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LOMA LINDA UNIVERSITY
School of Science and Technology
in conjunction with the
Faculty of Graduate Studies

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Psychopathic Traits, Skin Conductance, and Emotion in the Normal Population

by

Kimberley Erin Rose

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A Thesis submitted in partial satisfaction of
the requirements for the degree of
Master of Arts in General Psychology

_____

March 2011

Each person whose signature appears below certifies that this thesis in his/her opinion is adequate, in scope and quality, as a thesis for the degree Master's of Arts.

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ACKNOWLEDGEMENTS

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ABBREVIATIONS

CBT	Cognitive-Behavioral Therapy
PCL-R	Psychopathy Check List-Revised
SRP-II	Self-Report Psychopathy-Revised
PPI	Psychopathic Personality Inventory
SRP-E	Self-Report Psychopathy, Experimental
IPM	Interpersonal Manipulation
CA	Callous Affect
ELS	Erratic Lifestyle
CT	Criminal Tendencies
LSRP	Levenson's Self-Report Psychopathy
SRP-III	Self Report Psychopathy, Third Edition
SCR	Skin Conductance Response
SPECT	Single Photon Emission Computerized Tomography
IAPS	International Affective Pictures System
SES	Sexual Experiences Scale
TAS	Toronto Alexithymia Scale
SAM	Stand Alone Monitor

ABSTRACT OF THE THESIS

Psychopathic Traits, Skin Conductance, and Emotion in the Normal Population

by

Kimberley Erin Rose

Masters of Arts, Graduate Program in Psychology
Loma Linda University, March 2011
Dr. Paul Haerich, Chairperson

Research has suggested that psychopathic characteristics exist along a continuum

extending into the normal population (Andershed, Gustafson, Kerr, & Stattin, 2002; Ross,

Lutz, & Bailley, 2004; Williams, Paulhus, & Hare, 2007). Individuals high in subclinical

psychopathy were expected to show the same pattern of diminished psychophysiological

responding to negative stimuli that incarcerated psychopathic individuals have shown.

The callous affect (CA) dimension of psychopathy was expected to be associated with

physiological differences as this is considered the core element of psychopathy. Level of

CA was compared for skin conductance response (SCR) magnitude to empathy evoking

versus threatening stimuli. This was done to determine whether reduced response to

negative stimuli was associated with fearlessness, lack of empathy, or both. A marginally

reliable effect suggested that individuals with higher scores on CA showed stronger

emotional responses to for threat than for empathy evoking images. By comparison,

individuals low on CA showed stronger emotional responses to empathy than to threat

stimuli. It was also hypothesized that individuals with greater psychopathic tendencies

would take longer to process emotional stimuli compared to individuals with less

psychopathic tendencies. It was expected this would be shown by longer SCR latency.

Higher scores on the CA dimension of psychopathy was found to be positively correlated

with longer SCR latencies to threat and empathy stimuli compared to individuals who

reported less CA. This supported the hypothesis that individuals with more psychopathic

CA take longer to process and respond to emotion. Additionally, individuals with higher

overall psychopathic characteristics were significantly delayed in their SCRs to

threatening stimuli, but not to empathy or neutral. This suggested that in addition to

previous literature that has indicated that individuals higher in psychopathy show reduced

SCR to negative stimuli they also show delayed SCR response to threatening stimuli.

This suggested that individuals high in psychopathic characteristics show temporal

differences in responding to threatening stimuli, such that it takes them longer to process

threatening stimuli.

Psychopathic Traits, Skin Conductance Response and Emotion

Psychopaths cause considerable economic and emotional strain to society (Viding, 2004). They typically commit a greater proportion and variety of crimes (Hart & Hare, 1997) than other convicts, and their crimes tend to be more violent in nature (see Viding). The crimes that they commit are also more likely to be instrumental, or premeditated and for personal gain, rather than crimes of passion (Blair, 2001; Snowden, Gray, Smith, Morris, & MacCulloch, 2004). Additionally, psychopathic individuals have difficulty learning from punishment and are more likely to continue pursuing a goal even when it results in aversive consequences (Ellis, 1987) similar to individuals with frontal lobe damage (Damasio, 1994). Research has suggested that psychopathy may in part be due to orbitofrontal brain dysfunction (see Séguin, 2004).

Psychopathy is considered to be a specialized subtype of antisocial disorder (Blair, 2003). Psychopaths are distinguished from other antisocial individuals by both the types of crimes they commit and by their emotional deficits. They are cold-hearted, calculating, manipulative, blame externalizing, and narcissistic, showing no empathy or remorse for the distress they cause others. When asked why antisocial behavior is wrong, they are less likely than other individuals to report that the presence of a victim makes an action wrong (Verona, Patrick, Curtin, Bradley, & Lang, 2004). It appears that there has been a disruption in the moral socialization of these individuals (Blair, 2004).

Additionally, psychopathic individuals have a much worse prognosis for rehabilitation than do other antisocial individuals who do not show these emotional anomalies (see Viding, 2004). According to a meta-analysis by Hemphill, Hare, and Wong (1998) psychopathic individuals are more likely to reoffend. They found a

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correlation between psychopathy and general recidivism (weighted correlation = 0.27) as well as violent recidivism (weighted correlation = 0.27). Furthermore, at one year the violent recidivism rate was between 3 to 5 times higher for psychopaths compared to non-psychopaths. Rice, Harris, and Cormier (1992) studied psychopathic prisoners who received treatment in therapeutic communities based on principles of responsibility, risk-taking, support, and reality confrontation. The prisoners also had access to treatment through psycho-drama, art therapy, cognitive and life skills therapies. Alarmingly, they found that psychopaths who received treatment were more likely to reoffend violently than psychopaths who did not receive treatment. It has been theorized that the therapeutic process helps psychopathic individuals improve their manipulation skills (Viding). Other researchers have suggested that psychopaths require a different treatment approach. Cognitive-behavioral therapy (CBT) that focused on supporting their self interests, building insight about the inefficiency of their current methods in meeting their goals, and using positive reward rather than punishment has been suggested for psychopaths (Templeman & Wollersheim, 1979). Some success has been shown with CBT treatment of psychopathic sex offenders (Olver & Wong, 2009). Olver and Wong showed that inpatient psychopathic sex offenders who completed an intensive CBT program were less likely to reoffend violently than psychopaths who dropped out of the program. However, there was no difference between psychopaths who completed the program and those who did not for sexual reoffending. Psychopaths were also more likely to drop out of the program, with 73.3% completing it.

Psychopathy is considered to be very severe subtype of antisocial personality disorder (Blair, 2001). There is a growing body of research that has examined the

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emotional functioning of these individuals. As the research has accumulated, their emotional dysfunction, rather than their antisocial behavior, has been found to form "the core" of psychopathy (Viding, 2004).

As more has been learned about psychopathy, researchers have begun to be interested in the idea of subclinical psychopathy, or psychopathic traits that exist in the normal, non-criminal population. If psychopathy exists along a continuum that extends into the noncriminal population, then studying it at more points along that continuum should improve understanding of the construct. Additionally, examining individuals with psychopathic characteristics, who are functioning well in society, may lead to greater understanding of how to help individuals with more severe psychopathic tendencies, such as those who are incarcerated, to function more effectively within society.

Measuring Psychopathy

The Psychopathy Check List-Revised (PCL-R) was developed by Hare (1991) as an assessment tool for psychopathy. The PCL-R is considered the "gold standard" (Williams & Paulhus, 2004) for identifying psychopaths in a racially unbiased way (Cooke, Kosson, & Michie, 2001). In the criminal population there have been two factors that have consistently emerged with use of the PCL-R. The first factor of the PCL-R is considered to be the more affective, personality dimension of the psychopathy checklist (Viding, 2004). It measures callousness, narcissism, lack of empathy, lack of guilt, and superficial charm. This first factor has been referred to a few different ways, often as the personality, interpersonal, affective, or emotional callousness factor (Williams & Paulhus, 2004). This first factor is really thought to measure the core feature of psychopathy, which differentiates psychopaths from other anti-social

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individuals. The second factor measures antisocial behaviors, impulsivity, and sensation

seeking. This second factor is often termed the antisocial behavior or socially deviant

factor of the PCL-R (Williams & Paulhus).

The PCL-R is a clinical instrument that requires training to administer effectively

and accurately. Because of this, other self-report measures have been developed, such as

the Self-Report Psychopathy-Revised (SRP-II), a 60-item, Likert-type instrument (Hare,

Harpur, & Hemphill, 1989). The SRP-II was adapted from the PCL-R. Hare (1991)

found a 0.54 positive correlation between the two measures (as cited in Glenn, Raine,

Venables, & Mednick, 2007). Because the SRP-II requires less training to administer, it

has become increasingly popular in research. Additionally, the items of the SRP-II

appear to be more appropriate for use with individuals in the normal population. They

assess different levels of psychopathic tendencies. Some items are "I enjoy giving

"bossy" people a hard time," "Sometimes it's fun to see how far you can push someone

before they catch on," and "Not hurting others' feelings is important to me" (reverse

coded).

The validity of the SRP-II is comparable to other self-report measures of

psychopathy and is unique in that it was theoretically structured to mimic the PCL-R

(Glenn et al., 2007). Several other self-report instruments are also available to measure

psychopathic characteristics such as the Psychopathic Personality Inventory (PPI)

(Lilienfeld & Andrews, 1996), which was also found to be correlated with the PCL-R at

0.54 (Poythress, Edens, & Lilienfeld, 1998), but was originally structured with 8 domains

(Williams, Paulhus, Hare, 2007).

The SRP-II has been tested for convergent and divergent validity in the normal population. It has been found to be negatively correlated with measures of empathy, positively correlated with disagreeableness, positively correlated with violent entertainment choices, and negatively correlated with anxiety, to name a few (see review by Williams & Paulhus, 2004).

SRP-II scores have shown good reliability when used in non-criminal populations. Williams and Paulhus (2004) used it with a college student sample and obtained a Cronbach's alpha of 0.84. Another study by Andershed and colleagues (2002) reported a Cronbach's alpha of 0.86, with six additional items added to the SRP-II.

