requiring emotional responses. Additionally, the anterior cingulate cortex is also impaired in borderlines. This area plays a heavy role in emotional functions such as impulse control, empathy, and producing rational cognitive functions (Hazlett et al. 2005; Mizenburg et al. 2007; Tebartz van Elst et al. 2003). MRI studies found the frontal lobe, amygdala, hippocampus, orbitofrontal and anterior cingulate cortex are smaller in BPD patients than healthy adults. Additionally, they found a reduction in parts of the parietal cortex and corpus callosum, and an increased putamen (Zeich 2008). As the frontal lobe regulates planning and decision-making functioning, a smaller-than-normal frontal lobe would most likely cause problems with impulse control. Similarly, the parietal cortex and corpus callosum play roles in maintaining attention. Any deficits in these areas would likely create a personality that reveals actions that are highly impulsive, which can be seen in individuals with ADHD or BPD. In light of these findings, it would seem logical to adopt the notion that subjects with borderline personality disorder traits would have facial affect recognition deficits.

The aspects of borderline personality disorder that would perhaps lead to faulty social interaction might be the result of a core deficit of facial affect recognition. For instance, the DSM-5 criteria that relate to social interactions would be related to their inability to correctly decipher facial emotions. Those high on the following subscales would fit this theory: affect instability, self-image, anger, unstable relationships, and abandonment.
1.7 Lateralization of affect recognition in borderline personality disorder patients

Donegan et al. (2003), found borderlines have greater left amygdala activation to neutral, sad, fearful and happy facial expression compared to control subjects. Ruocco (2005) found that frontotemporal deficits in those with BPD “may be more strongly lateralized to the right hemisphere,” (p. 197). Dinn et al. (2004) showed similar findings; affective dysregulation in BPD shows dysfunction in the same areas. Additionally, Ruocco et al. (2013) found BPD patients had less activation in the right anterior cingulate cortex and the right amygdala.

1.8 Purpose of current study

The purpose of the current study is to examine facial affect recognition in those with subclinical borderline features to determine if there are deficits. Additionally, this study aimed to examine this relationship through the lens that BPD is a multidimensional construct.

1.9 Hypothesis

In line with the research, we hypothesize the strongest deficits of subclinical borderlines would be seen in reaction to anger and fearful stimuli, as these are the most intense negative emotions.

We expect the number of correctly identified negative emotional stimuli (sadness, anger, fear, and disgust) to be significantly lower in subjects with subclinical borderline traits than the controls, as the literature reveals borderlines cannot correctly identify
negative emotional stimuli very well.

Additionally, we believe the subclinical borderlines will have a significantly longer reaction time (RT) to the negative emotional stimuli than the controls, since they will have to decipher emotions using a less-than-optimal anterior cingulate gyrus.

With regard to the criteria of BPD, we expect to find those high on the affect instability, unstable relationships, and suicide scales to have the lowest accuracy and slowest reaction times to the stimuli, particularly the negative emotions, because those high on these scales tend to be the most likely to be borderline.

With regard to lateralization, we hypothesize those with borderline features will have significantly longer reaction times and lower accuracy to negative stimuli presented in the left-visual field, as the right amygdala and anterior cingulate gyrus tends to be impaired and/or smaller in borderlines.
CHAPTER II

METHODS

2.1 Participant Screening

Students enrolled at Cleveland State University (CSU) or Cuyahoga Community College (Tri-C) psychology courses were screened for borderline personality traits (See Appendices B and C for CSU and Tri-C IRB approvals). All potential subjects were administered the Borderline Personality Questionnaire (BPQ) as the screening measure. Two-hundred-and-three students were given the BPQ in one of two mediums- print or digital. The print version was simply a printed-out version of the BPQ (see Appendix D). For those given the print screening version, the questionnaire was filled out in the first 15 minutes of class after the investigator obtained permission from the instructor. The investigator was present while students completed the scale, insuring participants turned their answers in and therefore capitalized on screening the most students possible per class. In classes where the professor had limited time and couldn’t allow administration of the screening measure, a digital version of the BPQ was created and the link was distributed (See Fig. 2 for a representation of the online version). Students then filled out the measure at their leisure and their answers were able to be downloaded to a spreadsheet. All students gave written informed consent prior to filling out the screening
measure (see Appendix E for screening informed consent).

Table 2 shows sample demographics. The majority of participants were Caucasian (68.8%), female (88.6%), and right-handed (94.3%). Participants had a mean age of 20.89 ± 4.75 (range = 23). There were 3 (8.6%) subjects of Hispanic ethnicity. Sixteen (45.7%) of the 35 subjects exhibited high borderline traits, as defined as scoring at least 1.5 standard deviations above the mean. All who participated in the second portion of the study were undergraduate students enrolled in a psychology course at Cleveland State University.

2.2 Subjects

Table 2 shows sample demographics. The majority of participants were Caucasian (68.8%), female (88.6%), and right-handed (94.3%). Participants had a mean age of 20.89 ± 4.75 (range = 23). There were 3 (8.6%) subjects of Hispanic ethnicity. Sixteen (45.7%) of the 35 subjects exhibited high borderline traits, as defined as scoring at least 1.5 standard deviations above the mean. All who participated in the second portion of the study were undergraduate students enrolled in a psychology course at Cleveland State University.
2.3 Measures

**Borderline Personality Questionnaire (BPQ)** - The BPQ is an 80-question self-report measure which identifies the risk of one having borderline personality disorder. It also helps with diagnosis of the disorder. The subscales of the test correlate with the nine criteria of the DSM-5: 1) Impulsivity, 2) Affective Instability, 3) Abandonment, 4) Unstable Relationships, 5) Self-Image, 6) Suicide/Self-Mutilation, 7) Emptiness, 8) Intense Anger, 9) Quasi-Psychotic States.

Endorsing a question in the direction of BPD yielded 1 point, making the possible scores on the measure range from 0-80. The normed United States data (N=181) show a mean of 22.38 ± 12.91 for healthy subjects. While there is no specific cutoff for BPD on the BPQ, 1.5 SD above the mean yields a score of 41.75, which would most likely be considered borderline.

