AN ANALYSIS OF CONSCIOUS FEAR AND AUTOMATIC THREAT RESPONSE IN PSYCHOPATHY

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ABSTRACT

A lack of fear has been proposed to be one of the driving forces behind the callous and antisocial behavior of psychopathic individuals. However, the term "fear" has taken on many different meanings and has been operationalized in many different ways. On one hand, fear can be described as the subjective and conscious experience of fear (e.g., "I feel afraid"). On the other hand, fear is often equated with an automatic bodily response to threat (e.g., physiological responses to threatening stimuli). The present study sought to clarify whether psychopathy is associated with each of these types of "fear." In a sample of 64 male and female inmates in a county jail, threat detection, as well as the ability to recognize threat directed toward others, were assessed using threatening images along with measures of skin conductance and heart rate. The conscious experience of fear was measured via self-reported emotional experience in response to fear-inducing stimuli, as well as though the peripheral processes of interoception, alexithymia, and empathy. In a departure from previous literature, almost no significant relationships were found between total psychopathy and measures for the conscious experience of fear and automatic threat response. Additionally, gender was not found to be a significant moderator in any of these relationships. Limitations, implications, and suggestions for future research are discussed.

DEDICATION

This thesis is dedicated to my sister, whose strength and resilience have always inspired me, and to my husband, for being my rock of unwavering love and support.

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AN ANALYSIS OF CONSCIOUS FEAR AND AUTOMATIC THREAT RESPONSE IN PSYCHOPATHY

Psychopathy is a personality disorder involving manipulativeness, lack of empathy or guilt, impulsivity, and antisocial behavior. One of the hallmarks of psychopathy is antisocial behavior, which is thought to be driven by emotional deficits. These emotional deficits have long been included in conceptualizations of psychopathy, with early theorists describing intact intellectual functioning, but severely limited emotionality (Kraepelin, 1910; Schneider, 1923). Later, it was proposed that this deficit is specific to certain emotions involved in interpersonal interactions, like anxiety and fear (Lykken, 1957; McCord & McCord, 1964). In light of these theories, Hoppenbrouwers, Bulten, and Brazil (2016) have presented research suggesting that there are two subtypes of fear that must be considered in research concerning reduced fear in psychopathy: the conscious experience of fear and automatic threat response. I will discuss these two subtypes of fear and how fear relates to specific aspects of psychopathy, like empathy.

Defining Fear

The assertion that lack of fear is a defining feature of psychopathy presumes that fear itself has a distinct definition. In a recent review of literature regarding fear in psychopathy, it was proposed that fear is not a unitary construct but can be conceptualized as two separate processes: the conscious experience of fear and automatic threat processing (Hoppenbrouwers et al., 2016; LeDoux, 2014). The conscious experience of fear is the psychological experience of a negative emotion that an individual subjectively characterizes as fear (Hoppenbrouwers et al.,

2016). Automatic threat processing, on the other hand, does not require the individual to experience fear, and is instead the detection and defensive reaction to threat (Hoppenbrouwers et al., 2016). This is often measured as physiological reactions (e.g., skin conductance and heart rate), and automatic behaviors (e.g., the startle reflex) in response to a threat (Hoppenbrouwers et al., 2016). There is significant evidence that conscious fear and automatic threat processing occur separately, and involve distinct areas of the brain (Phelps, 2006). Consequently, in order to determine whether psychopathy is characterized by lack of fear, we must establish whether this deficit is in the conscious experience of fear, and/or in automatic threat processing.

Automatic fear deficits in psychopathy. Previous literature concerning the study of fear deficits in psychopathy has not distinguished the conscious experience of fear and automatic threat processing. Rather, self-reported emotional experience has been viewed as a subjective measure of fear, and physiological measures have been viewed as objective measures of fear. David Lykken was one of the first to study physiological processes as a measure of psychological constructs. He was also one of the first to suggest that the emotional deficit in psychopathic individuals could be specific to certain emotions, arguing that such individuals experience a deficit in anxiety (Lykken, 1957).

In literature concerning the concept of fear, it is often entangled with the concept of anxiety. It is important to separate these concepts in order to parse out the distinct characteristics of fear, in order to clarify its relationship with psychopathy. Some important differences of note between fear and anxiety are the endurance, utility, and motivational direction of these emotions. Fear is characterized as a brief emotion that exists as a response to specific threatening events and usually has an avoidance motivation (Grillon, 2008; Hoppenbrouwers et al., 2016). Conversely, anxiety is characterized by an enduring arousal that may or may not be triggered by

a specific threat and causes the individual to be hypersensitive and alert (Grillon, 2008; Hoppenbrouwers et al., 2016). Another explanation of anxiety is in the conceptualization of trait anxiety, which is similarly global and enduring (Hoppenbrouwers et al., 2016). These emotions have also been delineated in the neurobiological literature, in which it has been shown that the expression of anxiety is associated with activity in different areas of the brain than the expression of fear (Robinson, Overstreet, Allen, Pine, & Grillon, 2012). While anxiety will not be analyzed in this study, it is important to consider these distinctions in order to clarify the concept of fear.

Today, there are a several major physiological processes that are used to measure fear in psychopathy. The most widely researched physiological processes are those that are associated with the autonomic nervous system: affective startle modulation, electrodermal activity, and heart rate.

Startle potentiation. Affective startle modulation, also known as the startle blink reflex, is a fairly common way to measure a physiological response. It refers to the blink response exhibited when exposed to aversive stimuli, which would fall under the automatic behaviors in automatic threat processing. The startle blink reflex has been proposed as a measure of fear response (Vaidyanathan, Patrick, & Bernat, 2009) and employed in recent studies to measure the magnitude of fear response in individuals with psychopathic traits (Verona, Bresin, & Patrick, 2013). In a study of undergraduates, Vaidyanathan et al. (2009) examined relationships between the startle blink response and trait fearlessness, under the assumption that fearlessness is an essential component of psychopathy. They performed a confirmatory factor analysis of the following measures of dispositional fear, psychopathy, and fearlessness: the Fear scale of the Emotionality, Activity, and Shyness Questionnaire, The Fear Survey Schedule (FSS), the Harm Avoidance scale of the Tridimensional Personality Questionnaire (TPQ), the Fearless

Dominance Subscales of the Psychopathic Personality Inventory (PPI), and the Thrill and Adventure Seeking subscale of the Sensation Seeking Scale (SSS). This factor analysis revealed that the data from these measures administered in a large community sample loaded onto one factor that the researchers labeled "Trait Fear" (Vaidyanathan et al., 2009). Trait fear was associated with increased startle potentiation while viewing threatening images, like an image of a gun pointed at the viewer. That is, participants high in trait fear were more likely to have a reflexive (automatic) fear reaction to threatening images, whereas participants low in trait fear (scoring high on psychopathy/fearlessness measures) showed deficient startle potentiation to threatening images (Vaidyanathan et al., 2009). The researchers interpreted this result as being consistent with traditional conceptualizations of psychopathy, involving a general deficit in fear as an emotion, as well as modern interpretations of this concept, which suggest deficits in threat reactivity (Vaidyanathan et al., 2009). Overall this study suggests that the startle blink response is associated with self-reported trait fearfulness, including the type of fearlessness assessed by psychopathy measures.