As of yet, the factor structure of the SRP-II in normal, non-criminal populations has not been fully confirmed. The SRP-II was constructed to conceptually mirror the two-factor structure of the PCL-R. The SRP-II was intended to show the same emotional callousness and antisocial behavior factors, however, factor analyses of this instrument in the normal population has shown a variable factor structure. Two, three and five factor solutions have also been proposed (see Williams, Nathanson, & Paulhus, 2002; Williams & Paulhus, 2004; Williams et al., 2002; Williams, Paulhus, & Hare, 2007).

A recently revised version of the SRP-II has been developed. A new experimental 60 item version of the scale, called the SRP-E, presumably standing for Self-Report Psychopathy, Experimental version has been developed (Williams et al., 2007). This new scale has a four factor structure. The intent of the upgraded version was to capture the four facets of psychopathy that appear in the research with other self-report instruments. Exploratory analysis of the new scale revealed four oblique factors and a follow-up second study confirmed the factor structure. The four factors found were

described as: Interpersonal Manipulation (IPM), Callous Affect (CA), Erratic Lifestyle (ELS), and Criminal Tendencies (CT).

Williams and colleagues (2007) tested the reliability and validity of the SRP-E. They found an alpha reliability for the total SRP-E scale was an alpha of .88, which suggested acceptable reliability. The alpha reliabilities for the four factors ranged from, .67 to .91, which were acceptable reliabilities. In terms of validity they found that SRP-E was positively correlated with other self-report psychopathy scales used with the normal populations such as the PPI, Levenson's Self-Report Psychopathy (LSRP), and Eysenck's P Scale.

Following testing of the SRP-E (Williams, Paulhus, & Hare, 2007) a very recent version, called the Self Report Psychopathy, Third Edition (SRP-III), with 64 items has been developed (Paulhus, Neumann, & Hare, in press). Many of the items on this scale are the same as items from the SRP-II, and SRP-E. The items are rated on a 1 to 5 Likert scale. The alpha reliabilities reported in the SRP-III manual for the subscales were 0.81, 0.79, 0.74, and 0.82 for IPM, CA, ELS, and CT, respectively (Paulhus et al., in press). They reported an overall SRP-III scale alpha of 0.81. These alpha numbers suggested acceptable scale reliability.

Physiological Responsiveness and Brain Function

Physiological measures have been used in research with psychopathy because they are believed to be tied to underlying emotions or to general arousal (Lorber, 2004). Psychopathy is known to be related to emotional dysfunction. Because emotion is known to have physiological correlates, physiological research on psychopathy is prolific. Physiological measures such as heart rate, skin conductance response (SCR),

electroencephalography (brain waves), and electromyography (facial movements) have added considerable insight to this research area. These measures have been useful because they are less likely to be biased than self-report measures and are more directly linked to underlying biology.

Along with heart rate, SCR has been particularly popular in studying the antisocial disorders (Lorber, 2004). SCRs are thought to reflect general arousal states (Dawson, Schell, & Filion, 2000). Psychopathic individuals have diminished physiological arousal to stimuli which typically evoke a fearful response. In a meta-analysis Lorber (2004) found that task related SCR had a negative relationship with psychopathy. Individuals who were psychopathic showed smaller SCR amplitudes when engaged in emotional tasks. Based on arousal theory, it has been suggested that psychopathic individuals may also have low baseline arousal states compared to controls even under non-emotional conditions (Ellis, 1987).

According to Dawson and colleagues (2000) SCR has been shown to be a good index of arousal. Because of this, if an investigator wanted to measure anxiety, then skin conductance would be the most responsive of the physiological measures (Dawson et al.). This may also explain the popularity of skin conductance as a measure for psychopathic individuals. Because psychopathic individuals have been characterized in terms of their lack of fear and arousal, anxiety is a commonly used construct in this research area.

SCR has proven to be useful in measuring affective intensity of a presented stimulus (Dawson et al., 2000). In normal individuals, SCRs occur for both positive and negative stimuli, with similar magnitude for an individual (Dawson et al.). Psychopathic individuals have also shown this, however their response to these affective stimuli are

typically smaller compared to controls (Herpertz et al., 2001). This relationship indicated that emotional stimuli of any valence, produced arousal, but that arousal for emotional stimuli was not as pronounced in psychopathic individuals. Additionally, a meta-analysis by Lorber (2004) revealed that there was a relationship between low baseline skin conductance and psychopathy; however, it was a small effect. This indicated that psychopathic individuals were also less aroused under non-emotional conditions than non-psychopathic individuals.

Additionally, as in most SCR research, research on psychopathy and SCR has most commonly assessed amplitude (Dawson et al., 2000). Amplitude is the height of the wave created when an SCR occurs. Another SCR measures which may be useful for study is the onset latency (Dawson et al.).

It may take psychopathic individuals more effort to process emotion, as suggested by preliminary single photon emission computerized tomography (SPECT) findings in a study by Intrator and colleagues (1997). They found that psychopaths showed an increase in cerebral blood flow during an emotional task compared to controls. They suggested that psychopaths used additional cognitive resources to process emotion, but despite added effort were very inefficient at it. However, due to the small sample size (N = 17, 8 psychopaths, 9 controls) this finding needs replication. Furthermore, another study with MRI found that college students high in psychopathic personality traits employed brain regions known to be involved in perception and cognition in order to complete an emotional task (Gordon, Baird, & End, 2004). By comparison, participants low in psychopathic personality traits used areas of the brain involved in emotional interpretation to complete the emotional task. This suggested individuals with

psychopathic traits attempted to compensate for their emotional dysfunction with other cognitive skills. The above research suggested that psychopaths devoted a greater variety and amount of cognitive resources when engaged in emotional task, suggesting less efficiency.

Moreover, research with emotion potentiated startle has suggested that, in addition to being inefficient at emotional processing, psychopaths are delayed in their emotional processing. Normal individuals blink their eyes and show an increase in sweat when there is a loud, unexpected noise. This results in an SCR and eye blink startle. In an emotion potentiated startle paradigm participants are exposed to emotional stimuli and then startled, typically with a loud noise. The addition of emotional stimuli, for normal individuals, causes a larger startle response seen by greater SCR and eye blink magnitudes. Sutton, Vitale, and Newman's (2002) emotion potentiated startle research suggested that psychopathic prisoners, particularly those low in anxiety, have delayed emotional processing. They concluded this after finding that low anxiety female psychopaths had diminished physiological response to negative images when startled 2.0 seconds after image onset and normal emotion potentiated startle at 4.5 seconds. Levenston, Patrick, Bradley, and Lang (2000) also showed that male psychopathic prisoners showed diminished startle response at early probe times (i.e. 0.25 s and 0.80 s) and showed more normal startle potentiation to threat images at later probe times (i.e. 1.80 s, 3.0 s, and 4.5 s). Their interpretation of these findings was that psychopaths had "a weakness in initial stimulus evaluation" (p. 373). The current study hypothesized that non-criminal individuals with psychopathic traits may also be slower at emotional processing. The hypothesized delay was expected to be shown with SCR onset latencies.

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SCR latency is the time it takes for an SCR to occur after stimulus onset. SCR latency is a simple way to determine if non-criminal individuals with psychopathic characteristics are also delayed in their emotional responses. This possibility required further investigation.

Lack of Empathy for Others

The apparent lack of emotion and empathy in psychopathic individuals has been of considerable interest to researchers and has been explored through physiological measures. Because psychopaths appear to be very emotionally devoid, much work has been devoted to understanding the physiology of these individuals to discern whether the emotional differences occur at a biological level. Emotion, arousal, and physiological responsiveness are thought to be intricately linked (Dawson et al., 2000). As expected, psychopaths have shown differences in many physiological responses thought to be associated with both emotion and general arousal (Lorber, 2004; Herpertz et al., 2001; Ellis, 1987; etc.). These findings suggested that psychopaths are emotionally impaired. This impairment has most often been recognized as fearlessness; however, lack of empathy is also apparent through their crimes.

Findings of biological differences have incited nature versus nurture debates on the etiology of psychopathy. It has been suggested that psychopathy is a developmental disorder (Viding, 2004). Some researchers have theorized that psychopathy is caused by a disruption in the development of moral socialization (Blair, 2004). It is thought that due to this disruption psychopaths never develop the capacity for empathy. For the most part mental health professionals as well as the criminal justice system have had very little success rehabilitating these individuals (Rice et al., 1992; Viding, 2004; Hemphill et al.,

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1998). These findings lead one to wonder if perhaps the psychopath is a victim of his/her own physiology. If so, would this mean that the psychopath has very little control over his/her own behavior?

A review of the psychopathy literature revealed that most researchers, to date, have focused on psychopathic characteristics of incarcerated individuals, and much of the research concerning emotion in this population has examined anxiety or fear differences (Fowles, 2000; Patrick, Cuthbert, & Lang, 1994; Patrick & Iacono, 1989). The CA and lack of empathy components of psychopathy and their relationship to physiological responses and brain imaging have been studied in these populations (Patrick et al., 1994; Verona et al, 2004; Amrhein, 2004; Muller et al., 2003). The general findings have been that the CA component of psychopathy is related to diminished arousal and physiological response to affective stimuli.

One particularly interesting study by Herpertz and colleagues (2001) used electromyographic measurement of facial movement to look at the differences between psychopathic individuals and controls. Psychopathic individuals did not display significantly different facial movements to sad, pleasant, or neutral images. This indicated that psychopathic individuals did not frown or smile as often or to the degree that normal individuals did. This finding also suggested an emotionally dysfunctional element to the disorder. These studies have increased the understanding of the nature of psychopathy and have suggested that their amoral and highly antisocial behavior may be a byproduct of their emotional dysfunction. It has been hoped that improved understanding the emotional deficits of psychopathic individuals will lead to better methods of rehabilitation and prevention in this incorrigible population (Viding, 2004).