The BPQ has high convergent validity ($r=.85$) when correlated with the MMPI-2

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N (%)</th>
</tr>
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<tbody>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>4 (11.4)</td>
</tr>
<tr>
<td>Female</td>
<td>31 (88.6)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>24 (68.6)</td>
</tr>
<tr>
<td>Black</td>
<td>7 (20.0)</td>
</tr>
<tr>
<td>Asian</td>
<td>2 (5.7)</td>
</tr>
<tr>
<td>Native</td>
<td>2 (5.7)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>3 (8.6)</td>
</tr>
<tr>
<td>Handedness</td>
<td></td>
</tr>
<tr>
<td>Right</td>
<td>33 (94.3)</td>
</tr>
<tr>
<td>Left</td>
<td>2 (5.7)</td>
</tr>
<tr>
<td>Borderline Subjects</td>
<td>16 (45.7)</td>
</tr>
<tr>
<td>Control Subjects</td>
<td>19 (54.3)</td>
</tr>
<tr>
<td>Suicidal Ideation</td>
<td>10 (28.6)</td>
</tr>
</tbody>
</table>
BPD scale, and satisfactory discriminant validity \( (r = .48, r = .45) \) when correlated with the MMPI-2 Schizotypal Disorder Scale (STY) subscale and the Schizotypal Personality Questionnaire (SPQ), respectively (Poreh 2006; Chanen 2008). The BPQ also has satisfactory criterion validity (tau = .051) when using the Diagnostic Interview for Borderline Patients (Gunderson, Kolb, & Austin 1981). Additionally, it has an overall high internal consistency (Kuder-Richardson coefficient = .094) according to the study conducted by Chanen et al. (2008), as well as high internal consistency for each subscale (Cronbach’s alphas range from .78 to .93) (Fonseca-Pedrero et al. 2011).

2.4 Materials

Pictures of Facial Affect (POFA) - Ekman and Friesen (1976) developed a set of 110 grayscale photographs of 14 Caucasian men and women who posed with all 7 facial expressions. Fifty-one of the presented stimuli were men and the other 59 emotional stimuli were women (see Fig. 1). This measure is now the standard measure to decipher facial affect recognition deficits (O’Sullivan & Ekman 2008). Many researchers use this stimulus in facial affect research (Conson et al. 2013; Nijboer & Jellema 2012; Matthews et al. 2003; Becker et al. 2011) to name a few, and Russell and Bullock (1985) call Ekman and Friesen’ extensive work important due to the prototypical basic emotions that are displayed in the stimuli.

2.5 Participant Selection

Inclusion criteria for the experimental group was a BPQ score of at least 1.5 standard deviations higher than the normed means on the Borderline Personality
Questionnaire (BPQ; Poreh 2006). Of the 203 screened, only 25 students from both CSU and Tri-C met the borderline personality traits criteria. Of those 25, only 16 CSU students agreed to be in the study. The control group were subjects who scored within the range of one standard deviation below and one-half a standard deviation higher than the total score mean of BPQ normative data. Only 85 students fell within this normal range. None of the Tri-C students responded to any invitation to participate in the study. The controls were chosen based on how many BPQ scales closely matched the norms. Those with the highest amount of sales matching the norms were contacted first. Students with the lowest BPQ total scores were excluded. Study inclusion criteria was purposely strict in order to mimic clinical borderlines as closely as possible.

2.6 Experimental paradigm

The experiment was held in an empty conference room on CSU’s campus. Occasionally, the experiment needed to be conducted in the co-investigator’s office due to technological issues that required a desktop rather than the laptop used in the conference room. Instructions were given and written informed consent was obtained prior to the start of the experiment (see Appendix F for experiment informed consent). After instructions were given, the researcher stepped out of the room, allowing the participant to self-administer the experiment. Participants (N=35) were seated approximately 24 inches from the computer monitor. Each trial began with an asterisk in the center of the screen warning subjects the stimuli was to appear in half a second. A fixation cross replaced the asterisk as a photograph with a randomized facial expression appeared simultaneously. Each facial expression was presented for one-half second
before a white screen replaced the stimulus. Participants were instructed to focus their attention on the cross in the center of the screen as to see the facial expressions out of their peripheral vision so hemispherical lateralization could later be analyzed. Each emotion (happy, sad, angry, fearful, surprise, disgust, and neutral) was counterbalanced to appear either 548 pixels to the left or right of the center of the computer screen. Subjects were instructed to decide what facial expression was shown and to respond by pressing a button on a Cedrus response box (see Fig. 3). Each button corresponding to an emotion was a different color. The colors of each emotion were purposely different than one would expect to associate the color with. For example, happy is black, which normally is considered a negative color. Sad and fear are yellow and light blue, respectively, which are usually associated with positive emotions. This was done in attempt to avoid inadvertently causing faster reaction times to emotions due to the color associated. In a sense, the theory behind this action was to alleviate any bias and therefore level the playing field for each emotion, so to speak.

Figure 3. One of two Cedrus input response boxes used to record participants’ answers and reaction times.
The blank, white computer screen and fixation cross remained until the participant pressed a button. Practice trials consisting of 24 randomized facial expressions counterbalanced to appear on either the right or left of the screen gave the participant a feel for the experiment to reduce any learning curve. The photographs used for the practice trials were different grayscale facial expressions than the ones in the experiment in attempt to reduce any practice effects that may occur. In the main portion of the experiment, all 110 photos were administered in the same block and were randomized for each participant. The software was programmed to record RT as well as the participant’s answer, the correct answer, and whether response given matched the correct one. The experiment took approximately 15 minutes to complete. An opportunity was given after the experiment ended to ask any questions. The stimuli were presented and recorded via SuperLab software.

2.7 Design

The experiment was a mixed design, with the within-subjects factors being relative lateralization index for each emotion, and emotion (happy, sad, anger, fear, surprise, disgust or neutral). The between-subject factor was group classification (borderline trait or control). The dependent variables were the number of correct total responses, as well as amount correct for each emotion. Additionally, average reaction times for the 110 photographs and each emotion were dependent variables.