In a study of male prisoners, Levenston, Patrick, Bradley, and Lang (2000) found that individuals high in psychopathic traits exhibited less potentiation of the startle blink response when viewing images of victims in distress (e.g., a man being attacked) and threatening images, compared with individuals low in psychopathic traits. They attributed this finding to general deficits in threat reactivity, along with possible emotional deficits in psychopathy (Levenston et al., 2000). Bernat, Patrick, Steffen, Hall, and Ward (2004) found that high scores on the Interpersonal-Affective factor of the PCL-R (including items like lack of empathy, shallow emotions, and callous-unemotional traits) were related to decreased potentiation for threatening images in male prisoners. In a study of female prisoners, Verona et al. (2013) found that

individuals high in psychopathic traits exhibited higher startle potentiation during threatening images, compared with neutral images and images of victims in distress. Individuals low in psychopathic traits exhibited higher startle potentiation during threatening images and images of victims in distress, compared with neutral images, with no significant difference in potentiation between threatening images and images of victims in distress (Verona et al., 2013).

Skin conductance. Electrodermal activity, also known as skin conductance, refers to increases in electrical activity on the surface of a person's skin, as a result of sweat causing increased conductance. As a person experiences heightened emotion, they sweat more, increasing skin conductance. Thus, this physiological process is used to empirically measure emotional arousal (Glenn & Raine, 2014). A meta-analysis of psychophysiological studies found that, in 18 studies, psychopathic traits were associated with lower resting electrodermal activity (Lorber, 2004). Essentially, those with psychopathic traits have a lower baseline of skin conductance, compared with a normal sample. It has also been suggested that this is not true for personality disorders associated with psychopathy such as Borderline Personality Disorder. In a study in which participants were shown neutral, pleasant, and unpleasant images, Herpertz et al. (2001) found that not only did psychopathic individuals have no affective startle modulation, but they also had decreased electrodermal activity overall in comparison to a normal sample. Individuals with Borderline Personality Disorder, on the other hand, exhibited physiological responses similar to the normal sample. This is important to note, because it has been suggested that psychopathy in women could be expressed in a form closer to Borderline Personality Disorder (Sprague, Javdani, Sadeh, Newman, & Verona, 2012).

There have been a few studies in which researchers used skin conductance as a measure of automatic threat response in psychopathy. In a study of male prisoners, Ogloff and Wong

(1990) found that those high in psychopathic traits had a lower skin conductance level during anticipation of a 1000hz tone (during a countdown to the tone), compared with those low in psychopathic traits. Similarly, in a study of undergraduate students, Dindo and Fowles (2011) found that fearlessness, as measured by the fearless dominance factor of Lilienfeld's Psychopathic Personality Inventory (PPI), was associated with decreased skin conductance response during a visual countdown to what participants were told would be a loud noise. In a study of male prisoners, Patrick, Cuthbert, and Lang (1994) found that participants rated high in psychopathic traits (on the PCL-R), relative to the low-psychopathy group, showed reduced skin conductance response to a six short fear-inducing prompts (i.e., "Alone in bed, I feel a scuttling along my bare leg; I switch on the light, and trembling, see a large, black spider moving up my thigh"; Vrana, Cuthbert, & Lang, 1989). In another study of male prisoners, Rothemund et al. (2012) found that participants rated high in psychopathic traits (also on the PCL-R) showed reduced skin conductance response to a conditioned stimulus that had been associated with a shock or loud noise, relative to the low-psychopathy group.

Heart rate. Heart rate, in the context of psychophysiological processes, can be measured in a resting state as beats per minute, or in reaction to stimuli as heart rate reactivity (Glenn & Raine, 2014). It has been suggested in studies conducted on both adults and adolescents that individuals with psychopathic traits show fewer changes in heart rate (less of an increase) in response to emotionally evocative stimuli (Anastassiou-Hadjicharalambous & Warden, 2008; Serafim, Barros, Valim, & Gorenstein, 2009). In a study of prisoners convicted of murder, Serafim et al. (2009) found that those higher in psychopathic traits exhibited lower heart rates than those low in psychopathic traits in response to pleasant, neutral, and aversive images. This

finding supports the general theory of limited emotionality in psychopathy, described by the authors as "affective indifference" (Serafim et al., 2009).

With regard to fear in psychopathy, there have been a few studies that have used heart rate as an objective measure of fear reactions. In a group of male prisoners, Patrick et al. (1994) found less differentiation in heart rate measured during fear inducing prompts (i.e., "Taking a shower, alone in the house, I hear the sound of someone forcing the door, and I panic") and neutral prompts in participants high in psychopathic traits, compared with those low in psychopathic traits (as measured by the PCL-R). Additionally, in a study of young adult community members, Fanti et al. (2017) found a negative correlation between total psychopathy measured on the Youth Psychopathy Index-Short Version and resting heart rate, indicating that individuals with psychopathic traits have a lower heart rate at rest (with no stimuli), than those low in psychopathic traits.

Conscious fear deficits in psychopathy. As previously mentioned, the conscious experience of fear has been measured in the past as self-reported emotional experience and viewed as a subjective measure of the unitary construct of fear. However, the conscious experience of fear can be broken down into various contributing factors. Although automatic threat and the conscious experience of fear can be separated into two distinct processes, it is important to understand that these processes are linked. While it is possible to have an automatic threat response without consciously feeling fear, it is far less likely that one would consciously experience fear without an accompanying (or more likely, preceding) automatic threat response (Hoppenbrouwers et al., 2016). Hence, the present study will discuss interoception, or the degree to which an individual perceives internal bodily reactions, in relation to the conscious experience of fear. Additionally, we will discuss alexithymia, an individual's failure to perceive and

understand emotions in the self and others. Both of these abilities are associated with subjective emotional experience and it has been suggested that deficits in interoception and alexithymia may be related to the interpersonal-affective factor of psychopathy (Gao, Raine, & Schug, 2012).

Interoception. If there is a theoretical connection or overlap to be found between automatic threat processing and the conscious experience of fear, it would be interoception. As previously mentioned, interoception is generally considered to be a sense of one's own physiological processes, like the heartbeat (Craig, 2003). That is, it is an individual's awareness of the feelings caused by the vagus nerve and, by extension, the parasympathetic nervous system, as well as the sympathetic nervous system. On a broader level, these feelings arise from neurobiological structures, like the anterior insula and ventromedial prefrontal cortex, which are also associated with emotional awareness (Craig, 2003; Terasawa, Fukushima, & Umeda, 2013). Interoception is thus related to a person's ability to sense their own emotions. In an fMRI study of undergraduates, Terasawa et al. (2013) found several shared neurological structures were activated when participants were instructed to self-monitor for specific bodily sensations and specific emotions.

Interoception can be measured in two ways. Interoceptive awareness can be generally defined as one's conscious feeling of physiological processes in the body, as well as noticing when one's emotions cause a physiological reaction (Mehling et al., 2012). Interoceptive accuracy concerns one's ability to accurately perceive the physiological processes, like counting one's own heartbeat (N. Hart, McGowan, Minati, & Critchley, 2013). In a sample of adult community members, Dunn et al. (2010) found a positive relationship between interoceptive accuracy and the strength of the relationship between physiological processes (like heart rate) and the cognitive experience of emotion. This suggests that interoception is a crucial step in the

subjective experience of emotions (Hoppenbrouwers et al., 2016). In a community sample of adult men, Gao et al. (2012) found that participants high in psychopathic traits had a greater difference between their reported physiological reactions and the researchers record of actual changes in participants' physiological reactions. In this study, participants were given a "social stressor" task, in which they were to prepare a speech about their faults in a short period of time, and then deliver it to the interviewer (Gao et al., 2012). This study was able to record the disconnect between the perceived physiological reaction and the actual reaction occurring in participants high in psychopathic traits (Gao et al., 2012).