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Fearlessness

Psychopaths have been described as lacking fear (Cleckley, 1964). This assertion has been empirically explored by several studies. Different findings have emerged concerning their fearlessness depending on the manner in which it is assessed. For example, when compared to low psychopathy sex offenders, psychopathic sex offenders did not differ on self-reported fearfulness or ability to imagine themselves in fearful (and neutral) situations (Patrick et al., 1994).

Similarly, Bare and colleagues (2004) had students imagine themselves in fear or anxiety producing situations using vignettes. The undergraduates were then separated into high and low psychopathy groups based on their SRP-II scores. Bare and colleagues found no differences between low and high psychopathy groups in self-reported ability to imagine themselves in fear provoking situations.

These findings were interesting because the psychopathic individuals' self-reports appeared to be inconsistent with others perceptions of them. These findings seemed to contradict the common perception, and Cleckley's (1964) conceptualization of psychopathic individuals as 'fearless.' Interestingly, while psychopaths did not report lack of fear, the physiological data seemed to indicate that they had abnormal or diminished fear responses (Bare et al., 2004). It appeared that there was a difference between one's cognitive evaluation of experiencing fear and the experience of the physiological fear response. Alternatively it is possible that individuals high on psychopathy actually did not experience fear but reported the experience of fear due to social pressure, deception, or other factors.

Damasio (1994) found that frontal lobe damage patients showed diminished SCR compared to controls when preparing to engage in risky choices in a gambling task. While some of these patients were able to explain that their choices were too risky to be successful over the course of the task, these individuals continued to choose risky options. Damasio's (1994) findings may be useful in understanding how individuals with diminished SCR may have expressed fear verbally while their behavior suggested fearlessness. Another study using the same gambling task found that psychopathic individuals made poor choices and demonstrated a lack of learning over the course of the task (Mitchell, Colledge, Leonard, and Blair, 2002) similar to the frontal lobe damaged patients in Damasio's study. This led Mitchell and colleagues (2002) to infer that there was orbitofrontal cortex dysfunction in psychopaths, which may explain their fearless behavior.

In the previously mentioned study by Patrick and colleagues (1994), criminals high in psychopathy who did report fearlessness were compared to criminals low in psychopathy. Criminals high in psychopathy who reported fearlessness showed smaller physiological responses to fearful imagery than low psychopathic individuals.

This suggested that self-reported fearfulness, overt behavior, and physiology were all important measures to research, as they may not all lead to the same conclusions about an individual's experience of emotion (Lang, 1978).

Bare and colleagues (2004) found that undergraduate students scoring high on the CA factor of the SRP-II, were less reactive to vignettes designed to elicit anxiety than those scoring low. This indicated that the physiology of these individuals in response to threat was diminished compared to that of individuals with low CA scores. This finding

is also consistent with the research on startle response in this population. Normal individuals when startled with a loud, unexpected noise will show an SCR. Individuals with psychopathy have shown diminished SCR and inhibited blinking responses (Levenston et al., 2000).

Psychopaths have also more frequently shown no response to startle when compared to controls and individuals with borderline personality disorder (Herpertz et al., 2001). Response to startle can be interpreted as a fear or threat response (Levenston et al., 2000). Many of the above findings support Cleckley's (1964) contention that psychopathic individuals are fearless.

The original SRP-II scale has recently been revised (Williams, Paulhus, & Hare, 2007). These revisions included pruning some of the anxiety based items of the scale (Williams, Paulhus, & Hare, 2007). In the new version of the scale, the SRP-E, they found no remaining correlation between psychopathy and other measures of anxiety. It is their contention that if there were a true relationship between anxiety and psychopathy than this relationship would have remained after the anxiety based items of the SRP-II were removed (Williams, Paulhus, & Hare, 2007). This lack of correlation with anxiety measures suggested that the emotional deficits found in psychopathy may not truly be fear based as Cleckley believed. Lack of empathy may be the critical piece of the emotional deficits for these individuals rather than true fearlessness.

Differentiation between fear and empathy responses has rarely been directly compared in psychopathy. One study by Levenston and colleagues (2000), however, did compare images of threatening content to those with content of harm to other individuals. This study found that startle responses during victim images were inhibited for inmates.

The study also found that startle responses occurred during threat images, but they were weak. This finding made sense in that personally threatening content should provoke more of a response than distressing content concerning other individuals. It appeared that this finding, too, had yet to be replicated in non-criminal samples.

Aggression and Violence

Aggression and violence have been some of the most studied characteristics of psychopathy. It is believed that biological processes are central to the development of antisocial and violent behavior (Raine, 2002). Heart rate has been shown to be the best physiological measure of differences between psychopaths and controls according to some researchers (Patrick et al, 1994). However, Lorber (2004) found in a meta-analysis that resting heart rate was correlated to aggression, but was not correlated to psychopathy. It was also found that task heart rate was not correlated to aggression or psychopathy. Furthermore, heart rate reactivity was only correlated to aggression for adults and but there was no evidence of a correlation with psychopathy. Lorber found that SCR had a positive relationship with aggression, but there was a negative relationship between SCR and psychopathy. These findings may seem contradictory because psychopathic individuals typically commit aggressive acts. However, this finding was probably due to the fact that the relationship between aggression and SCR was averaged over many studies that have different types of aggressors in them. The meta-analysis seemed to suggest that the majority of aggressors have increased SCR, but that psychopathic aggressors have decreased SCR. Because only a small subset of aggressors is psychopathic (Hart & Hare, 1997), the positive relationship between most aggressors and higher SCR would be more pronounced. Lorber's results also suggested

that SCR may show a more reliable association with psychopathy than heart rate measures.

When focusing on aggression and violence in psychopathy, it is important to make some clarifications. Antisocial, aggressive, or violent behavior does not, by itself, indicate that the individual is a psychopath. As previously discussed, the CA feature has distinguished psychopathy from general antisocial disorder (Müller et al., 2003). Antisocial individuals commit different types of violent and aggressive acts. Blair (2001) argued that there are probably two distinct types of aggression, which are substantially different in nature and cause. Psychopathic individuals are typically instrumental aggressors. According to Blair, this meant that their aggressive behavior was premeditated to achieve personal gain, such as money. This type of aggression was described by Blair as cold and calculated and occurred in pursuit of a desired goal or object. It is important to differentiate this type of aggression from reactive aggression. Blair described reactive aggression as aggressive or violent behaviors that were a reaction to frustration, or to perceived threat. These have also been referred to as impulsive violent acts (Volavka, 1999). Passionate or 'heat of the moment' violence falls into this category. The violent acts of most aggressors typically fall into one category or the other of the two types of aggression (Volavka). Additionally, it has been shown that impulsive violence can be reduced with the use of the drug phenytoin, but it is not effective in reducing premeditated violence (Barratt, Stanford, Felthous, & Kent, 1997). Impulsive violence has also been found to be associated with deficits in serotonin in the brain and reduced monoamine oxidase A (see review by Volavka, 1999). This suggested that the different types of aggression are also biochemically different. Because of this, it is

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important to understand how psychopaths are classified. It is particularly important for physiological research since these two types of aggression appear to have different biochemistry. Categorizing participants only in terms of antisocial behavior combines these two types of aggression, which appear to be emotionally distinct.

It is probable that instrumental aggressors are able to tolerate their own antisocial behavior because they have reduced empathy or distress in response to others' pain and suffering. This clinical understanding has been supported by the findings that these individuals showed diminished or no SCR to images of distress (see review by Lorber, 2004; Levenston et al, 2000). The lack of distress may have allowed them to perpetrate crimes for their own benefit without having an aversive physiological reaction to their victims. Reactive aggressors, on the other hand, are probably highly emotional. They typically commit crimes of passion in response to frustration or perceived threat. It is important to distinguish these two types of aggressors as they are likely to be physiologically distinct as well.

Psychopathic Traits in the Normal Population

While the differences in emotionality for psychopathic individuals in the criminal population have become more clearly elucidated, less is known about psychopathic tendencies and their relationship to emotion in the normal population. Some studies have used the Self-Report Psychopathy scales to measure psychopathic characteristics in the normal population. These studies have indicated that this construct is meaningful at the subclinical level (Bare et al, 2004; Gordon et al., 2004; Williams & Paulhus, 2004; DeMatteo, Heilbrun, & Marczyk, 2006; etc.). This suggested that levels of psychopathy probably exist along a continuum. What has not yet fully elucidated is whether or not

physiological responses also vary along a continuum in relation to psychopathic

tendencies in the normal population.

It seems reasonable that some individuals with unemotional, callous,

manipulative, guiltless, deceitful tendencies do not end up in the correctional system.

Even in one of the earliest descriptions of psychopathy the idea of the "successful

psychopath" was suggested (Cleckley, 1964). The successful psychopath is an individual

who can operate effectively within society regardless of their emotional differences

(Cleckley). Any systematic differences between successful psychopaths and criminal

psychopaths warrant more study. Additional research may identify which variables are

important for successful functioning in society. Understanding how individuals high in

psychopathic characteristics process emotional information differently from individuals

low in psychopathic characteristics may be the first step in working towards treating

individuals with criminal psychopathy. This has been a particularly salient issue because

psychopathy has generally been considered to be untreatable. It has been shown that

criminal psychopaths were less likely to receive psychotherapeutic treatment, because

they were more often evaluated as unsuitable for it (Shine & Hobson, 2000). Failing to

receive a recommendation for transfer to a therapy wing in the prison was found to be

associated with the CA factor of the PCL-R (Shine & Hobson). The belief that

psychopaths are untreatable has been supported by findings that therapeutic treatment

was associated with violent reoffending for psychopaths (Rice et al., 1992). Viding

(2004) suggested that the insight-oriented approach of therapy increased psychopaths'

ability to manipulate. Perhaps, the emotion focused nature of therapy has been

ineffective for individuals who process emotion in a way altered from the norm. Change

in therapy can be driven both by negative and positive emotional experiences. Additionally, therapy provides relief from distressing emotional states due to the interpersonal relationship between the therapist and the client. Since psychopaths have shown emotional dysfunction it is in some ways unsurprising that a very emotion centered approach to positive behavioral change has historically been unsuccessful for these individuals. Insight into how these individuals experience emotion differently may lead to development of better, more focused, rehabilitation techniques for psychopaths. Perhaps more cognitively based programs might be developed, which require less emotional ability. In particular, it is hoped that comparison between the criminal and non-criminal populations will provide valuable understanding of this construct at a non-pathological level. Increased understanding of what factors help individuals who are physiologically similar to psychopaths have more adaptive functioning is likely to be useful.