2.8 Data Analysis

Descriptive statistics summarized the sample demographics. With regard to
reaction-time data, any outlier as defined as 2 standard deviations above or below the mean were removed. One-way ANOVAs were run to calculate any differences between the experimental and control group for overall average reaction times as well as average reaction time broken down by emotion. Additional one-way ANOVAs were calculated to determine if there were significant differences in total number correct, as well as by emotion. In order to determine if any subscales of the BPQ or if RT to emotion stimuli predicted membership of high, average, or low facial affect recognition, a discriminant analysis was calculated. Average facial affect was considered falling within the range of .5 standard deviations below and above the mean of total correct stimuli. Low and high facial affect, then, were considered 1.5 standard deviation below and above the mean, respectively. The borderline-trait group was then split to create a subset of data. Those who were considered a “high” borderline risk reported high means (1.5 SD above the mean) on the suicidality/self-mutilation scale, and those who were a “medium” risk were those who were not high on the suicide scale, but still high enough on the total BPQ to be considered having borderline traits. One-way ANOVAs were then repeated for the above analyses with this new subset of data to determine if this split caused any differences.

To determine if there was any lateralization effect of the emotions, a relative index was created. The formula for the index is

\[
\text{Relative index} = \frac{\#X_{\text{Correct left}}}{\#X_{\text{Correct left}} + \#X_{\text{Correct right}}}
\]

where X equals the emotion being analyzed. For example, the relative index for happy is the amount of happy stimuli the participant correctly identified that were presented in the
left visual field divided by the total amount of happy stimuli the participant correctly identified (both right and left visual-field). The relative index for each emotion ranges from .00 to 1.00. Index numbers closer to zero show the participant gave more correct responses to stimuli presented on the right half of the screen and vice versa. If one scored a .5, it indicates the individual got exactly the same number of stimuli correct on the left and right visual-fields for the emotion being analyzed. One-way ANOVAs were then run to identify any significant differences between experimental and control groups based on relative indices for each emotion, and also for each index by risk type: high, medium, and controls. Two-tailed Pearson correlations broken down by borderline risk status were conducted to determine association between relative indices and the participant’s score on each BPQ scale. Lastly, additional two-tailed Pearson correlations were run to determine any association between BPQ subscales and RT of emotion. Data were analyzed using SPSS version 22.

2.9 Ethical Considerations

All of the participants were treated in accordance to the ethical guidelines of the American Psychological Association (APA) and the Cleveland State University Institutional Review Board (IRB).

Although there were no perceivable risks for participating in this study, a few considerations were kept in mind when working with people who possess borderline personality traits. Appropriate word choice and inflection was made when contacting the students who have traits of BPD in order to alleviate any negative interactions with the participants.
CHAPTER III

RESULTS

The average BPQ score of control subjects was 19.05 ± 4.42 as compared to the borderline trait group average BPQ score of 45.06 ± 7.36. As expected in borderlines, 87.5% and 62.5% of subjects were statistically high on the affective instability scale and the suicide/self-mutilation scale, respectively (see Table 3). Overall, the average number of emotions correctly identified was 70.14 (63.76%) ± 12.81. This overall percentage was similar, although slightly lower, to the results of Kosson et al.’s 2002 study of facial affect recognition in criminal psychopaths (control M = 71.38% ± 12.53; psychopath M = 73.24% ± 12.43).

The one-way ANOVA comparing each emotion RT and experimental group status showed no significant differences (all F values ≤ 2.20 and all p values ≥ .147). Similarly, the one-way ANOVA comparing accuracy for each emotion and experimental group status showed no significant differences (all F values ≤ 1.24 and all p values ≥ .273). When high-risk borderline was compared against medium-risk and controls, the one-way ANOVAs showed no significant differences between accuracy and risk group status (all F values ≤ 1.51 and all p values ≥ .237).
<table>
<thead>
<tr>
<th>BPQ Scales</th>
<th>Mean (SD)</th>
<th>High on scale* N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Borderline Traits</td>
<td>Controls</td>
</tr>
<tr>
<td>Impulsivity</td>
<td>3.44 (2.16)</td>
<td>1 (6.3)</td>
</tr>
<tr>
<td></td>
<td>1.21 (1.44)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Affect Instability</td>
<td>8.25 (1.69)</td>
<td>14 (87.5)</td>
</tr>
<tr>
<td></td>
<td>2.02 (3.79)</td>
<td>5 (26.3)</td>
</tr>
<tr>
<td>Abandonment</td>
<td>5.13 (2.22)</td>
<td>15 (93.8)</td>
</tr>
<tr>
<td></td>
<td>2.00 (1.60)</td>
<td>4 (21.1)</td>
</tr>
<tr>
<td>Unstable Relationships</td>
<td>2.22 (5.56)</td>
<td>4 (25.0)</td>
</tr>
<tr>
<td></td>
<td>2.09 (2.16)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Self-Image</td>
<td>5.44 (2.71)</td>
<td>8 (50.0)</td>
</tr>
<tr>
<td></td>
<td>2.00 (2.29)</td>
<td>1 (5.3)</td>
</tr>
<tr>
<td>Suicide</td>
<td>3.19 (1.83)</td>
<td>10 (62.5)</td>
</tr>
<tr>
<td></td>
<td>.74 (1.10)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Emptiness</td>
<td>2.39 (5.43)</td>
<td>10 (62.5)</td>
</tr>
<tr>
<td></td>
<td>2.00 (1.49)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Anger</td>
<td>6.19 (2.20)</td>
<td>2 (12.5)</td>
</tr>
<tr>
<td></td>
<td>3.74 (3.12)</td>
<td>1 (5.3)</td>
</tr>
<tr>
<td>Quasi-psychotic States</td>
<td>2.44 (1.86)</td>
<td>4 (25.0)</td>
</tr>
<tr>
<td></td>
<td>1.42 (1.21)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Total BPQ Score</td>
<td>45.06 (7.36)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>19.05 (4.42)</td>
<td></td>
</tr>
</tbody>
</table>

* In order to be considered high on a scale, participants must have scored at least 1.5 standard deviations above the mean.
However, the one-way ANOVA comparing emotion RT and risk group status showed a significant difference ($F(2,34)= 4.22, p= .024$) regarding total average sad RT between high-risk ($M=1904.30 \pm 163.61$) and medium-risk borderlines ($M=2320.06 \pm 429.09$) and also between medium-risk borderlines and controls ($M=1881.52 \pm 361.03$).