Alexithymia. Alexithymia is defined as an inability to perceive and understand experienced emotions in oneself and in others (Bagby, Parker, & Taylor, 1994). The major practical disconnect between automatic threat processing and the conscious experience of fear is that the former can occur without the individual having a conscious experience of fear as an emotion. A general inability to perceive and understand one's emotions would naturally affect the conscious experience of fear. Thus, assuming a deficit of the conscious experience of fear in individuals with psychopathic traits, alexithymia may be a factor contributing to this deficit. Levant, Hall, Williams, and Hasan (2009) found that men are significantly more likely than women to exhibit alexithymia. Additionally, Moskacheva, Kholmogorova, and Garanyan (2015) found that this inability to perceive and understand one's own emotions is directly related to decreased capacity for empathy. Some studies have shown a negative or nonsignificant relationship between psychopathy and alexithymia (Louth, Hare, & Linden, 1998; Pham, Ducro, & Luminet, 2010). This may be because a main limitation of these studies is small sample size, as (Gori et al., 2014) had a much larger sample size than the others and did find a correlation between alexithymia and high levels of psychopathic traits. Another possibility is that, since

many of the items used to measure alexithymia, like "It is difficult for me to find the right words for my feelings" and "I have feelings I can't quite identify", would require affirming what some may see as a weakness or shortcoming because of the words "can't" or "difficult", individuals with psychopathic traits may be less likely to affirm these items due to an inflated self-image and a tendency to minimize personal struggles (Kroner & Forth, 1995).

Self-Reported Emotional Experience. The most common way that researchers measure the conscious experience of fear is via self-report questionnaires. Literature concerning the subjective experience of emotions in psychopathy varies greatly. One meta-analysis found that the experience of happiness is reduced and the experience of anger is greater in psychopathy, with no significant levels of any other experienced emotions, including fear (Hoppenbrouwers et al., 2016). Another found that individuals high in psychopathic traits have difficulty recognizing emotions in general, specific deficits in recognizing happiness and surprise (Dawel, O'Kearney, McKone, & Palermo, 2012). Still another found specific deficits in recognizing fear and sadness, with no deficits for anger, disgust, surprise, or happiness (Marsh & Blair, 2008). Unfortunately, in individuals with psychopathic traits, the conscious experience of fear has not often been measured directly (via self-report measures), but rather through the previously mentioned other factors in the conscious experience of fear.

Empathy

The lack of empathy is a hallmark characteristic of psychopathy, and a characteristic that is central to psychopathy across various measures and conceptualizations. Empathy relates to our discussion of fear in that there have been studies that have investigated fear alongside empathetic fear—that is, the ability of perceive, understand, and share another individual's experience of fear. In these studies, stimuli are introduced (typically images or videos), that are intended to

instigate a fear or threat response in that participant. Additionally, stimuli are introduced that show another person in a situation that is fearful or threatening, in order to gauge the participants' reaction to another person in distress. In a study of male prisoners, Blair, Jones, Clark, and Smith (1997) found that individuals high in psychopathic traits showed reduced skin conductance response to images of victims in distress, compared with individuals low in psychopathic traits. There was no significant difference between individuals high and low in psychopathic traits in skin conductance response to threatening or neutral images (Blair et al., 1997). In a previously mentioned study, Levenston et al. (2000) found that individuals high in psychopathic traits exhibited less startle potentiation during images of victims in distress and threatening images. Additionally, they found that within the high psychopathy group, there was greater potentiation during threat images, compared with images of victims in distress, which would indicate that individuals high in psychopathic traits have an increased automatic reaction to threat, relative to the distress of others (Levenston et al., 2000). Thus, one possibility is that individuals high in psychopathy have more pronounced deficits in recognizing fear in others than recognizing a threat to themselves.

THE PRESENT STUDY

The present study sought to clarify the relationship between fear—divided into automatic threat detection and the conscious experience of fear—and psychopathy in a sample of male and female inmates. Threat detection, as well as the ability to recognize threat directed toward others, was assessed using threatening images and a written, fear-inducing prompt along with measures of skin conductance and heart rate. The conscious experience of fear was assessed as self-reported emotional experience, along with measuring the underlying factors of interoception and alexithymia. This study was the first study of psychopathy to measure these different components of fear within a single study.

As an exploratory goal, this study also investigated the possibility that that there is a significant difference between men and women who exhibit psychopathic traits, with regard to deficits in fear and empathic fear. This study also attempted to replicate the work of two other studies that found differences in physiological reactions between distress images (empathetic fear), threatening images (automatic fear), and neutral images in participants with psychopathic traits.

With regard to automatic threat response, I hypothesized that total psychopathy scores would be negatively associated with skin conductance responses and heart rate during threat-related images. Additionally, I hypothesized that total psychopathy scores would be negatively associated with skin conductance responses and heart rate during distress-related images.

With regard to the conscious experience of fear, I hypothesized that total psychopathy scores would be negatively associated with ratings of fear when prompted to recall personal

experiences of being afraid. I hypothesized that total psychopathy scores would be negatively associated with increased skin conductance response and heart rate increase to the fear-inducing story prompt. I hypothesized that total psychopathy would be associated with reporting feeling fear less often and less intensely. I hypothesized that total psychopathy would be negatively associated with interoceptive awareness and accuracy. I hypothesized that total psychopathy would be positively associated with alexithymia.

I hypothesized that interoceptive awareness would partially mediate the relationship between psychopathy and the indicators of conscious experience of fear (see Methods section for measures).

I hypothesized that alexithymia would partially mediate the relationship between psychopathy and the indicators of conscious experience of fear (see Methods for measures).

Additionally, I examined gender as a possible moderator in the relationship between psychopathy and the indicators of automatic threat response as well as the conscious experience of fear. This analysis was be exploratory because of limited power.

METHODS

Participants

Participants were 64 male and female inmates (34 male, 30 female) recruited from the Tuscaloosa County Jail. Participants ranged from 19 to 57 years old, with the mean age being 30.22. The sample was 50% African American, 40.6% Caucasian, 4.7% Hispanic or Latinx, 1.6% Native American, and 3.1% identified as another race. 65.6% of participants had never been married, 14.1% were married, 10.9% were divorced, 6.3% were separated, and 3.1% were widowed. Regarding sexual orientation, the sample was 89.1% Heterosexual and 10.9% Homosexual or Bisexual.

In compliance with the regulations of the Tuscaloosa County Jail, participants were rewarded for completing the study with a snack. Participants who agreed to participate signed an informed consent at the beginning of the testing session with the researcher. As this is a vulnerable population, this informed consent was explained to them in detail, with special care given to making sure that they understood the voluntary nature of the study, as well as the confidentiality of the records.

Participants were recruited by providing participant sign-up sheets with adequate information regarding the nature and purpose of the study to jail staff, who distributed the sheets to inmates. These sheets were collected from the jail by the researchers, who then conducted testing sessions with participants individually in a private interview room in the jail facilities. Participants who were unable or unwilling to complete more than half tasks for either the

conscious experience of fear or automatic threat response were excluded.

Measures

The measures described below were administered in a single session that lasted approximately 2 hours.