Current Study

The aim of this study was to assess the relationship between psychopathic characteristics in the normal population and emotional reactivity as assessed by SCR. SCR was used to measure physiological reactivity in the sympathetic nervous system during presentation of selected International Affective Pictures System (IAPS) images (Lang, Bradley, & Cuthbert, 2005). Differences in SCR to images with threatening content versus images showing distress in others designed to evoke empathy were assessed. The Self-Report Psychopathy scale, 3rd Edition (SRP-III) was used to assess psychopathic tendencies (Paulhus et al., in press). The CA subscale was hypothesized to be associated with reduced SCR magnitude to affective images. A stronger negative

relationship was expected between level of CA and response to empathy images than between this factor and threat images. SCR latencies were also assessed.

Several hypotheses were tested. SCRs evoked by images with negative stimuli and their relationship to psychopathic tendencies in the normal population were assessed. In most studies images are grouped into positive, negative, and neutral groups. Different categories of negative images have typically have been assessed together. Because individuals with psychopathic tendencies are likely to have differing responses to threatening images (e.g. gun pointed at participant) than to images showing harm to others (e.g. mutilations) this study assessed them separately. SCRs to these two types of negatively images were examined for differences.

It was hypothesized that:

1. a negative relationship between SCR magnitude to emotionally negative images and psychopathic CA, as measured by the CA subscale of the SRP-III, in non-criminal individuals would be found,

2. there would be a positive relationship between SCR latency for negative images and the CA subscale,

3. there would be no relationship between neutral images and psychopathy scores.

4. the average SCR magnitude evoked by images showing harm to others would be more strongly negatively related to the CA subscale of psychopathy scores than the average SCR magnitude in response to images with personally threatening content.

Hypothesis one. It was hypothesized that there would be a negative correlation between SCR magnitude to emotionally negative images and psychopathic CA in non-

criminal individuals. Confirmation of this hypothesis would suggest an association between CA and reduced SCR magnitude in the normal population. This finding would suggest that psychopathy occurred along a continuum.

Hypothesis two. It was expected that there would be a positive relationship between SCR latency for negative images and the CA factor of psychopathy. This would indicate that individuals with the core feature of psychopathy respond more slowly to emotionally laden images. This would indicate that in addition to showing smaller responses to emotional stimuli individuals higher in CA were slower to respond to emotional stimuli and would support other researchers' findings that individuals with psychopathic tendencies were more inefficient at processing emotionally laden stimuli (Intrator et al., 1997).

Hypothesis three. There was expected to be no relationship between SCR in response to neutral images and psychopathy scores. This was expected because there should not have been an emotional response to these images for any of the participants. Previous findings of psychopathic individuals' responses to neutral stimuli have been mixed. A meta-analysis by Lorber (2004) indicated that there was an association between resting SCR and psychopathy; however he noted that across studies the effect was small. If this was the case, than individuals with greater psychopathic tendencies may show reduced responding to neutral stimuli compared to individuals who are low on psychopathic tendencies. Other studies, however, have shown that psychopathic individuals had a pattern of diminished SCR to both positive and negative stimuli in an emotion modulated startle paradigm, but had a slightly elevated SCR to neutral stimuli (Patrick, Bradley, & Lang, 1993). Studies that showed this pattern, however, typically

utilized the startle probe paradigm (e.g. Patrick et. al). Though the findings were

conflicted, the overall finding with psychopathic individuals was that their emotional

responding and processing was altered. Therefore, it was not expected that there would

be significant findings with non-emotional stimuli.

      Hypothesis four. Additionally, it was expected that average SCR magnitude

evoked by empathy images would be more strongly negatively related to the CA factor of

psychopathy than the average SCR magnitude in response to threat images. It was

expected that individuals higher on CA would still show a response, although diminished,

to personally threatening material. Support for this hypothesis would suggest the

"fearlessness" that Cleckley (1964) described may not be absolute and that lack of

empathy for others may be the more defining feature.

      Overview. Overall, this research study was expected to show that subclinical

psychopathy was a meaningful construct to study in the normal population. Confirmation

of these hypotheses was expected to indicate that psychopathy, particularly the CA factor,

existed along a continuum. Additionally, if individuals with higher CA scores had

greater SCR magnitudes to threat images than to empathy images this would indicate that

they do not necessarily show a lack of fear for their own well being. This would suggest

that lack of empathy rather than lack of fear may be more characteristic of psychopathy.

Furthermore if individuals with higher CA have longer SCR latencies for negative stimuli

than this would provide valuable information about how these individuals process

emotion. Examination of these emotional processing differences can be used to inform

rehabilitation of these individuals from a cognitive perspective, given their deficits may

be less amenable to more emotion focused psychotherapy.

Methods

Participants

The sample for this study was drawn from a non-criminal population. Participants were 141 students recruited from California State University, San Bernardino who were enrolled in at least one college psychology course. Due to computer failure one data file was lost leaving sample size of 140 for demographic and SRP-III scale analysis. For SCR, data for 11 participants were lost due to failure of physiological equipment. This left 129 participants for SCR magnitude. SCR latency measurements could not be calculated for participants who did not produce SCR amplitudes so the N for latency measurements was 91, 87, and 78 for empathy, threat, and neutral conditions, respectively. Incentive for this study was class extra credit. Only participants who were 18 or older were included. Individuals with uncorrected visual impairment were excluded, because some of the stimuli were visual. Individuals with severe hearing impairment were also excluded because startle probes occurred on some trials for use in a concurrent study.

Power Analysis

Lorber's (2004) meta-analysis was used to help determine appropriate power for this study. Lorber examined 95 studies to understand the relationship between psychophysiological factors and aggression, psychopathy, and conduct problems. Twenty-eight studies provided sufficient information about psychopathy and task related SCR to compute an overall effect size. A small effect size of -0.25 for the relationship between psychopathy and SCR was found, however, when only adult data was included

the effect size was larger, -0.43 (Lorber, 2004). Presumably this indicated the effect of more developed, stable psychopathic characteristics.

The current study used an adult non-criminal sample. Given that the sample was of adults, Lorber's (2004) effect size of -0.43 was used as an estimate to calculate a priori power. An estimated effect size of 0.40, with a power of 0.80 and an alpha of 0.05 was used to calculate the expected number of participants needed for a correlational design using G*power 3.1.0 program (Institut für Experimentelle Psychologie, Duesseldorf). According to Cohen (2001) a power of .80 is considered adequate. Because all of the hypotheses which predicted significant findings were directional the power was calculated as one-tailed with a significance level of 0.05. Approximately 37 participants were required. The actual number of participants with SCR data was 129, which gave an a priori power of 0.99 to find an effect size of 0.40.

Materials and Measures

The SRP-III, an adapted version of the PCL-R, was used to obtain a measure of psychopathic characteristics for each participant. Each participant was asked to indicate their level of agreement for how well each SRP-III item described them. The SRP-III contained a Likert scale from 1-5, with 1 indicating that the participant strongly disagreed and 5 indicating strong agreement. Item answers were collected with E-prime 2.0 program (Psychology Software Tools, Sharpsburg) and reverse coding of items requiring it was done prior to summing subscale, and total scale scores. Some example items were, "I purposely flatter people to get them on my side," and "People are too sensitive when I tell them the truth about themselves." As previously mentioned, the SRP-III has four subscales: IPM, CA, ELS, and CT. Each subscale can range from values of 16-80 and

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the total scale scores range from 64-320 (Paulhus et al., in press). The total scale

measures psychopathic characteristics as a whole, where as the subscales capture four

facets of the disorder, which are correlated. The primary subscale of interest for the

current study was the CA subscale which measures callous affect and lack of empathy,

which is thought to be the core feature of psychopathy. While the PCL-R is considered

the 'gold standard' in psychopathy research (Williams & Paulhus, 2004; Cooke et al.,

2001), the PCL-R must be administered in an interview style using trained clinicians and

requires review of participant's criminal record. The SRP-III was administered as it is

more efficient and more appropriate for a non-criminal population. With permission of

the first author, the SRP-III items were used in the following study (Paulhus, 2009).

Computerized versions of the Sexual Experiences Scale (SES) and the Toronto

Alexithymia Scale (TAS) were also administered as part of a concurrent study. The SES

measured unwanted sexual contact, and the Toronto Alexithymia Scale (TAS) measured

difficulty identifying emotions.

The first interval SCR to IAPS (Lang et al., 2005) images was the dependent

variable. This was measured as the largest SCR peak with an onset within 1-5 seconds of

stimulus presentation. Earlier and later SCRs were disregarded as not stimulus relevant

(similar to procedure from Zaidel et al., 1995). The majority of work done with SCR has

measured amplitude. In this study amplitudes were measured when an SCR occurred.

The amplitude measurement was the height of the wave created for the SCR. When no

SCR was produced for an experimental trial an SCR measurement of zero was used for

analysis. For each trial type both the height of the wave for each SCR and the scores of

zero when participants did not respond were averaged. SCR magnitude refers to this

average. In addition to the traditional measure of SCR magnitude, the SCR latency was evaluated. SCR latency, or the time between stimulus onset and SCR onset, was measured. For SCR magnitudes of zero there were no latency measurements. A Psylab Stand Alone Monitor (SAM; Contact Precision Instruments, Boston) was used to collect the SCRs with an SC5 constant 0.5 Volt data acquisition modual (Contact Precision Instruments, Boston). Psylab 8 (Contact Precision Instruments, Boston) was used to process and extract the SCR data. A square root transformation was performed in order to normalize the distribution of SCRs (Dawson et al., 2000).