With regard to analyzing whether RT to emotions predicted whether one was low, average, or high on facial affect recognition, the discriminant analysis showed no significant functions ($\text{Wilks’ } \lambda (df=14)= .231, \chi^2= 19.04, p= .164$).

The second discriminant analysis which attempted to determine whether scores on subscales on the BPQ would predict level of facial affect recognition was also non-significant ($\text{Wilks’ } \lambda (df=18)= .314, \chi^2= 13.90, p= .734$). With regard to lateralization, there is a significant difference in the relative disgust index when comparing borderlines ($M=.61 \pm .08$) to controls ($M=.73 \pm .12$) ($F(2,32)=7.09, p= .003$). Breaking the data into further subgroups, results show significant differences between high-risk borderlines, medium-risk borderlines and control subjects ($F(2,34)= 8.73, p= .001$). The least significant difference (LSD) post-hoc test shows there are significant differences ($F(2,32)=7.09, p= .003$) between medium-risk borderlines ($M=.56 \pm .07$) and control subjects ($M=.73 \pm .12$), $p= .001$ and differences between high-risk borderlines ($M=.63 \pm .07$) and control subjects ($M=.73 \pm .12$), $p=.025$. Pearson’s correlations revealed an association between controls’ score on the suicide subscale of the BPQ and relative total index ($r(19)= .462, p= .047$), the relative anger index ($r(19)= -.543, p= .016$), and the relative disgust index ($r(19)= .487, p= .034$). Relative disgust also significantly correlated with controls’ score of the quasi-psychotic states subscale ($r(19)=.455, p= .050$). Lastly, relative fear significantly correlated with the controls’ score on total BPQ ($r(19)=.510$,
For medium-risk borderlines, the only significant correlation found was between the relative surprise index and their score on the suicide scale of the BPQ \( r(6)= -.880, \ p=.021 \). For high-risk borderlines, there were no significant correlations between any of the relative indexes and scores received on any of the subscales of the BPQ.

The results of the correlations which show significant associations between BPQ subscales and RT of emotion can be seen in Table 4.

<table>
<thead>
<tr>
<th>BPQ Scale</th>
<th>Sad RT (^{b})</th>
<th>Anger RT</th>
<th>Disgust RT</th>
<th>Neutral RT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impulsivity</td>
<td>.346</td>
<td>.366</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( p )</td>
<td>.042</td>
<td>.030</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>35</td>
<td>35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anger</td>
<td>---</td>
<td>.366</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>( p )</td>
<td>---</td>
<td>.031</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>---</td>
<td>35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unstable Relationships</td>
<td>---</td>
<td>---</td>
<td>-.367</td>
<td>---</td>
</tr>
<tr>
<td>( p )</td>
<td>.030</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suicide</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>.369</td>
</tr>
<tr>
<td>( p )</td>
<td>---</td>
<td></td>
<td></td>
<td>.029</td>
</tr>
<tr>
<td>N</td>
<td>---</td>
<td></td>
<td></td>
<td>35</td>
</tr>
</tbody>
</table>

\(^a\) Borderline Personality Questionnaire

\(^b\) Reaction Time
CHAPTER IV

DISCUSSION

To the best of our knowledge, this is the first study to examine the relationship between certain subscales of borderline personality disorder and facial affect recognition in people with subclinical borderline traits. The primary finding of this study shows our sample of adults with subclinical borderline features do not exhibit significant deficits in their recognition of facial affect, yet rather appear to have difficulties in reacting quickly to the stimuli they encounter. This decline in reaction time might explain the day-to-day difficulties they have in interacting with others.

Overall, contrary to our hypothesis, the 16 subclinical borderline adults did as well as the 19 controls in regard to correctly identifying the presented emotional stimuli. However, our findings are similar to Dyck et al. (2009) who found that people with borderline personality disorder can correctly identify faces if given enough time. It is because of this finding that we were more interested in how quickly the respondent could decipher emotions rather than amount or percentage correct. It is important to remember when borderlines identify facial expressions, they tend to have the most trouble with the micro expressions of emotion (Ekman 1977).

Consistent with other literature (Arntz & Veen 2001, Dyck 2009, Giesen-Bloo &
Arntz 2005), the evaluation of negative emotions correlated with borderline personality disorder. Similarly, past fMRI studies have shown increased prefrontal activation when borderlines were shown emotionally-negative stimuli (Belbo et al. 2013). The reaction times of negative emotions (sad, anger, and disgust), as well as neutral, correlated with the scales of the BPQ.

In our study, controls responded the fastest to sad stimuli, with high-risk borderlines significantly, yet only slightly, slower. Interestingly, it was the medium-risk borderlines who responded significantly slowest to sad stimuli than the other groups. The correlations show the faster one reacts to sad stimuli, the higher scores one tends to have on the impulsivity scale of the BPQ ($r(33) = .346, p=.042$). As there was only one experimental subject that scored high on the impulsivity scale, it is consistent that more impulsive individuals would react faster to sad stimuli, and in this case, they are the control subjects.

The faster one reacts to anger, the more impulsive they tend to be ($r(33) = .366, p=.030$) and the more they feel anger themselves ($r(33) = .366, p=.031$). This is an important finding because it shows that although borderlines may have difficulty reacting to angry stimuli, they also possess some sort of self-awareness that they tend to get angrier than healthy individuals. To clarify, since the BPQ is self-report, in order to be classified as high on the anger scale the individual filling out the report must have some awareness that they tend to typically react with anger.

The faster one reacts to disgust, the lower one scores on the unstable relationship scale, which means the more stable the relationship is ($r(33) = -.367, p=.030$). Lastly, and possibly most interesting, the faster one responds to neutral stimuli the higher one tends
to score on the suicide/self-mutilation scale ($r(33)= .369, p= .029$). Past research shows borderlines reactions to neutral stimuli are associated with negative emotions.