Psychopathy Checklist-Screening Version. Psychopathic traits were assessed with the Hare Psychopathy Checklist: Screening Version (PCL:SV; S. D. Hart, Cox, & Hare, 1995). This screening version is based on one of the most commonly used measures of psychopathy, the Psychopathy Checklist (PCL; Hare, 2003). Although there is a great deal of debate over how many higher-level factors contribute to psychopathy—Hare says there are two, others say three (Cooke & Michie, 2001) or four (Vitacco, Rogers, Neumann, Harrison, & Vincent, 2005)—it is generally accepted that there are certain criteria that load onto an interpersonal-affective factor. The PCL:SV has 12 items: superficial, grandiose, deceitful, lacks remorse, lacks empathy, doesn't accept responsibility, impulsive, poor behavioral controls, lacks goals, irresponsible, adolescent antisocial behavior and adult antisocial behavior. These 12 items are rated with a score of 0, 1 or 2 (0="the item does not apply to the individual", 1="the item applies to a certain extent, but not to the degree required for a score of 2", and 2= "the item applies to the individual"; S. D. Hart et al., 1995) for a maximum total score of 24. The twelve items can be split into two 6-item groups, which are representative of two separate factors of psychopathy: interpersonal/affective (Factor 1) and lifestyle/antisocial (Factor 2). This measure of psychopathy was shown to have high reliability with the widely-used PLC-R (r=.80).

Discreet Emotions Questionnaire. Each participant was asked to complete the Discreet Emotions Questionnaire (DEQ; Harmon-Jones, Bastian, & Harmon-Jones, 2016, see Appendix A), in order to determine that they were experiencing fear, as opposed to another emotion, during

the presentation of stimuli. The DEQ, a self-report scale recently designed and validated by Harmon-Jones et al. (2016), was developed specifically for the purpose of measuring discrete emotions, rather than dimensional emotions. This is based on the theory that there are certain emotions that all humans inherently experience and express. While discrete emotions can be rated dimensionally (in terms of valence, arousal, and motivational direction), they can also be classified in terms of other, less concrete attributes (like subjective feelings and cognitive appraisals). The DEQ was also developed with the purpose of having an accurate scale of self-reported emotions and using emotion descriptors that were obtained from participants themselves (Harmon-Jones et al., 2016). The questionnaire consists of a list of emotion words, each of which load on to one of 8 emotion factors (anger, disgust, fear, anxiety, sadness, desire, relaxation, and happiness), to be rated on a seven-point Likert scale of the degree to which participant experienced each emotion while exposed to certain stimuli. Reliability for all the subscales of this measure were high, with a Cronbach's alpha greater than .80 (Harmon-Jones et al., 2016).

One aspect of the DEQ involves participants reading story prompts designed to induce certain emotions, followed by the questionnaire (Harmon-Jones et al., 2016). For this study, participants were read the fear story prompt, which states: "Please remember a SPECIFIC time when you were in danger. You were threatened with harm and you were either uncertain about how to deal with the situation or felt unable to cope. Please think of a negative situation, when you were faced with being injured or harmed, in which you experienced an extremely intense emotional response." In accordance with the instructions from the DEQ, participants were then instructed: "Take a few moments to remember the situation that you thought of. As you remember the incident, re-experience the emotions you felt at that time as strongly as possible. Tell me when you have the experience in mind, and the emotions are strong". After the

participant indicated that they had the experience in mind, the next instructions were: "At this time, please describe aloud the events of the emotional experience that you remembered. In as much detail as possible, describe what happened, paying particular attention to your thoughts and feelings." Participants were then given three minutes to describe the experience they remembered. Throughout this task, we measured heart rate and skin conductance response with a galvanic skin response sensor. The prompt was followed by the questionnaire, in which participants were asked to rate the emotion words listed in Appendix A on a seven-point Likert scale (See Appendix A; Harmon-Jones et al., 2016).

Presentation of images. Neutral photos, direct-threat photos, and victim-distress photos from the International Affective Picture System were shown while measuring heart rate and skin conductance response with a galvanic skin response sensor. The images were presented in random order, with 15 images in each category: neutral (i.e., a bowl, a spoon, a basket), direct-threat (i.e., a gun pointed at the camera, a snake coiled to strike, a spider), and victim-distress (i.e., a man pointing a gun at another man, a man holding a knife to a woman's throat, a man with his hand around a woman's throat). Before the presentation of stimuli, physiological data were recorded for five minutes in order to obtain a baseline level of skin conductance and a resting heart rate. Instructions at the beginning of the task directed participants to watch the screen and pay attention to the images that appear on the screen. Each image was shown for seven seconds and preceded by a ten-second orienting screen in order to allow skin conductance and heart rate to return to baseline, for the separation of physiological responses to specific images.

A galvanic skin response sensor (Shimmer GSR+) was used to monitor skin conductivity between two electrodes attached to two fingers of one hand, as well as heart rate via an Optical

Pulse Sensing Probe (photoplethysmogram) on another finger of the same hand. Skin conductance and heart rate data were recorded and coded using the Shimmer ConsensysPRO application. Before the fear prompt, two snap connector Ag/AgCl electrodes were placed on the palmar surface of the second and third fingers, along with a photoplethysmogram sensor on the index finger. After the placement of the sensors, the first five-minute resting period was recorded. Skin conductance response and heart rate increase were averaged from the time the participant begins describing their experience until the end of the participant's response. Each of these were compared with the average of the previously recorded resting period as the baseline. After this task, there was another five-minute resting period, followed by the presentation of picture stimuli. During the picture presentation, skin conductance response was measured as the largest increase during the ten seconds after picture onset compared with the baseline obtained during the first resting period. Heart rate response was measured as average change during the ten seconds after picture onset from the one-second baseline immediately preceding picture onset.

After all physiological data was collected, the previous images were presented again, grouped by category. Instructions directed participants to watch the screen and pay attention to images they had seen before. Each image group was immediately followed by the Discrete Emotions Questionnaire, having participants rate how much they feel certain emotions.

Frequency and Intensity of Emotions Questionnaire. Participants were also asked to rate the frequency with which they experience different emotions. The prompt read "For each emotion, please indicate how often you feel this emotion as an adult. How often do you experience: Participants rated the following emotions: Happiness, Sadness, Fear, Surprise, Disgust, and Anger. These emotions were rated on a Likert scale that lists: "Never", "Rarely",

"Sometimes", "Often" and "Very often." Participants were then be asked to rate the intensity at which they experience these emotions relative to other people. The prompt read "For each emotion, please indicate the intensity to which you feel the emotion relative to others. How intensely do you think you experience each emotion relative to other people?" The same emotions were listed, and participants rated the emotions on a Likert scale that lists: "Much less intensely", "Moderately less intensely", "Slightly less intensely", "Same intensity", "Slightly more intensely", "Moderately more intensely", and "Much more intensely."

Interoceptive ability. As a measure of interoceptive ability, participants were administered a heartbeat tracking task, detailed by N. Hart et al. (2013). In the heartbeat tracking task, participants were given the following instructions: 'Without manually checking, can you silently count each heartbeat you feel in your body from the time you hear "start" to when you hear "stop"'. This task was repeated six times, using time-windows of 25, 30, 35, 40, 45 and 50 seconds (N. Hart et al., 2013). An Optical Pulse Sensing Probe connected to the galvanic skin response sensor (Shimmer GSR+) provided a photoplethysmogram (PPG) signal from a finger, which was used to estimate heart rate. The accuracy score of the heartbeat task was computed as: $1 - (|n\text{beats}_{\text{real}} - n\text{beats}_{\text{reported}}|)/((n\text{beats}_{\text{real}} + n\text{beats}_{\text{reported}})/2)$, in accordance with N. Hart et al. (2013). The nature and instructions of this task were designed specifically to preclude possible group differences (N. Hart et al., 2013).