Images from the IAPS (Lang et al., 2005) were used as stimuli. Photographs were chosen from the 384 available based on valence and category of content. Seven images with personally threatening content (e.g. gun pointed at participant, masked man, etc.; IAPS image numbers: 6230, 6244, 6250, 6260, 6300, 6370, 6510), 7 images depicting harm or distress of others that should evoke empathy (e.g. burn victim, person with gunshot wound, etc.; IAPS image numbers: 3010, 3060, 3071, 3215, 3216, 3220, 3440), and 7 neutral images (e.g. bird, pocket watch, etc.; IAPS image numbers: 1616, 1675, 5920, 7042; 7058; 6910; 7190) were used as target stimuli for this experiment. Positive, erotic, and negative interpersonal images were also shown as part of a concurrent study, but were not analyzed for the current study.

The valence ratings of the target images were examined using the IAPS norms (Lang et al., 2005) and means for selected stimuli were compared with t-tests using Microsoft Office Excel 2003 (Microsoft Corporation, Redmond). The mean valence ratings were 2.64 ($SD = 0.25$), 2.29 ($SD = 0.55$), and 5.33 ($SD = 0.16$) for threat, empathy and neutral images, respectively, measured on a scale from 1 to 8, with 1 being

very negative and 8 being very positive. Mean empathy and threat valence ratings did not significantly differ ($p = 0.15$, two-tailed). Mean valence for the neutral images was significantly more positive than the threat and empathy images ($p = 0.04$, one-tailed).

The mean arousal ratings for threat images was 6.64 ($SD = 0.53$) and for empathy images was 5.55 ($SD = 1.92$). Mean threat and empathy arousal ratings did not significantly differ ($p = 0.17$, two-tailed). Mean arousal rating for neutral images was 4.57 ($SD = 0.95$) which was significantly less arousing than the threat and empathy images ($M = 6.10$, $SD = 1.47$, $p < 0.001$, one-tailed).

Images were displayed on a 17" color monitor and participants were seated approximately 90 cm away. The vertical visual angle of the images was approximately 17.2° and the horizontal visual angle was 20.2°. The number of pixels varied slightly for each image, but the maximum number was 1024 x 768 pixels (Lang et al., 2005).

Procedure

An announcement advertising the experiment was placed on the California State University, San Bernardino research website. The announcement referred to the study as: Variations in Emotional and Interpersonal Behavior as a Function of Personality Type. The announcement encouraged individuals 18 years or older with adequate hearing and normal or corrected to normal vision to participate in the study.

All individuals who chose to participate signed up for an appointment time to come into the laboratory via an online system. Once in the laboratory they were given a consent form to sign (Appendix A) and the procedures were also explained verbally. The participants were reminded that they were free to discontinue the study at any time by simply informing the researcher.

Participants were then directed to a sink to wash their hands with warm soap and water. This was necessary because SCR is affected by skin cleanliness, dead skin, oil, and dirt (Dawson et al., 2000). This provided a control so that participants' skin had an equivalent level of cleanliness. Disposable Ag-AgCl electrodes were attached to the distal phalanges of the participants' non-dominant hand. This site was chosen because of the large number of sweat glands present there and the relative lack of calluses on the non-dominant hand (Dawson et al.). A pulse monitor was also attached to each participant's middle finger of their non-dominant hand in order to measure heart rate for a concurrent study. They were then seated in a chair in front of a computer screen positioned approximately 90 cm in front of the participant (Amrhein et al., 2004). Participants were told that images of varying emotional content would be presented some of which would likely be unpleasant. Participants were cautioned that they may be tempted to close their eyes, to look away, or turn away from the screen but to please refrain from doing so. Participants were asked to sit quietly without making any large movements and passively view all of the images presented. Participants were then asked if they understood what they were supposed to do and whether they had any questions.

After a 2 minute baseline period, a series of startle probes were administered for use in a concurrent study. Following this, the images were presented in a randomized order for 8 seconds each (Amrhein et al., 2004). Additionally, a 20-second blank light grey screen was presented between each image to allow for physiological responses to return to baseline between images. On selected trials early and late startles were also administered; however, these trials were excluded from the current analysis. For the last

segment of the experiment a prepulse inhibition startle paradigm was administered. These trials were included for use in separate studies.

Demographic information (i.e. age, gender, ethnicity, and handedness) was collected. Participants were administered a computerized version of the SRP-III items via the E-prime 2.0 program (Psychology Software Tools, Sharpsburg). Participants also completed the Toronto Alexithymia Scale (TAS), and the Sexual Experiences Scale (SES) as part of the computerized questionnaire for use in other concurrent studies.

Statistical analyses were performed using Microsoft Office Excel 2003 (Microsoft Corporation, Redmond) and the Statistical Package for the Social Sciences Version 17.0 (SPSS; SPSS Inc., Chicago).

Design and Plan for Statistical Analysis

This experiment was a within-subjects experimental design with all participants exposed to all types of images. Bivariate correlations were used to assess relationships between variables. The predictor variables for analyses were participants' scores on the CA subscale of the SRP-III and category of negative image (threat, empathy, neutral). The outcome variables were the mean SCR magnitude and latency.

As indicated in hypothesis one, a negative relationship between CA scores and SCR magnitude evoked by both threat and empathy images was expected. A significant negative correlation between SCR magnitude to threat and empathy images and scores on the CA subscale would support this hypothesis. Furthermore, this hypothesis would be supported by a main effect of CA scores for the one-way repeated measures ANCOVA testing differences in threat versus empathy images with CA scores as a covariate.

For hypothesis two it was expected that CA scores would be associated with slower physiological response to negatively emotionally laden content. A positive correlation between CA scores and SCR latency for both types of negative images was expected.

SCR magnitudes and latency times for neutral stimuli were not expected to have any significant correlation with CA scores. Bivariate correlations were performed to test hypothesis three.

To test hypothesis four the mean SCR magnitude to empathy images was compared to threat images for varying levels of CA. It was expected that participants low on CA would react equally to all negative images whereas those high on CA would show depressed responses overall, but would respond more similarly to threat images and respond less to empathy images. A significant interaction between the CA scores and SCR magnitude to threat versus empathy evoking images was expected. If individuals high on self-reported CA show diminished response to all negative images, but more so to empathy than to threat this would support hypothesis four.

In order to assess hypothesis four a one-way repeated measures ANCOVA examining category of image (threat, empathy) with CA scores as a continuous covariate was run. The response to neutral images was not included in the ANCOVA model because it is expected that there will be either no relationship or a very small relationship between CA scores and SCR to neutral images. An interaction between image category and CA scores was expected.

Demographics

A frequency analysis was performed on the demographic variables: gender, ethnicity, age, and handedness. In terms of education, all participants were currently enrolled in at least one college psychology course for which they received credit for study participation. The demographic information is presented in Table 1. Based on self-report the participants were predominantly Hispanic (49.6%), overwhelmingly female (89.4%) and mostly right-handed (94.3%). The average age of the participants was 25.2 ($SD =$ 8.2), with 22 years being the most common age of participants ($Mode = 22$).

Table 1

Demographic Characteristics of the Sample

Sample Characteristics	Percentage (*N*)	Mean (*SD*)
Gender		
Female	89.4% (125)	
Male	10.6% (15)	
Age in years		25.2 (8.2)
Ethnicity		
Hispanic/Latino-a	49.6% (69)	
European Origin/Caucasian	23.4% (33)	
African Origin	13.5% (19)	
Asian Origin	6.4% (9)	
Bi-racial	4.3% (6)	
Other	2.8% (4)	
Handedness		
Right	94.3% (132)	
Left	5.7% (8)	

Self-Report Psychopathy

The distributions of participants' summed scores for each of the four subscales of the SRP-III and the total scale score were analyzed using SPSS 17.0 to see if the assumptions of normality were met. Z-scores for skew and kurtosis were calculated to determine if any of the scales varied significantly from what would be expected with a normal distribution (for statistical formulas see Field, 2005, p. 72). Using two-tailed tests of significance at $p = 0.05$ the CA, ELS, IPM, and SRP-III total scores were all found to be normally distributed in terms of skew ($z_{CA} = 1.28$, $p = 0.20$; $z_{ELS} = 0.87$, $p = 0.38$; $z_{IPM} = 0.48$, $p = 0.63$; $z_{TOT} = 1.27$, $p = 0.20$) and in terms of kurtosis ($z_{CA} = -0.90$, $p = 0.37$; $z_{ELS} = 0.01$, $p = 0.99$; $z_{IPM} = 0.95$, $p = 0.34$; $z_{TOT} = 1.07$, $p = 0.28$). The CT subscale was found to be significantly positively skewed ($z_{CT} = 4.93$, $p < 0.0001$) and leptokurtic ($z_{CT} = 2.30$, $p = 0.01$). This suggested that more individuals scored at the lower end of this scale than would be expected in a normal distribution with very few individuals reporting higher levels of criminal tendencies. Because this scale was not used in further analyses, other than correlations between SRP-III scales, it was not transformed. The SRP-III total scale score can range from 64 to 320; in this sample the total scale scores ranged from 91 to 195. The mean score for the SRP-III total for this sample was 136.13 ($SD = 22.82$). The present findings were compared with the norms for females since the current study was 89.4% female. This mean is consistent with the scale norms for undergraduate females ($M = 139.6$, $SD = 25.4$; Paulhus et al., in press). The subscale scores can range from 16-80. The means for the subscales were also similar to that of the scale norms for females. The mean scores for the subscales were 37.14 ($SD = 8.39$), 34.15 ($SD = 6.54$), 40.20 ($SD = 7.79$), and 24.64 ($SD = 6.41$), for IPM, CA, ELS, and CT, respectively. By