Partial correlations were considered to control for neutral facial expressions, but due to the fact that neutral reaction time is positively correlated with the suicide and self-mutilation scale of the BPQ, it didn’t seem an appropriate measure to control for as it most likely wouldn’t give the best indication of what was actually occurring.

The data suggests there are hemispherical lateralization effects of some emotions. In controls, for example, when analyzing the emotion of disgust, medium-risk borderlines averaged equal amounts of stimuli correct in both visual fields. On average, high-risk borderlines correctly identified significantly more stimuli presented in the left-visual field than the right, and control subjects identified the most correct in the left-visual field stimuli than the other groups. Donegan et al.’s (2003) research does not necessarily contradict our study, since our findings centered on the emotion of disgust. Our data suggests lateralization of disgust is symptom specific; it could be that when those with borderline traits are experiencing an episode, the lateralization changes. It is important to note that those with medium-risk (high on borderline traits, yet no suicidal ideation) show equal hemispherical lateralization yet, on average, controls utilize the right hemisphere more than the left when shown a disgusted face. Though we did not hypothesize the extent or direction of hemispherical lateralization, this finding is interesting as one would most likely expect the high-risk borderlines and controls to be on opposite ends of the spectrum for lateralization.

Therefore, we should think about the concept of facial affect recognition as a dynamic process as a process of emotional state. Based on the data in this study, a
reasonable theory to adopt to explain changing lateralization in participants is that relative facial recognition is not absolute, but instead is relative to the emotional state of the person and therefore is dynamic. As the relative indexes are based on lateralization, there were correlations between lateralization for all emotions except anger. In the general literature, it is theorized that the right hemisphere controls emotion more so than the left, though the left is important for preprocessing social emotions.

A likely strategy borderlines adopt to try to compensate for their increase of lateralization of processing emotion would be to use both hemispheres. This can be seen somewhat in previous literature, as Belbo et al.’s (2013) findings suggest, people with BPD tend to suppress both their positive and negative emotions in an attempt to cover up any extreme emotional arousal that may be deemed inappropriate in society’s perception. Perhaps subclinical medium-risk borderlines use both hemispheres to compensate for their erratic emotions, which could extend to judging emotional faces or stimuli. Medium-risk borderlines may be compensating for their deficits when viewing disgusted stimuli by utilizing the left hemisphere more than the right. When they start to become emotional and therefore undergo a borderline episode, their logic (left hemisphere) becomes underutilized and they start utilizing the right hemisphere more.

The results of the discriminant analysis indicate how fast one reacts to different emotional stimuli or how high their scores are on subscales of the BPQ doesn’t predict which level of facial affect recognition ability one will fall into. In light of the findings in the data, it is clear there is some evidence to support the notion that those with borderline personality disorder, even those with subclinical borderline traits, have some degree of facial affect recognition deficits.
Although this study used a subclinical population, this subgroup may actually help parse out what factors underlie borderline personality disorder. It can be assumed that those tested had at least a decent amount of social skills, as the participants were all functioning college students and were not therefore not completely incapacitated socially. If this test was to be done for clinical borderlines, there would likely be less cooperation and a greater impairment of functions unrelated to facial affect recognition. This, in turn, could cause difficulty parsing apart what aspect of borderline personality disorder causes facial affect deficits, if at all. Therefore, this study utilized a different population than other studies to see if it was similar to the literature.

4.1 Limitations

There are several notable limitations in this study. Specific to this study, the limited sample size may hinder generalizability to other population samples. Additionally, the low number of participants was due to having a very specific sample. However, since we found significance in such a small sample, our findings are robust. Since the sample was extracted from undergraduate students, various motivations for completing the screening and/or study should be taken into consideration. As the experimental participants were categorized as solely subclinical, it is likely the results would have been stronger if the subjects were clinically-diagnosed borderlines.

Additionally, it is important to remember that though the instructions explicitly state the subject should focus their entire attention on the fixation cross in the middle of the screen and see the photo of the emotion out of their peripheral vision, there was no way to control where the subject was looking and therefore we cannot guarantee that their
eyes didn’t wander during the presentation of stimuli. More generalized limitations include a high co-morbidity rate of other disorders and BPD (Sarkis 2013) which makes it difficult to isolate the symptoms devoted solely to BPD. Medications may have been taken by participants that interact with the executive processes, which may produce confounding results.

4.2 Future research

Clinical misinterpretation can occur when borderlines are under stress and duress and are experiencing different emotions than when they are not in an acute state. As such, it may also be best to test facial affect recognition in borderlines during both an acute state and compare it against their baseline when they are not experiencing an episode. If this research was conducted, one may be able to see if the lateralization of emotions changes as a result of where the person is with regard to emotional state. In turn, this could help prove if facial affect recognition deficits are dynamic rather than static and are therefore a trait, not a state.

Eye-tracking research would help determine whether the participant remained looking at the fixation cross for the duration of the stimuli and would allow for any data not meeting this important stipulation to be dropped. Additionally, eye tracking would allow researchers to determine what part of the face people gaze at to determine facial expression, whether it be the eyes or the mouth regions. Perhaps borderlines only have difficulty determining affect in particular facial regions, and there is a flaw in in their ability to process these aspects of expression.

If this study was to be replicated, perhaps it would be best to present a separate
block where the stimuli is presented in the center of the screen as well in order to
compare accuracy and RT to the lateralized stimuli. Lastly, replication studies should
include varying stimuli presentation durations to determine if this causes any accuracy or
RT effects, and determine whether the placement of where the emotions are located on
the Cedrus input box make a difference regarding accuracy and RT.
REFERENCES


boys with attention deficit/hyperactivity disorder. *Child Neuropsychology, 14*(1), 82-96.


doi:10.1093/oxfordjournals.schbul.a033335


Zimmerman, M., Dalrymple, K., Young, D., Chelminski, I., & Martinez, J. (2012). An
APPENDIX A

DSM-5 Borderline Personality Criteria

The DSM-5 criteria for BPD is indicated by five (or more) of the following (American Psychiatric Association 2013):

1. Frantic efforts to avoid real or imagined abandonment. Note: Do not include suicidal or self-mutilating behavior covered in Criterion 5.