Multidimensional Assessment of Interoceptive Awareness. Additionally, as a measure of interoceptive awareness, participants were administered the 32-item self-report Multidimensional Assessment of Interoceptive Awareness (MAIA; Mehling et al., 2012). This measure concerns the participant's ability to notice and regulate internal bodily functions, as well as understand when physiological processes (i.e. rapid heartbeat) are caused by emotions, with

items like “When I am tense, I notice where the tension is located in my body” (see Appendix A; Mehling et al., 2012). Items are rated on a Likert scale from 0 to 5, with 0 being never, and 5 being always (Mehling et al., 2012). This measure shows acceptable internal consistency reliability at just below .70, and has been validated for construct validity in comparison with other measures of interoception (Mehling et al., 2012).

Toronto Alexithymia Scale. Participants were also administered the 20 item Toronto Alexithymia Scale (Bagby et al., 1994). This is a self-report scale meant to measure Alexithymia, which refers to difficulty identifying and describing one’s own emotions, as well as an inclination to focus one’s attention externally. This is the most widely used measure of alexithymia. Items are rated using a 5-point Likert scale, with items like, “It is difficult for me to find the right words for my feelings” (see Appendix A for items; Bagby et al., 1994). This measure shows good internal consistency reliability for multiple languages and cultures at greater than .70, and the construct validity was confirmed by comparing this measure with other measures of emotional awareness (Bagby et al., 1994).

Basic Empathy Scale. As a measure of empathy, participants completed the Basic Empathy Scale (Jolliffe & Farrington, 2006). This scale is a 20-item self-report measure that has been used to assess empathy on the basis of two components: an affective component, and a cognitive component (see Appendix A for items; Jolliffe & Farrington, 2006). A Confirmatory Factor Analysis was done by the developers, which conformed this structure (Jolliffe & Farrington, 2006). The construct validity was also confirmed by comparing this measure with other measures of empathetic ability (Jolliffe & Farrington, 2006).

RESULTS

Total psychopathy scores ranged from 2-19, with a mean of 10.89 (see Table 1 for descriptive statistics for other study variables). A t-test showed a significant relationship between total psychopathy and gender ($t = 1.923$, $p < .001$), with women being less likely to exhibit psychopathic traits. Simple linear regressions were conducted with PCL:SV scores as the predictor variable and each measure concerning the conscious experience of fear and automatic threat processing (the two types of fear) as outcome variables (each outcome variable as a separate regression). Gender was controlled for in all regression analysis, as it was related to total psychopathy, as well as several outcome variables. Zero-order correlations are included in the appendix. These correlations appear to indicate that Factor 1 of the PCL was the driving force behind many of the significant relationships between study variables and total psychopathy. Separate simple linear regression were conducted for variables with a significant zero-order correlation with Factor 1, but not with Factor 2 or total psychopathy. Scores for the measures were computed according to standard procedures for each test. Outliers in each variable were removed if they were more than three standard deviations above or below the mean.

Table 1. Variable Descriptive Statistics

	Min	Max	Mean	Standard Deviation
PCL:SV Psychopathy	2	19	10.89	4.243
Interoceptive Accuracy	-0.577	0.936	0.474	0.371
Interoceptive Awareness	14.095	32.929	24.854	4.085
Alexithymia	28	78	53.85	11.393
Basic Empathy	45	82	61.44	7.815
FIEQ	12	51	34.14	7.051
Fear Prompt change in SCR	-0.132	1.631	0.427	0.426
Threat Image change in SCR	-0.974	1.630	0.232	0.450
Distress Image change in SCR	-1.018	1.630	0.221	0.454
Neutral Image change in SCR	-0.971	1.630	0.230	0.449
Fear Prompt change in HR	-5.734	13.959	2.366	3.846
Threat Image change in HR	-1.793	3.143	-0.098	0.888
Distress Image change in HR	-3.017	3.016	-0.331	1.203
Neutral Image change in HR	-3.831	2.302	-0.094	1.348

The Conscious Experience of Fear

Fear prompt self-reported emotion. In response to the fear prompt, 31.3% of participants rated anger higher than the other emotions and 29.7% of participants rated fear higher than the other emotions. Thus, associations between psychopathy and both fear and anger ratings were examined in analyses. Controlling for gender, there was no significant relationship between total psychopathy and ratings of fear in response to the fear prompt. Additionally, there was no significant relationship between total psychopathy and anger in response to the fear prompt (see table 2).

Image viewing self-reported emotion. In response to the threatening images, 28.8% of participants rated anger higher than the other emotions and 27.1% of participants rated fear higher than the other emotions. In response to the distress images, 47.5% of participants rated anger higher than the other emotions and 27.9% of participants rated fear higher than the other emotions. Thus, both fear and anger ratings were examined in these analyses. Controlling for gender, there was no significant relationship between total psychopathy and ratings of fear in

response to threat images (see table 2). However, there was a significant negative relationship between total psychopathy and ratings of fear in response to distress images. There was no significant relationship between total psychopathy and anger in response to neutral images, threatening images, or images of others in distress (see table 2).

Other measures related to conscious experience of fear. Controlling for gender, there was no significant relationship between total psychopathy and interoceptive accuracy, interoceptive awareness, or alexithymia (see table 2). There was no significant relationship between total psychopathy and the frequency or intensity of emotions in general (β = -.093, p = .471), nor was there a significant relationship between total psychopathy and the frequency (β = -.207, p = .093) or intensity (β = -.171, p = .180) of experienced fear.

Table 2. Regression Coefficients and Significance Values

	PCL:SV Total	
	β	p
Interoceptive Accuracy	-.032,	.807
Interoceptive Awareness	-.021	.873
Basic Empathy	-.240	.068
Basic Empathy Cognitive Subscale	-.124	.334
Basic Empathy Affective Subscale	-.257	.048*
Alexithymia	.152	.259
FIEQ	-.093	.471
Fear Prompt Highest Rated Emotion (anger)	-.085	.518
Threat Image Highest Rated Emotion (anger)	.093	.498
Distress Image Highest Rated Emotion (anger)	.226	.085
Neutral Image Highest Rated Emotion (relaxation)	.183	.166
Fear Prompt Fear Rating	-.189	.139
Threat Image Fear Rating	-.190	.134
Distress Image Fear Rating	-.265	.039*
Fear Prompt change in SCR	.032	.806
Threat Image change in SCR	.179	.172
Distress Image change in SCR	.194	.141
Neutral Image change in SCR	.169	.201
Fear Prompt change in HR	-.069	.612
Threat Image change in HR	.091	.504
Distress Image change in HR	.079	.551
Neutral Image change in HR	-.083	.526

Automatic Threat Response

Regarding the measures of automatic threat response, controlling for gender, there was no significant relationship between total psychopathy and difference in heart rate during the fear prompt or difference in skin conductance response during the fear prompt (see table 2). There was also no significant relationship between total psychopathy and change in heart rate during neutral images, threatening images, or images of others in distress (see table 2). Additionally, there was no significant relationship between total psychopathy and change in skin conductance response during neutral images, threatening images, or images of others in distress (see table 2). However, controlling for gender, there were significant positive relationships between PCL Factor 1 and increase in skin conductance response during neutral images ($\beta = .276$, $p = .016$), threatening images ($\beta = .272$, $p = .018$), and images of others in distress ($\beta = .291$, $p = .011$).

Empathy

Controlling for gender, the relationship between total psychopathy and basic empathy was trending toward significance (see table 2). The cognitive and affective subscales were analyzed separately. Controlling for gender, there was a significant negative relationship between total psychopathy and the affective subscale of basic empathy. Controlling for gender, there was not a significant relationship between total psychopathy and the cognitive subscale of basic empathy.

Mediation and Moderation Analyses

Because neither interoceptive awareness nor alexithymia were related to total psychopathy, no mediation analyses were performed.