Table 2

Descriptive Statistics for SRP-III Scores for Total Sample

SRP-III Scales	Mean (*SD*)	Range	Skew (*SE*)	Kurtosis (*SE*)
Subscales				
IPM	37.14 (8.39)	18-58	0.10 (0.21)	-0.39 (0.41)
CA	34.15 (6.54)	20-52	0.26 (0.21)	-0.37 (0.41)
ELS	40.20 (7.79)	22-64	0.18 (0.21)	0.01 (0.41)
CT	24.64 (6.41)	16-48	1.00 (0.21)	0.94 (0.41)
SRP-III Total	136.13 (22.82)	91-195	0.26 (0.21)	-0.43 (0.41)

comparison, the mean scores for the norms were as follows: 41.0 (*SD* = 8.9), 4.3 (*SD* = 8.0), 41.4 (*SD* = 8.2), and 22.8 (*SD* = 8.3), IPM, CA, ELS, and CT, respectively. The slightly reduced variability in scores for the current study may be due to the slightly smaller sample size (*N* = 140) as compared to the Paulhus and colleagues norms (*N* = 194). (see Table 2)

In order to compare the current sample to Paulhus et al.'s (in press) norms the current sample was analyzed separately for males and females. SRP-III scores separated by gender are listed in Table 3. Two tailed t-tests (*p* < 0.05), with variances pooled based on sample size, were run to determine if there were any significant differences between Paulhus et al.'s Canadian Caucasian sample and the current American sample which was almost fifty percent Hispanic. No differences were found for any SPR-III scores for males (t_{CRIT} =1.99, $t(71)_{IPM}$ = -1.42, n.s.; $t(71)_{CA}$ = -1.63, n.s.; $t(71)_{ELS}$ = -0.29, n.s.; $t(71)_{CT}$ = 0.23, n.s.; $t(71)_{TOT}$ = -0.96, n.s.). Differences were found for females for the

Table 3

Descriptive Statistics for SRP-III Scores Separated by Gender

SRP-III Scales	Females Mean (*SD*)	Males Mean (*SD*)
Subscales		
IPM	36.39 (8.03)	43.33 (9.04)
CA	33.30 (6.08)	41.20 (6.07)
ELS	39.54 (7.35)	45.73 (9.35)
CT	24.30 (6.24)	27.47 (7.37)
SRP-III Total	133.54 (21.28)	157.73 (24.44)

IPM and SRP total scales (t_{CRIT} = 1.96, $t(259)_{IPM}$ = -4.38, $p < 0.0001$; $t(259)_{TOT}$ = -2.08, p=0.04) indicating that females in the current sample obtained lower means scores than Paulhus et al.'s sample for these two scales. A marginally reliable difference was found for the ELS scale ($t(259)_{ELS}$ = -1.93, p = 0.054) suggesting that participants in the current sample may have obtained lower scores than Paulhus et al.'s sample on this scale. There were no significant differences for women on the CA and CT scales ($t(259)_{CA}$ = -1.12, n.s.; $t(259)_{CT}$ = 1.64, n.s.).

The reliability of the four SRP-III subscales was assessed using Cronbach's alpha. The Cronbach's alpha for the CA, IPM, ELS, and CT were 0.65, 0.79, 0.69, and 0.61, respectively. The overall SRP-III Cronbach alpha was 0.87. Bivariate correlations were run between all of the subscales and the full scale score and are reported in Table 4. As would be expected, the correlations suggested that the subscales are significantly related to each other and to the overall SRP-III total scale score.

Table 4

Correlations between Subscales and Full Scale Score of the SRP-III

Scale	Callous Affect	Criminal Tendencies	Erratic Lifestyle	Interpersonal Manipulation	SRP-III Total
Callous Affect	1.0	**0.39*****	**0.54*****	**0.60*****	**0.80*****
Criminal Tendencies		1.0	**0.45*****	**0.32*****	**0.67*****
Erratic Lifestyle			1.0	**0.55*****	**0.83*****
Interpersonal Manipulation				1.0	**0.82*****
SRP-III Total Score					1.0

* ** indicates significance at p≤ 0.01, two-tailed

Skin Conductance Response

Both magnitude and latency measurements were extracted for each participant for each stimulus for which an SCR occurred. It is standard practice to use a square root transformation on SCR magnitude measurements to correct for skew and this was done (Dawson et al., 2000). The average SCR latency and transformed magnitude was calculated for neutral, threat, and empathy stimuli for each participant. The mean transformed SCR magnitude for the neutral images (M = 0.33 $\sqrt{\mu S}$, SD = 0.53 $\sqrt{\mu S}$) was similar to the mean transformed SCR magnitude for both empathy (M = 0.30 $\sqrt{\mu S}$, SD = 0.44 $\sqrt{\mu S}$) and threat images (M = 0.33 $\sqrt{\mu S}$, SD = 0.37 $\sqrt{\mu S}$). The mean SCR latencies for neutral images (M = 2.47 s, SD = 0.63 s) were also similar to the mean SCR latencies for empathy (M = 2.43 s, SD = 0.82 s) and threat images (M = 2.45 s, SD = 0.75 s). The

latency measurements were within the expected range as values from 1 – 3 seconds are considered typical (Dawson et al.). Bivariate correlations between each of these SCR variables and the psychopathy scores of interest were calculated using SPSS (see Table 5).

Table 5

Correlations between SRP-III and SCR Variables

	Magnitude			Latency			SRP-III		
	Threat	Empathy	Neutral	Threat	Empathy	Neutral	CA	IPM	Total
Magnitude	--								
Threat	1.0	0.57***	0.53***	-0.21**	-0.18	-0.09	-0.03	0.03	0.01
Empathy		1.0	0.80***	-0.19	-0.13	0.05	-0.15*	-0.02	-0.11
Neutral			1.0	-0.11	-0.06	-0.06	-0.19**	-0.08	-0.15
Latency			--						
Threat				1.0	0.29**	0.15	0.24**	0.22**	0.23**
Empathy					1.0	-0.05	0.21**	0.14	0.19
Neutral						1.0	0.06	0.05	0.18
SRP-III						--			
CA							1.0	0.60***	0.80***
IPM								1.0	0.82***
Total									1.0

* indicates significance at p≤ 0.05, one-tailed, only noted for correlations relevant to directional hypotheses
**indicates significance at p≤ 0.05, two-tailed
*** indicates significance at p≤ 0.01, two-tailed

As can be seen in Table 5, the SCR magnitudes to all categories of image stimuli (threat, empathy, and neutral) were correlated to each other. This suggested that each participant's magnitude of response to each stimulus category was related. Essentially participants who produced large responses were likely to do so for all image categories and participants who produced small responses were likely to do so for all categories of images. The values of the correlations between the SCR magnitudes ranged from r values of 0.53 to 0.80. These numbers are fairly typical, test-retest stability of for SCR usually ranges from 0.50 to 0.70 (Dawson et al., 2000).

Additionally, a negative correlation was seen between average SCR magnitude to threat stimuli and average latency to threat stimuli ($r = -0.21$, $p = 0.05$, two-tailed). This suggested that the smaller the response to a threat stimulus the longer the response is delayed. Furthermore, there was a positive correlation between threat and empathy latencies ($r = 0.29$, $p = 0.01$, two-tailed). This indicated that individuals who were slow to respond physiologically to threat images were also slow to respond to empathy images. Likewise, individuals who had a very quick physiological response to threat images were also more likely to have a very quick physiological response to empathy images.

Hypothesis one was partially supported by the above findings. There was no relationship between SCR magnitude for threat ($r = -0.03$, $p = 0.36$, one-tailed) images and CA. However, the expected negative association between CA and SCR magnitude for empathy ($r = -0.15$, $p = 0.04$, one-tailed) was found. There was also no association between the SRP-III total scores and SCR magnitude for either negative image category (see Table 5). This indicated that CA, but not overall SRP-III scores were negatively correlated to SCR magnitude for empathy images. This suggested that the CA factor of

psychopathy was related to physiological responses more than the overall construct of psychopathy, which included the antisocial behavior factor.

Supporting hypothesis two, individuals who reported higher levels of CA showed significantly longer latencies to empathy ($r = 0.21$, $p = 0.02$, one-tailed, see Figure 1) and to threat ($r = 0.24$, $p = 0.01$, one-tailed, see Figure 2) images than individuals who reported lower levels of CA. This suggested that individuals with higher levels of CA took longer to respond to negative images; this relationship was not seen with neutral images ($r = 0.06$, $p = 0.63$).

A positive relationship was found between SRP-III total scores and SCR latency to threat ($r = 0.23$, $p = 0.03$, two-tailed), but was only marginally reliable for empathy ($r = 0.19$, $p = 0.08$, two-tailed). There was also a positive relationship between IPM and latency to threat ($r = 0.22$, $p = 0.04$, two-tailed) but not to empathy ($r = 0.14$, $p = 0.19$, two-tailed). This suggested that for individuals with higher levels of psychopathy and interpersonal manipulation took longer to respond to threatening stimuli.