2. A pattern of unstable and intense interpersonal relationships characterized by alternating between extremes of idealization and devaluation

3. Identity disturbance: markedly and persistently unstable self-image or sense of self

4. Impulsivity in at least two areas that are potentially self-damaging (e.g., spending, sex, substance abuse, reckless driving, binge eating). Note: Do not include suicidal or self-mutilating behavior covered in Criterion 5.

5. Recurrent suicidal behavior, gestures, or threats, or self-mutilating behavior

6. Affective instability due to a marked reactivity of mood (e.g., intense episodic dysphoria, irritability, or anxiety usually lasting a few hours and only rarely more than a few days)

7. Chronic feelings of emptiness

8. Inappropriate, intense anger or difficulty controlling anger (e.g., frequent displays of temper, constant anger, recurrent physical fights)

9. Transient, stress-related paranoid ideation or severe dissociative symptoms
APPENDIX B

CSU IRB Approval

Memorandum
Institutional Review Board

To: Amir Poreh
Clinical Psychology

From: Bernie Strong, (x3624, b.r.strong@csuohio.edu) BKS
Sponsored Programs & Research Services

Date: April 14, 2014

Re: Results of IRB Review of your project number: #30067-POR-HS
Cc-Investigator: Michelle Aebi
Title: Facial Affect Deficits in Certain Subscales of Borderline Personality Disorder

The IRB has reviewed and approved your application for the above named project, under the category noted below. It has been determined that the research being performed under this protocol is Exempt. This determination does not expire and does not require an annual review.

However, by accepting this decision, you agree to notify the IRB of: (1) any additions to or changes in procedures for your study that modify the subjects' risk in any way; and (2) any events that affect that safety or well-being of subjects. Notify the IRB of any revisions to the protocol, including the addition of researchers, prior to implementation.

Thank you for your efforts to maintain compliance with the federal regulations for the protection of human subjects.


<table>
<thead>
<tr>
<th>Approval Category:</th>
<th>Approval Date:</th>
<th>cc:</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>X</em> Exempt (b2)</td>
<td>April 14, 2014</td>
<td>Project file</td>
</tr>
</tbody>
</table>
APPENDIX C

TRI-C IRB Approval

TO: Michelle Aebi

SUBJECT: Notice of ☒ Review and approval
         ☐ Exemption

The Human Subjects Review Committee of Cuyahoga Community College has reviewed and approved your proposal entitled:

Facial Affect Deficits in Certain Subscales of Students with Borderline Personality Traits

You are advised that with respect to:

1. the rights and welfare of the individual(s) involved;
2. the appropriateness of the methods used to secure informed consent; and
3. the risks and potential benefits of the investigation.

The Human Subjects Review Committee has reviewed your proposal and does consider your project to be:

☒ Fully acceptable (without reservations).
☐ Acceptable with the reservations noted below
☐ Not acceptable for the reasons noted below

Approval date: July 2, 2014

Signed for the Committee by:

G. Robert Stuart
G. Robert Stuart, Chairperson
Human Subjects Review Committee
APPENDIX D

BPQ Scale

**Study ID: _______________  Date: ___/___/_____**

**Instructions:** Please put a circle around the response that you feel best DESCRIBES YOUR USUAL SELF (for the past two years or longer) in relation to each statement. Circle T if you think the statement is true. Circle F if you think the statement is false.

**There are no right or wrong answers and there are no trick questions.** Please respond as honestly as you can, but don't ponder too long over each item.