Exploratory moderation analyses were conducted examining gender as a moderator on each measure concerning the conscious experience of fear or automatic threat processing. In

order to investigate gender as a moderator variable in the relationship between psychopathy and fear, analyses were conducted following the guidelines given by Baron and Kenny (1986). Linear regression analyses were conducted on each of the measures (entered separately) with psychopathy scores and gender entered on step 2 and the interaction vector of these constructs (psychopathy x gender) on step 3. The moderation of the relationship between total psychopathy and alexithymia was trending toward significance ($\beta = -.664$, $p = .071$). The relationship was not significant for men ($r = -.085$, $p = .662$), and was significant and positive for women ($r = .390$, $p = .025$). No other moderation of any of the analyzed relationships was significant (all $p > .169$).

DISCUSSION

The results of this study are in large part a departure from existing literature concerning both the conscious experience of fear and automatic threat response. As expected, there was a relationship trending toward significance between total psychopathy and basic empathy, with individuals higher in psychopathy scoring lower. This measure of empathy allowed for the further investigation of an affective and a cognitive component of empathy, which indicated that psychopathic traits are associated with lower affective—but not cognitive—empathy. Given the previously found disconnect between the perceived physiological reaction to stimuli and the actual physiological reaction found in participants high in psychopathic traits, a deficit in interoceptive awareness and interoceptive ability was expected in individuals high in psychopathic traits (Gao et al., 2012). However, there was no significant relationship between level of psychopathic traits and interoceptive awareness or interoceptive ability. This may be due to the smaller sample size (64 participants compared to Gao and colleagues' 138), the use of the screening version of the PCL as opposed to the full version (as used by Gao and colleagues), or perhaps gender differences in this mixed gender sample. Regarding the frequency and intensity of emotions, individuals higher in psychopathic traits showed no significant differences from those lower in psychopathic traits.

In self-reports of experienced emotion during the fear prompt and threatening images, there was also no significant relationship between level of psychopathic traits and highest reported emotion. Interestingly, the highest reported emotion in response to the fear prompt, threat images, and distress images was anger (although the second highest was fear). This result

might have been expected for individuals high in psychopathy, as they tend to have difficulty recognizing facial expressions of fear (Marsh & Blair, 2008). However, this result from the sample as a whole indicates that there may have been something inherently anger-inducing about the image set. Additionally, the significant negative relationship between total psychopathy and ratings of fear in response to distress images indicates that individuals higher in psychopathic traits are less likely to report feeling less fear in response to the distress of others, as compared with individuals lower in psychopathic traits. This may support the theory that individuals high in psychopathic traits do experience fear in response to threats toward self, but do not experience empathetic fear due to a deficit in empathy.

A similar departure from the existing literature was found in the relationship between automatic threat response and level of psychopathic traits. The "affective indifference" described in Serafim and colleagues' (2009) study of heart rate in psychopathy seems to be nonexistent in this sample, with no significant relationship between level of psychopathy and heart rate change in response to fear or distress imagery. Likewise, there was no significant relationship between total psychopathy and change in skin conductance response during threatening images and images of others in distress. This result is also quite different from previous literature, in which researchers have found negative relationships between total psychopathy and skin conductance response to negative emotional stimuli (Herpertz et al., 2001; Lorber, 2004; Sprague et al., 2012). Interestingly, there were significant *positive* relationships between PCL Factor 1 and increase in skin conductance response during neutral images, threatening images, and images of others in distress. This result would seem to indicate that individuals who are higher in the interpersonal and affective traits of psychopathy (i.e., manipulativeness, grandiosity, and lack of empathy) are generally more reactive than those lower in these traits. Based on the existing

literature, which supports a general *deficit* in affective reactions, this result is unexpected (Dindo and Fowles, 2011; Herpertz et al., 2001; Lorber, 2004; Ogloff and Wong, 1990). Perhaps individuals high in Factor 1 psychopathic traits need to be more cognizant of their own affect, in order to manipulate others. Although PCL Factor 2 was not related to any study variables, it would be interesting to specifically test whether this factor is driving the affective deficit reported by others.

The relationship between fear and psychopathy remains unclear in the results of this study. On the other hand, the otherwise null findings would seem to indicate that, for the most part, individuals high in psychopathic traits are no different than those low in psychopathic traits when it comes to automatic threat response, the conscious experience of fear, or emotional experience in general. It is possible that these null finding were due to gender differences in the phenotype of psychopathy, given that this was a mixed gender sample.

LIMITATIONS

The most significant limitation in this study was due to the nature of data collection in a forensic sample. It is likely that physiological data collected from some participants was affected by various outside influences that were a result of collecting the data in a jail setting. During the collection of physiological data, there were often loud and surprising noises from construction, other inmates, or even doors opening and closing. There was no conceivable way to control for this variable of loud noises, as they were fairly constant for nearly every session. The rooms in which sessions were conducted were occasionally very warm or very cold, which influenced the accuracy of the sensors (particularly for skin conductance response, when participants were sweating). This was controlled for mainly by excluding some skin conductance data recorded after participants started actively sweating. Being in a jail setting may have predisposed all participants to be more vigilant and reactive in general. In fact, many participants who had noticeable emotional reactions to the stimuli (i.e., crying during the fear prompt) stated that, stated that, in any other situation, they would not have had such a reaction. As for the self-report measures, although participants were explained in detail the confidentiality of their study records, some participants (particularly those who were pre-trial) may have been reluctant to report traits that they recognized as negative.

Another significant limitation was the experience of anger in response to stimuli that have been shown to elicit a fear response. The fear prompt, distress images, and threat images all elicited anger as the highest rated emotion. This begs the question, is there something about these images that elicits anger, or is there something about this population (a forensic population) that

causes these individuals to respond to fear stimuli with anger. It is possible that the jail environment (full of potential danger) primes these individuals to react instrumentally with anger rather than with fear. Because the images presented that have been used in previous studies were not rated regarding self-report emotional response in these previous studies, it is possible that the physiological arousal (or lack thereof) reported in these studies was in response to the emotion of anger, and not fear. This would be particularly important, given that, in a large portion of fear research related to psychopathy, self-reported reactions to emotional stimuli are not recorded, calling into question whether the target emotion (fear) was actually elicited, as opposed to some other emotion.

IMPLICATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

Further clarification of the relationship between psychopathy and fear has several important implications, including a greater understanding of the factor of fearlessness that is often implicated in conceptualizations of psychopathy, how fearlessness relates to callousness and lack of empathy, and the general cognitive (conscious) and physiological aspects of fearlessness in psychopathy. This greater understanding of fear within psychopathy can also shed light on the much larger body of research concerning psychopathy and fear as a unitary construct. In broader terms, the practical consequence of any research regarding the construct of psychopathy concerns the ethical implications of not having a full understanding of how psychopathy is expressed. The label of "psychopath" or "psychopathic traits" can have a great deal of impact on a person's life (Forouzan & Cooke, 2005). A greater understanding of fear in psychopathy, and how fearlessness influences antisocial behavior in psychopathy can have applications in treatment, as well as in correctional and forensic practice (Forouzan & Cooke, 2005).

Because the results of this study do not indicate a clear deficit in either automatic threat response of the conscious experience of fear, future research should seek to clarify this relationship by replicating the methods of this study, in order to clarify relationships between psychopathy and the various measures of emotional arousal and experienced emotion. These relationships should be analyzed in the context of other conceptualizations of psychopathy, since there is not yet a single agreed upon model of the disorder. Additionally, other measures of automatic threat response and the conscious experience of fear should be explored in relation to level of psychopathic traits. Finally, although it may be difficult, given the low prevalence rate of psychopathy in the general population, the literature on psychopathy and fear would benefit from studies done in a non-forensic population, in order to minimize the limitations associated with collecting physiological data in a forensic setting, as well as analyze the construct of psychopathy outside of the factor of justice-involvement

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APPENDIX A

The Discrete Emotions Questionnaire

Please indicate your response using the scale provided.
While *(undergoing the emotional experience, e. g., viewing the photographs, reading the story, etc.)* to what extent did you experience these emotions?