Hypothesis three was partially supported. As expected, there was not a significant relationship between SCR magnitude or latency to neutral images and overall SRP-III scores partially supporting hypothesis three. There was also no relationship between IPM and magnitude or latency to neutral images. There was, however, a significant relationship between SCR magnitude to neutral images and the CA subscale ($r = -0.19$, $p = 0.03$, two-tailed). This suggested that individuals who scored higher on CA showed smaller responses to neutral images as compared to individuals who scored lower on CA. This suggested that individuals who scored higher on CA found the neutral images less arousing than individuals who scored lower on CA.
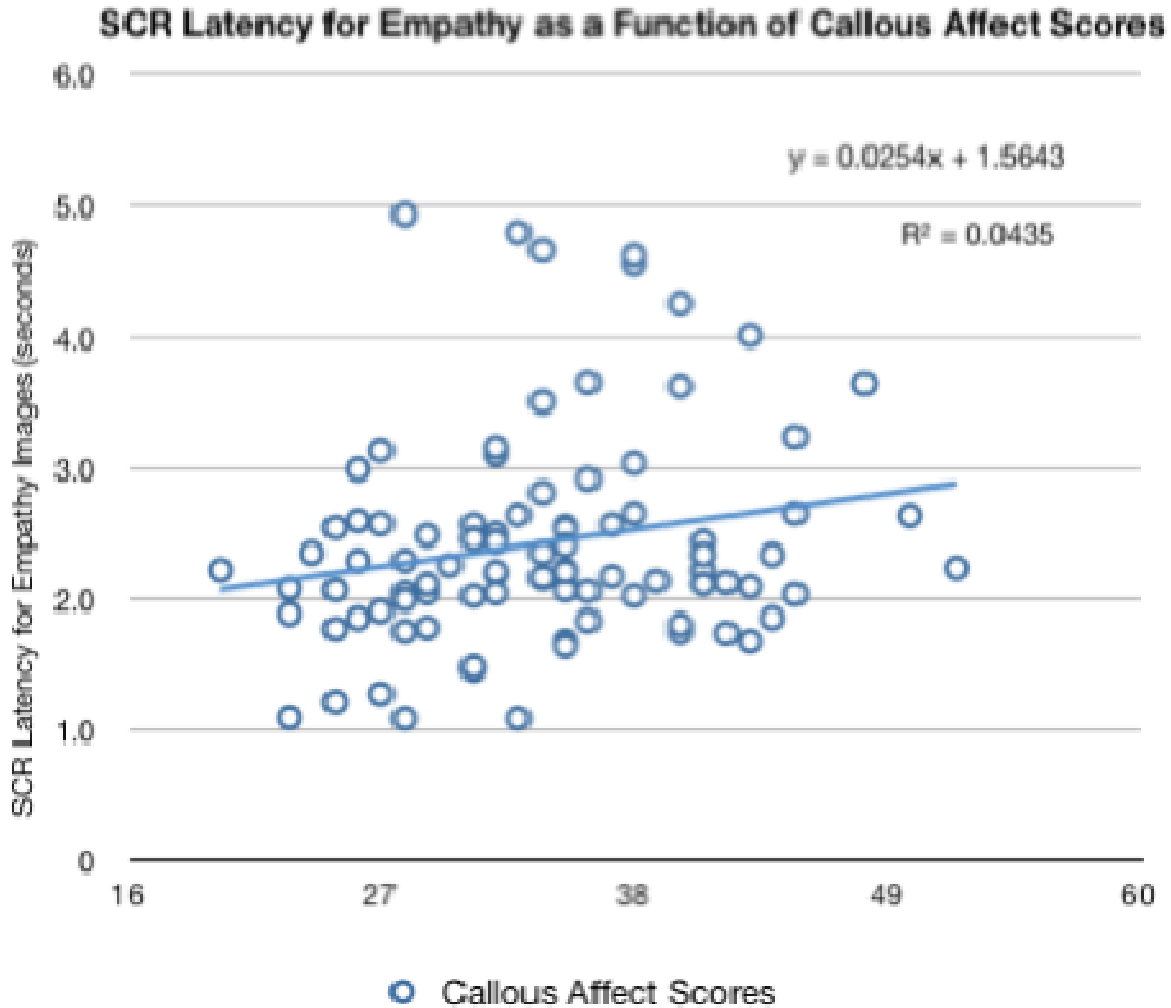
SCR Latency for Empathy as a Function of Callous Affect Scores

$y = 0.0254x + 1.5643$

$R^2 = 0.0435$

Figure 1. SCR Latency (s) for empathy images as a function of CA scores. Participants scoring lower on the CA subscale showed shorter SCR latencies to empathy images. Participants higher on the CA subscale showed longer SCR latencies to empathy images.

Latency measurements could only be calculated for participants who produced SCR

magnitudes. In order to ensure that the participants who were not analyzed were not

significantly different from those who were analyzed these two groups were compared on

the SRP-III scale and subscales for both responses to empathy and to threat images.

Independent samples t-tests with pooled variances were computed comparing participants

who produced measurable latencies and those who did not. No differences were found
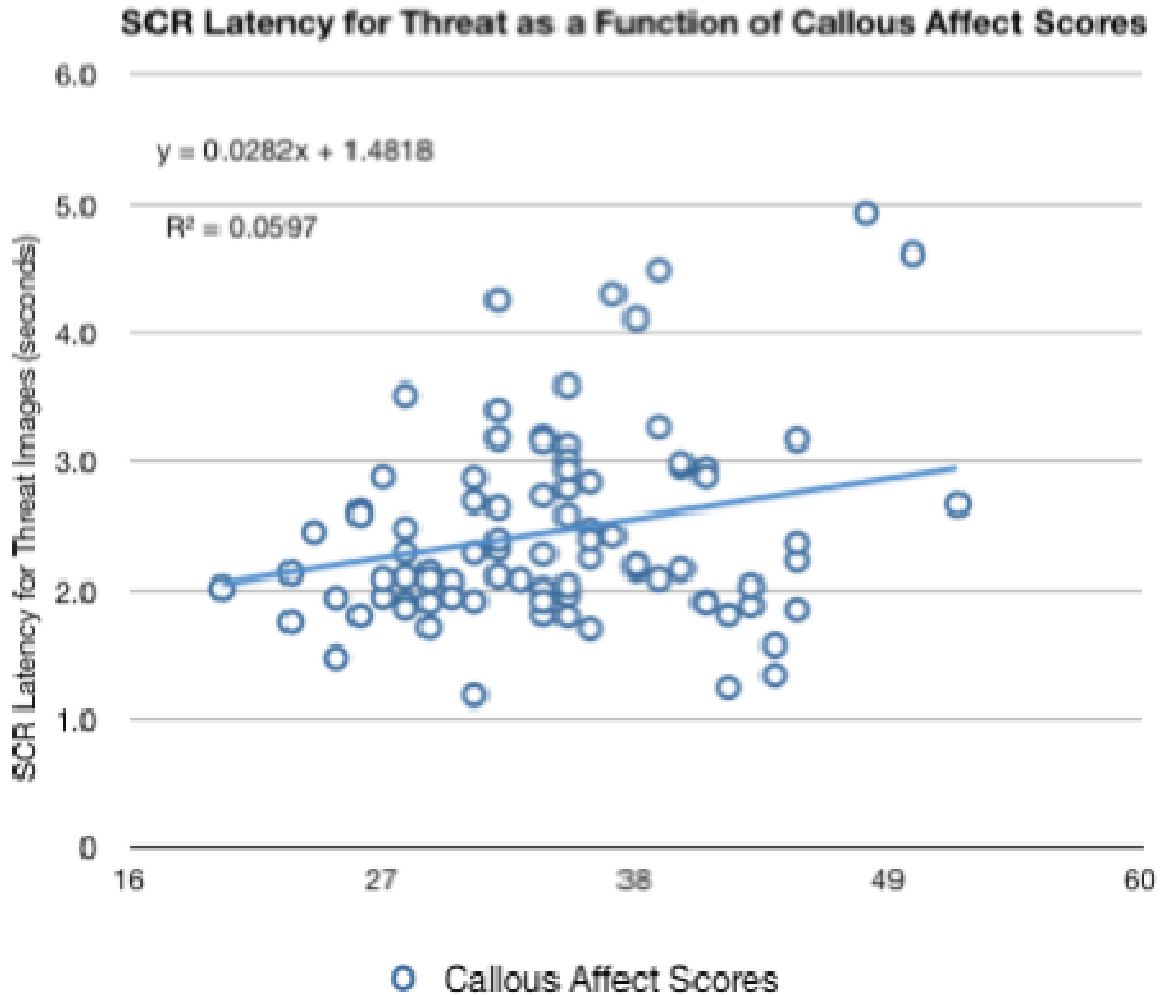
SCR Latency for Threat as a Function of Callous Affect Scores

$y = 0.0282x + 1.4818$

$R^2 = 0.0597$

○ Callous Affect Scores

Figure 2. SCR Latency (s) for threat images as a function of CA scores. Participants lower on the CA showed shorter SCR latencies to threat images. Participants higher on CA showed longer SCR latencies to threat images.

for any SPR-III scores between those who produced responses to empathy images versus those who did not ($t_{CRIT} = 1.96$, $t(138)_{IPM} = -1.01$, n.s.; $t(138)_{CA} = -0.41$, n.s.; $t(138)_{ELS} = -0.14$, n.s.; $t(138)_{CT} = -0.91$, n.s.; $t(138)_{TOT} = -0.08$, n.s.). Furthermore no differences were found for any SPR-III scores between those who produced responses to threat images versus those who did not ($t_{CRIT} = 1.96$, $t(138)_{IPM} = 1.57$, n.s.; $t(138)_{CA} = 0.85$, n.s.; $t(138)_{ELS} = 1.11$, n.s.; $t(138)_{CT} = -0.079$, n.s.; $t(138)_{TOT} = 1.18$, n.s.).

A one-way repeated measures ANCOVA was performed on SCR magnitude for image category (threat versus empathy) with CA as a covariate. The pattern of results suggested that individuals with higher scores for CA had decreased SCR magnitude for all negative images compared to individuals with lower scores on CA. However, this between subjects main effect of CA for SCR magnitude did not reach significance ($F(1, 127) = 1.47$, $p = 0.11$, one-tailed). This did not support hypothesis one. Hypothesis four was somewhat supported by a marginally reliable interaction which was found between category of image (empathy versus threat) and level of CA ($F(1, 127) = 2.44$, $p = 0.06$, one-tailed). The effect size of this finding was small ($r = 0.14$). If this was a reliable effect, then the power of this study to detect an effect this small was 0.34. This indicated that there may have been insufficient power to detect an interaction effect this small. In order to visualize the interaction, participants were dichotomized into low and high psychopathy groups (see Figure 3).

Participants who were higher on CA showed larger magnitudes to images chosen to elicit threat as compared to those designed to be evoke empathy. Participants lower on CA showed greater SCR magnitudes to empathy images as compared to threat images. Magnitude of response to threat for both groups was more similar than response to empathy (see Figure 3).