Please answer every question, even though sometimes you may find it hard to decide.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I often do things without thinking them through.</td>
<td>T</td>
</tr>
<tr>
<td>2.</td>
<td>I often become depressed or anxious 'out of the blue'.</td>
<td>T</td>
</tr>
<tr>
<td>3.</td>
<td>People often leave me.</td>
<td>T</td>
</tr>
<tr>
<td>4.</td>
<td>I am rarely disappointed by my friends.</td>
<td>T</td>
</tr>
<tr>
<td>5.</td>
<td>I feel inferior to other people.</td>
<td>T</td>
</tr>
<tr>
<td>6.</td>
<td>I have threatened to hurt myself in the past.</td>
<td>T</td>
</tr>
<tr>
<td>7.</td>
<td>I do not believe that I have the skills to do anything with my life.</td>
<td>T</td>
</tr>
<tr>
<td>8.</td>
<td>I rarely get angry at other people.</td>
<td>T</td>
</tr>
<tr>
<td>9.</td>
<td>Sometimes I feel like I am not real.</td>
<td>T</td>
</tr>
<tr>
<td>10.</td>
<td>I will not have sex with someone unless I have known them for quite some time.</td>
<td>T</td>
</tr>
<tr>
<td>11.</td>
<td>I sometimes feel anxious or irritable and become sad a few hours later.</td>
<td>T</td>
</tr>
<tr>
<td>12.</td>
<td>When people close to me die or leave me, I feel abandoned.</td>
<td>T</td>
</tr>
<tr>
<td>13.</td>
<td>I often exaggerate the potential of friendships only to find out later that they will not work out.</td>
<td>T</td>
</tr>
<tr>
<td>14.</td>
<td>If I were more like other people I would feel better about myself.</td>
<td>T</td>
</tr>
<tr>
<td>15.</td>
<td>I have deliberately tried to hurt myself without trying to kill myself.</td>
<td>T</td>
</tr>
<tr>
<td>16.</td>
<td>In general, my life is pretty boring.</td>
<td>T</td>
</tr>
<tr>
<td>17.</td>
<td>I frequently get into physical fights.</td>
<td>T</td>
</tr>
<tr>
<td>18.</td>
<td>People are sometimes out to get me.</td>
<td>T</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>19.</td>
<td>My friends have told me that my mood changes very quickly.</td>
<td>T F</td>
</tr>
<tr>
<td>20.</td>
<td>I am afraid to spend time alone.</td>
<td>T F</td>
</tr>
<tr>
<td>21.</td>
<td>People who seem trustworthy often disappoint me.</td>
<td>T F</td>
</tr>
<tr>
<td>22.</td>
<td>I have made a suicide attempt in the past.</td>
<td>T F</td>
</tr>
<tr>
<td>23.</td>
<td>I often feel like I have nothing to offer others.</td>
<td>T F</td>
</tr>
<tr>
<td>24.</td>
<td>I have trouble controlling my temper.</td>
<td>T F</td>
</tr>
<tr>
<td>25.</td>
<td>I can read other people's minds.</td>
<td>T F</td>
</tr>
<tr>
<td>26.</td>
<td>I have tried 'hard' street drugs (e.g. cocaine, heroin).</td>
<td>T F</td>
</tr>
<tr>
<td>27.</td>
<td>My mood frequently alternates throughout the day between happiness, anger, anxiety and depression.</td>
<td>T F</td>
</tr>
<tr>
<td>28.</td>
<td>When my friends leave, I am confident I will see them again.</td>
<td>T F</td>
</tr>
<tr>
<td>29.</td>
<td>My friends often disappoint me.</td>
<td>T F</td>
</tr>
<tr>
<td>30.</td>
<td>I have cut myself on purpose.</td>
<td>T F</td>
</tr>
<tr>
<td>31.</td>
<td>I often feel lonely and deserted.</td>
<td>T F</td>
</tr>
<tr>
<td>32.</td>
<td>I have no difficulty controlling my temper.</td>
<td>T F</td>
</tr>
<tr>
<td>33.</td>
<td>I sometimes see or hear things that others cannot see or hear</td>
<td>T F</td>
</tr>
<tr>
<td>34.</td>
<td>It is not unusual for me to have sex on the first date.</td>
<td>T F</td>
</tr>
<tr>
<td>35.</td>
<td>I sometimes feel very sad but this feeling can change quickly.</td>
<td>T F</td>
</tr>
<tr>
<td>36.</td>
<td>People often let me down.</td>
<td>T F</td>
</tr>
<tr>
<td>37.</td>
<td>I wish I could be more like some of my friends.</td>
<td>T F</td>
</tr>
<tr>
<td>38.</td>
<td>I used to try to hurt myself to get attention.</td>
<td>T F</td>
</tr>
<tr>
<td>39.</td>
<td>I am often different with different people in different situations so that sometimes I am not sure who I am.</td>
<td>T F</td>
</tr>
<tr>
<td>40.</td>
<td>I easily become irritated by others.</td>
<td>T F</td>
</tr>
<tr>
<td>41.</td>
<td>Sometimes I can actually hear what other people are thinking.</td>
<td>T F</td>
</tr>
<tr>
<td>42.</td>
<td>I get high on drugs whenever I feel like it.</td>
<td>T F</td>
</tr>
<tr>
<td>43.</td>
<td>I rarely feel sad or anxious.</td>
<td>T F</td>
</tr>
<tr>
<td>44.</td>
<td>No one loves me.</td>
<td>T F</td>
</tr>
<tr>
<td>45.</td>
<td>When I trust people, they rarely disappoint me.</td>
<td>T F</td>
</tr>
<tr>
<td>46.</td>
<td>I feel that people would not like me if they really knew me well.</td>
<td>T F</td>
</tr>
<tr>
<td>47.</td>
<td>I get angry easily.</td>
<td>T F</td>
</tr>
<tr>
<td>48.</td>
<td>It is impossible to read others' minds.</td>
<td>T F</td>
</tr>
<tr>
<td>49.</td>
<td>I sometimes feel very happy but this feeling can change quickly.</td>
<td>T F</td>
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<tr>
<td>50.</td>
<td>I find it difficult to depend on others because they will not be there when I need them.</td>
<td>T F</td>
</tr>
<tr>
<td>51.</td>
<td>The relationships with people I care about have lots of ups and downs.</td>
<td>T F</td>
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<tr>
<td>52.</td>
<td>I feel comfortable acting like myself.</td>
<td>T F</td>
</tr>
<tr>
<td>53.</td>
<td>I have never made an attempt to hurt myself.</td>
<td>T F</td>
</tr>
<tr>
<td>54.</td>
<td>I rarely feel lonely.</td>
<td>T F</td>
</tr>
<tr>
<td>55.</td>
<td>I often find that the littlest things make me angry.</td>
<td>T F</td>
</tr>
<tr>
<td>56.</td>
<td>Sometimes I can't tell between what is real and what I have imagined.</td>
<td>T F</td>
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<tr>
<td>57.</td>
<td>When I drink, I drink too much.</td>
<td>T F</td>
</tr>
<tr>
<td>58.</td>
<td>I consider myself to be a moody person.</td>
<td>T F</td>
</tr>
<tr>
<td>59.</td>
<td>I have difficulty developing close relationships because people often abandon me.</td>
<td>T F</td>
</tr>
<tr>
<td>60.</td>
<td>My friends are always there when I need them.</td>
<td>T F</td>
</tr>
<tr>
<td>61.</td>
<td>I wish I were someone else.</td>
<td>T F</td>
</tr>
<tr>
<td>62.</td>
<td>I feel like my life is not interesting.</td>
<td>T F</td>
</tr>
<tr>
<td>63.</td>
<td>When I am angry, I sometimes hit objects and break them.</td>
<td>T F</td>
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<tr>
<td>64.</td>
<td>I often receive speeding tickets.</td>
<td>T F</td>
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<tr>
<td>65.</td>
<td>I often feel like I am on an emotional 'roller coaster'.</td>
<td>T F</td>
</tr>
<tr>
<td>66.</td>
<td>I feel like my family has deserted me.</td>
<td>T F</td>
</tr>
<tr>
<td>67.</td>
<td>I am very comfortable with who I am.</td>
<td>T F</td>
</tr>
<tr>
<td>68.</td>
<td>I often do things impulsively.</td>
<td>T F</td>
</tr>
<tr>
<td>69.</td>
<td>My life is without purpose.</td>
<td>T F</td>
</tr>
<tr>
<td>70.</td>
<td>I am not sure what I want to do in the future.</td>
<td>T F</td>
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<tr>
<td>71.</td>
<td>At times I eat so much that I am in pain or have to force myself to throw up.</td>
<td>T F</td>
</tr>
<tr>
<td>72.</td>
<td>People tell me that I am a moody person.</td>
<td>T F</td>
</tr>
<tr>
<td>73.</td>
<td>The people I love often leave me.</td>
<td>T F</td>
</tr>
<tr>
<td>74.</td>
<td>In social situations, I often feel that others will see through me and realize that I don’t have much to offer.</td>
<td>T F</td>
</tr>
<tr>
<td>75.</td>
<td>I have been in the hospital for trying to harm myself.</td>
<td>T F</td>
</tr>
<tr>
<td>76.</td>
<td>I often feel empty inside.</td>
<td>T F</td>
</tr>
<tr>
<td>77.</td>
<td>Others often make me angry.</td>
<td>T F</td>
</tr>
<tr>
<td>78.</td>
<td>I often become frantic when I think that someone I care about will leave me.</td>
<td>T F</td>
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<tr>
<td></td>
<td>I am confused about my long-term goals.</td>
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<td>---</td>
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<tr>
<td>80.</td>
<td>Others say I'm quick tempered.</td>
<td>T</td>
</tr>
</tbody>
</table>
STATEMENT OF INFORMED CONSENT