1	2	3	4	5	6	7
Not at all	Slightly	Somewhat	Moderately	Quite a bit	Very much	An extreme amount

Anger (Ag)	Scared (F)
Wanting (Dr)	Mad (Ag)
Dread (Ax)	Satisfaction (H)
Sad (S)	Sickened (Dg)
Easygoing (R)	Empty (S)
Grossed out (Dg)	Craving (Dr)
Happy (H)	Panic (F)
Terror (F)	Longing (Dr)
Rage (Ag)	Calm (R)
Grief (S)	Fear (F)
Nausea (Dg)	Relaxation (R)
Anxiety (Ax)	Revulsion (Dg)
Chilled out (R)	Worry (Ax)
Desire (Dr)	Enjoyment (H)
Nervous (Ax)	Pissed off (Ag)
Lonely (S)	Liking (H)

Ag = Anger items, Dg = Disgust items, F = Fear items, Ax = Anxiety items, S = Sadness items, Dr = Desire items, R = Relaxation items, H = Happiness items.

Multidimensional Assessment of Interoceptive Awareness (MAIA)

	Standardized loading	SE
Noticing		
1. When I am tense I notice where the tension is located in my body.	.697	.039
2. I notice when I am uncomfortable in my body.	.594	.045
3. I notice where in my body I am comfortable.	.711	.038
4. I notice changes in my breathing, such as whether it slows down or speeds up.	.452	.053
Not-Distracting		
5. I do not notice physical tension or discomfort until they become more severe.	.631	.050
6. I distract myself from sensations of discomfort.	.644	.050
7. When I feel pain or discomfort, I try to power through it.	.622	.051
Not-Worrying		
8. When I feel physical pain, I become upset.	.629	.049
9. I start to worry that something is wrong if I feel any discomfort.	.724	.046
10. I can notice an unpleasant body sensation without worrying about it.	.577	.051
Attention Regulation		
11. I can pay attention to my breath without being distracted by things happening around me.	.589	.041
12. I can maintain awareness of my inner bodily sensations even when there is a lot going on around me.	.766	.027
13. When I am in conversation with someone, I can pay attention to my posture.	.625	.038
14. I can return awareness to my body if I am distracted.	.728	.031
15. I can refocus my attention from thinking to sensing my body.	.758	.028
16. I can maintain awareness of my whole body even when a part of me is in pain or discomfort.	.747	.029
17. I am able to consciously focus on my body as a whole.	.721	.031
Emotional Awareness		
18. I notice how my body changes when I am angry.	.518	.045
19. When something is wrong in my life I can feel it in my body.	.534	.044
20. I notice that my body feels different after a peaceful experience.	.817	.024
21. I notice that my breathing becomes free and easy when I feel comfortable.	.809	.025
22. I notice how my body changes when I feel happy/joyful.	.837	.023
Self-Regulation		
23. When I feel overwhelmed I can find a calm place inside.	.730	.032
24. When I bring awareness to my body I feel a sense of calm.	.736	.032
25. I can use my breath to reduce tension.	.773	.029
26. When I am caught up in thoughts, I can calm my mind by focusing on my body/breathing.	.735	.032
Body Listening		
27. I listen for information from my body about my emotional state.	.761	.030
28. When I am upset, I take time to explore how my body feels.	.769	.030
29. I listen to my body to inform me about what to do.	.822	.026
Trusting		
30. I am at home in my body.	.601	.042
31. I feel my body is a safe place.	.831	.028
32. I trust my body sensations.	.817	.029

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Basic Empathy Scale (20 items)

Rate each statement on a 5-point scale with 1=strongly agree and 5=strongly disagree.

1. My friends' emotions don't affect me much _____

2. After being with a friend who is sad about something, I usually feel sad _____

3. I can understand my friend's happiness when they do well at something _____

4. I get frightened when I watch characters in a good scary movie _____

5. I get caught up in other people's feelings easily _____

6. I find it hard to know when my friends are frightened _____

7. I don't become sad when I see other people crying _____

8. Other people's feeling don't bother me at all _____

9. When someone is feeling 'down' I can usually understand how they feel _____

10. I can usually work out when my friends are scared _____

11. I often become sad when watching sad things on TV or in films _____

12. I can often understand how people are feeling even before they tell me_____

13. Seeing a person who has been angered has no effect on my feelings_____

14. I can usually work out when people are cheerful_____

15. I tend to feel scared when I am with friends who are afraid_____

16. I can usually realize quickly when a friend is angry _____

17. I often get swept up in my friends' feelings_____

18. My friend's unhappiness doesn't make me feel anything_____

19. I am not usually aware of my friends' feelings_____

20. I have trouble figuring out when my friends are happy_____

Toronto Alexithymia Scale - 20

Please answer the following questions, using the scale provided:

(1) Completely disagree
(2) Disagree
(3) Neutral
(4) Agree
(5) Completely agree

1.	I am often confused about what emotion I am feeling.	1 – 2 – 3 – 4 – 5
2.	It is difficult for me to find the right words for my feelings.	1 – 2 – 3 – 4 – 5
3.	I have physical sensations that even doctors don't understand.	1 – 2 – 3 – 4 – 5
4.	I am able to describe my feelings easily.	1 – 2 – 3 – 4 – 5
5.	I prefer to analyze problems rather than just describe them.	1 – 2 – 3 – 4 – 5
6.	When I am upset, I don't know if I am sad, frightened, or angry.	1 – 2 – 3 – 4 – 5
7.	I am often puzzled by sensations in my body.	1 – 2 – 3 – 4 – 5
8.	I prefer to just let things happen rather than to understand why they turned out that way.	1 – 2 – 3 – 4 – 5
9.	I have feelings that I can't quite identify.	1 – 2 – 3 – 4 – 5
10.	Being in touch with emotions is essential.	1 – 2 – 3 – 4 – 5
11.	I find it hard to describe how I feel about people.	1 – 2 – 3 – 4 – 5
12.	People tell me to describe my feelings more.	1 – 2 – 3 – 4 – 5
13.	I don't know what's going on inside me.	1 – 2 – 3 – 4 – 5
14.	I often don't know why I am angry.	1 – 2 – 3 – 4 – 5
15.	I prefer talking to people about their daily activities rather than their feelings.	1 – 2 – 3 – 4 – 5
16.	I prefer to watch "light" entertainment shows rather than psychological dramas.	1 – 2 – 3 – 4 – 5
17.	It is difficult for me to reveal my innermost feelings, even to close friends.	1 – 2 – 3 – 4 – 5
18.	I can feel close to someone, even in moments of silence.	1 – 2 – 3 – 4 – 5
19.	I find examination of my feelings useful in solving personal problems.	1 – 2 – 3 – 4 – 5
20.	Looking for hidden meanings in movies or plays distracts from their enjoyment.	1 – 2 – 3 – 4 – 5

APPENDIX B

Zero-Order Correlations Table, see following pages.

Zero-Order Correlations

Variables	1	2	3	4	5	6	7	8	9	10	11	12	15
1. Gender	-												
2. Age	.315*	-											
3. Race	-0.190	-0.220	-										
4. Dominance	-.283*	0.001	0.075	-									
5. PCL Factor 1	-.427**	-.363**	-0.010	0.128	-								
6. PCL Factor 2	0.018	0.101	-0.148	0.202	.393**	-							
7. PCL Total	-0.237	-0.149	-0.098	0.198	.824**	.845**	-						
8. Fear Prompt HR Change	-0.016	-.276*	0.062	0.084	0.091	-0.191	-0.062	-					
9. Fear Prompt SCR Change	0.212	-0.189	-0.048	-0.130	-0.022	0.004	-0.011	-0.018	-				
10. Fear Prompt Highest Rated Emo	-0.139	0.014	-0.009	-0.074	0.033	-0.107	-0.047	0.073	-0.094	-			
11. Threat Image HR Change	-0.070	-0.134	0.075	-0.023	0.037	0.135	0.104	0.015	-0.013	-0.028	-		
12. Distress Image HR Change	-0.020	-0.009	0.116	-0.105	0.180	-0.039	0.080	0.135	-.286*	0.077	-0.021	-	
13. Neutral Image HR Change	-0.214	0.000	0.121	.353**	0.043	-0.090	-0.031	0.088	-0.174	-0.026	0.041	.313*	-
14. Threat Image SCR Change	-0.116	-0.234	0.154	-0.051	.318*	0.020	0.197	0.097	.589**	-0.009	0.011	-0.182	-0.142
15. Distress Image SCR Change	-0.099	-0.223	0.135	-0.017	.330**	0.023	0.206	0.112	.604**	0.034	-0.026	-0.200	-0.128
16. Neutral Image SCR Change	-0.096	-0.203	0.125	-0.066	.315*	-0.001	0.182	0.115	.611**	-0.017	-0.021	-0.163	-0.136
17. Threat Picture Highest Rated Emo	-0.085	-.287*	-0.044	-0.230	0.119	0.066	0.107	-0.043	0.021	-0.072	-0.208	-0.051	-0.086
18. Distress Picture Highest Rated Emo	-0.199	-0.204	0.056	-0.107	.303*	0.133	.259*	-0.079	-0.018	0.038	-0.009	0.120	-0.058
19. Neutral Picture Highest Rated Emo	-0.020	-0.149	0.023	0.072	0.154	0.145	0.180	0.045	0.096	0.038	0.145	-0.142	-0.171
20. Interoceptive Accuracy	0.181	0.191	-0.082	0.035	-0.243	0.110	-0.073	-0.153	-0.153	-0.089	-0.029	-0.091	-0.162
21. Fear Frequency	.339**	0.074	-0.007	-.272*	-.291*	-0.172	-.276*	-0.015	-0.041	-0.104	0.121	-0.217	-0.181
22. Fear Intensity	.249*	0.169	0.038	-0.213	-0.190	-0.178	-0.220	-0.050	-0.182	-0.115	0.014	0.119	-0.173
23. FIEQ Frequency	0.171	0.021	-0.037	-0.111	-0.149	-0.056	-0.121	-0.010	-0.087	-0.040	-0.028	-0.130	-0.034
24. FIEQ Intensity	0.192	0.086	0.056	-0.110	-0.076	-0.126	-0.122	0.026	-0.093	0.030	-0.091	0.132	-0.025
25. FIEQ Total	0.206	0.067	0.021	-0.124	-0.119	-0.110	-0.137	0.013	-0.102	0.002	-0.074	0.029	-0.033
26. MAIA Total	-0.168	-.303*	0.219	0.191	0.155	-0.113	0.020	-0.050	0.002	-0.085	0.025	.294*	.267*
27. TAS Total	0.021	-0.069	-0.023	-0.199	0.182	0.046	0.137	0.149	-0.053	0.083	-0.192	0.045	-0.061
28. Basic Empathy Affective Subscale	.336**	0.181	-0.114	-0.122	-.305*	-0.228	-.319*	0.064	-0.067	-0.008	-0.016	0.088	0.023
29. Basic Empathy Cognitive Subscale	0.241	-0.208	0.064	0.029	-0.150	-0.153	-0.181	0.082	0.171	0.060	0.028	0.037	-0.065
30. Basic Empathy Total	.345**	0.017	-0.044	-0.067	-.279*	-0.229	-.304*	0.084	0.037	0.025	0.004	0.077	-0.017

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

Zero-Order Correlations

14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
-															
.983**	-														
.987**	.977**	-													
-0.007	-0.03	-0.03	-												
0.118	0.12	0.09	.473**	-											
0.098	0.10	0.10	0.01	0.09	-										
-0.126	-0.15	-0.13	-0.15	-0.17	0.14	-									
-0.095	-0.08	-0.08	-0.12	-.37**	-0.05	0.07	-								
-0.084	-0.10	-0.09	-0.06	-0.06	-0.10	0.20	.590**	-							
-0.117	-0.10	-0.11	-0.07	-.35**	0.00	0.23	.712**	.474**	-						
-0.052	-0.04	-0.06	-0.07	-0.07	0.05	0.17	.401**	.764**	.566**	-					
-0.088	-0.07	-0.09	-0.08	-0.21	0.03	0.22	.592**	.727**	.834**	.927**	-				
0.012	0.00	-0.01	0.04	0.07	-0.22	-0.08	-0.24	-0.19	-0.08	-0.12	-0.12	-			
0.040	0.07	0.05	0.21	0.07	0.12	-0.16	0.09	0.00	-0.01	0.00	-0.01	-.45**	-		
-0.158	-0.13	-0.11	-0.01	-0.18	-0.09	0.18	.394**	.448**	.353**	.426**	.442**	0.01	-0.10	-	
-0.023	-0.01	0.00	-0.08	-0.22	0.05	.301*	0.17	0.23	.325**	.389**	.405**	0.12	0.00	.451**	-
-0.118	-0.09	-0.07	-0.04	-0.22	-0.03	.273*	.348**	.414**	.399**	.480**	.498**	0.07	-0.07	.895**	.802**

APPENDIX C

The University of Alabama
801 University Blvd
Tuscaloosa AL
TEL: 205 348 6457
FAX:

NOTICE OF APPROVAL FOR HUMAN RESEARCH

DATE:	May 20, 2019	
TO:	Glenn, Andrea, Psychology	
	Conners, Frances, Psychology	
FROM:	Graham, Jeanelle, MPH,Research Compliance Specialist, FB Non-Medical	
PROTOCOL TITLE:	The Impact of Personality Traits on Executive Functioning	
FUNDING SOURCE:	NONE	
PROTOCOL NUMBER:	19-03-2181	
APPROVAL PERIOD:	Approval Date: April 18, 2019	Expiration Date: April 17, 2020

The Institutional Review Board (IRB) for the protection of human subjects has reviewed the protocol entitled: The Impact of Personality Traits on Executive Functioning. The project has been approved for the procedures and subjects described in the protocol. This protocol must be reviewed for renewal on a yearly basis for as long as the research remains active. Should the protocol not be renewed before expiration, all activities must cease until the protocol has been re-reviewed.

If approval did not accompany a proposal when it was submitted to a sponsor, it is the PI's responsibility to provide the sponsor with the approval notice.

This approval is issued under University of Alabama's Federal Wide Assurance 00004939 with the Office for Human Research Protections (OHRP). If you have any questions regarding your obligations under Committee's Assurance, please do not hesitate to contact us.

Please direct any questions about the IRB's actions on this project to:

Graham, Jeanelle

Graham, Jeanelle

Approval Period:	April 18, 2019 through April 17, 2020
Review Type:	FULLBOARD
IRB Number:	01