AGREEMENT TO VOLUNTARILY PARTICIPATE IN RESEARCH PROJECT

Researcher: Michelle Aebi  
Education: Experimental Psychology Master's student at Cleveland State University 
Contact Information: (603) 809-6653 Email: mcascio@harding.edu  
Faculty research supervisor: Dr. Amir Poreh Email: a.poreh@csuohio.edu

Purpose of the Study: The purpose of this study is to gather information from undergraduate students on personality style. After the in-class portions, we will later ask some of the students to participate in a follow-up study designed to determine the link between their personality traits and facial affect recognition abilities.

Procedures and Duration of the Study: Participants will be asked to spend 10-20 minutes during their class to answer the yes or no questions of a screening scale. Those who participate in the second portion of the study will spend approximately 30 minutes completing a measure on a computer designed to indicate facial affect recognition.

Confidentiality: Your identity will remain confidential and the results of the brief screening will be decoded (your name will be removed from the answer sheet once it is coded). Any extracts from your answers that are quoted or referenced in the thesis will be entirely anonymous. At times, it may be necessary for me to discuss the results of your survey with my faculty advisor, Dr. Poreh. He is held to the same confidentiality standards and will not divulge any indication of which answers were yours or anyone else’s.

Again, the data will be coded as to ensure participants' confidentiality. All data will be kept under lock and key for the federal mandated duration of 3 years after testing. After that, it will be destroyed via paper shredder. Participants may, with their permission, be contacted at a later date to attend an interview and facial affect recognition portion of the study.

Participation: Your participation in this study is voluntary. You will not be compensated for your participation in this study. You may withdraw your participation at any time without consequence. You may also choose not to participate in this study without repercussions.
Risks: Refusal to participate in this study will result in no penalty or loss of benefit to you. Though the forms are not anonymous, there should be no risk of discomfort or embarrassment of divulging personal information, which some of the questions on the BPQ ask. Once the data is received, it will be combined into a conglomerate of data. You will have an opportunity to express any concerns you have, and if you wish, you may also pursue your concerns with me, Michelle Aebi (603) 809-6653, or my faculty research supervisor Dr. Amir Poreh.

Benefits: You will not be compensated for your participation, although you will receive class credit if applicable. You will have the satisfaction of contributing to our knowledge and understanding of personality styles and facial affect recognition. If you would like to receive one, I will provide you with a preliminary report of my findings.

Informed Consent: By your signature below, you freely agree to participate in this study. You agree that you have been given the opportunity to ask questions and have them answered to your satisfaction. You understand that you may be contacted at a later date for a follow-up interview. You have received a copy of this consent form signed by the researcher.

I understand that if I have any questions about my rights as a research subject I can contact the CSU Institutional Review Board at (216) 687-3630.

Person agreeing to participate in study: ____________________________

Signature ____________________________ Date ____________________________

Contact Information: (phone) ____________________________ Email: ____________________________

Contact Information: ____________________________________________

Person obtaining consent:

Signature ____________________________ Date: ____________________________
Statement of Informed Consent

Agreement to Voluntarily Participate in Research Project

Researcher: Michelle Aebi
Education: Experimental Psychology Master's student at Cleveland State University
Contact Information: (603) 809-6653 Email: mcascio@harding.edu
Faculty research supervisor: Dr. Amir Poreh Email: a.poreh@csuohio.edu

Purpose of the Study: The purpose of this study is to gather information from undergraduate students on personality style. This is an in-class screening to decipher who we want to ask back for the follow-up study on facial affect recognition, which is how well one can decipher between the six universal facial expressions of emotion (anger, hurt, fear, happiness, sadness, and surprise). Those chosen to be asked to participate in the second portion will be contacted at a later date. These students will have the opportunity to participate in the follow-up study designed to determine the link between their personality traits and facial affect recognition abilities.

Procedures and Duration of the Study: Participants will be asked to will spend 10-20 minutes during their class to answer the yes or no questions of a screening scale. Those who participate in the second portion of the study will spend approximately 30 minutes completing a measure on a computer designed to indicate facial affect recognition.

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Informed Consent: By your signature below, you freely agree to participate in this screening measure for personality types. You agree that you have been given the opportunity to ask questions and have them answered to your satisfaction. You understand that you may be contacted at a later date for a follow-up study depending on your answers to these questionnaires. You have received a copy of this consent form signed by the researcher.

I understand that if I have any questions about my rights as a research subject I can contact the CSU Institutional Review Board at (216) 687-3630.

Person agreeing to participate in study: ____________________________________________

Signature __________________________ Date __________________________

Contact Information: (phone) __________________ Email: _______________________

Person obtaining consent:

Signature __________________________ Date: __________________________

53