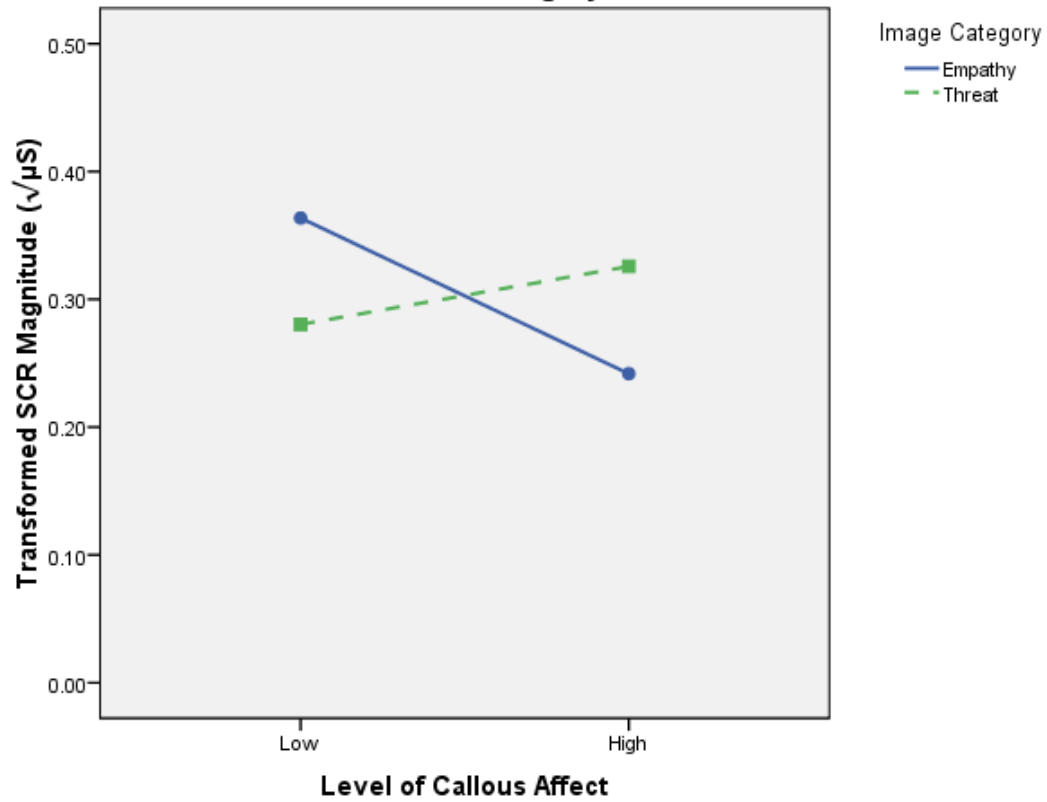Transformed SCR Magnitude as a Function of Callous Affect and Image Category

Figure 3. Transformed SCR magnitude as a function of CA and image category. Participants low on the CA showed greater SCR magnitude to empathy images as compared to threat images. Participants high on CA showed larger SCR magnitude to threat images as compared to empathy images.

Discussion

Psychopathy and Skin Conductance Response

Supporting hypotheses it was found that SCR latencies to threat and empathy images were reliably longer for individuals who reported greater CA. This suggested that this dimension of subclinical psychopathy is related to delayed SCR to negative images. Importantly, this suggested that it takes individuals with higher levels of CA take longer to generate an emotional response to negative images of both threatening and empathy inducing content.

When the SRP-III total scale was examined with regards to latency it revealed that latency to threat images was longer for individuals reporting higher levels of overall psychopathy ($r = 0.23$, $p = 0.03$, two-tailed), but latency for empathy images was only marginally reliable ($r = 0.19$, $p = 0.08$, two-tailed). Individuals higher in psychopathic tendencies were more likely to have delayed SCR to threat. This suggested that they received physiologic feedback that indicated danger less quickly than individuals who were less psychopathic. Moreover, the more CA reported the more likely the individual was to have a delayed response to threat and empathy stimuli. Taken together with prior research this suggested that SCRs are not only diminished for negative emotional stimuli in individuals with higher levels of psychopathic tendencies (Lorber, 2004), but they are also delayed.

The current study's results are interesting in light of research by Sutton and colleagues (2002) with female psychopathic prisoners using emotion potentiated startle. They found that low anxiety psychopaths showed diminished startle during unpleasant images when probes were presented 2.0 seconds after stimulus onset. When startle

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probes were presented at 4.5 seconds, low anxiety psychopaths showed normal emotion

potentiated startle reflex. Taken with the latency findings in the current study, this

suggested low anxiety psychopaths did not have sufficient time to process to the emotion,

preventing the negative stimuli from affecting the early startle. When they were given

more time to process the negative emotion it affected startle. The additional time

appeared to be enough for them to process the emotion such that it augmented startle

similar to non-psychopaths and high anxiety psychopaths. This was consistent with the

current study, also done with primarily females, which suggested for both empathy and

threat images individuals on the higher end of the CA scores took closer to 2.5 to 3.0

seconds to respond to negative emotion (see Figures 1 & 2). The current study results

also supported Levenston and colleagues' (2000) finding with male prisoners, that

psychopathy is associated with delayed emotional processing.

Furthermore, Levenston and colleagues (2000) found that at later probe times

startle was inhibited for empathy images and was weak for threat images. The current

study found that delayed emotional processing for threat images was associated with CA,

IPM, and overall psychopathy scores. The delayed emotional processing for empathy

images, however, was uniquely associated with CA scores.

These results were very interesting in light of learning. Research has suggested

that psychopathic individuals are impaired in emotional learning and are less likely to

learn from punishment (Mitchell et al., 2002; Birbaumer et al., 2005; etc.). This lack of

learning from punishment has been verified by functional magnetic resonance imaging

and SCR (Birbaumer). A heightened physiological state of arousal can be interpreted as

either positive or negative in valence. In the presence of positive environmental stimuli

heightened arousal may be interpreted positively (Schachter & Singer, 1962). However, in the presence of a negative stimulus a heighten state of arousal may be perceived by the organism as negative (Schachter & Singer). Because of this, physiological feedback from the body can be interpreted as an aversive stimulus that helps individuals learn how to avoid environmental threats (Damasio, 1994). Several things are likely to determine the effectiveness of the organism's physiological feedback as a learning tool for future situations. One element is the magnitude of the response to threat. If the threatening stimulus creates a smaller less aversive physiological response, then this is likely to reduce learning in situations where this physiological "punishment" would likely cause changes in behavior for an individual that responded with a normal level of physiological discomfort. As can be seen from the current study, the time between the onset of the threatening stimulus and the response for individuals higher in psychopathic tendencies takes longer than individuals lower in psychopathic tendencies. Learning theory suggests that the quicker the feedback, or the more chronologically linked to stimuli are the better the organism is able to associate the two. If the aversive physiological state in response to threat is delayed, this, in addition to the reduced magnitude of the response, may reduce the association between the physiological state and the threatening stimulus causing more impairment in learning from punishment. Punishment has been shown to be one of the least effective methods of altering behavior. Due to its already limited effectiveness even small hindrances to learning may exacerbate overall dysfunction for these individuals.

The SPECT findings from the study by Intrator and colleagues (1997) showed that individuals with psychopathy devoted more resources to processing emotional

content. This was found with psychopaths in an inpatient substance abuse program. The current study furthered Intrator and colleagues by showing that individuals high in psychopathic CA also took *longer* to process emotion. It has also furthered the work of Sutton et al. (2002) and Levenston et al. (2000) by showing delayed emotional processing with a non-criminal population. The delayed emotional response for non-criminals with psychopathic CA found in this study has advanced the understanding of emotional processing anomalies for these individuals.

Another unique characteristic of the current study was that the delayed emotional processing was shown without startle. Because of this, it is likely that a purer measure of empathy was obtained. Startle probes introduce some element of fear into each trial. In the current study the findings were shown with passive viewing.

Callous Affect and Skin Conductance Response Magnitude to Threat versus Empathy

The interaction between CA scores and SCR to threat versus empathy found in this study was marginally reliable. The potential implication of this result has been discussed here and awaits replication from future studies. The interaction suggested that individuals with higher levels of CA responded more strongly to threat images than to empathy images. Individuals with lower levels of CA responded more strongly to empathy images than to threat images. This suggested that individuals who strongly endorsed statements such as "Most people are wimps," "I like to see fist fights," and "I never cry at movies" had stronger emotional reactions when threatened than when experiencing empathy. Interestingly, Cleckley's (1964) idea of "fearlessness" was not fully supported by these results.

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In contrast, individuals who disagreed with the previous statements, but did strongly endorsed statements such as, "My friends would say that I am a warm person," "It tortures me to see an injured animal" and "I feel sorry when I see a homeless person" also showed physiology consistent with these statements. Individuals reporting lower levels of CA showed stronger responses to empathy inducing content than to personally threatening content. This indicated it was more distressing for these individuals to see others in pain, such as mutilated bodies, than it was to see threatening content, such as guns pointed at the viewer. It is interesting to see that these individuals' self-report of their level of empathy was consistent with their physiological responding.

The results of the current study are in line with the results from Levenston and colleagues (2000), which compared images of threatening content to those with content of harm to other individuals. Levenston and colleagues' study found that startle responses during empathy images (e.g. mutilations) were inhibited for psychopathic prisoners, but that weak startle responses occurred during threat images (e.g. weapons aimed at the viewer). The marginally reliable findings in the current study replicate these findings in a non-criminal population without use of the emotion startle paradigm.

Scale Reliability

When developing the SRP-III, Williams, Paulhus, and Hare (2007) reported a total scale reliability of 0.88 for what they called the SRP-E. This was very similar to the Cronbach alpha reliability found in the current study of 0.87. Williams and colleagues found subscale reliabilities that ranged from alpha values of 0.67 to 0.91. The current study found slightly lower reliabilities ranging from Cronbach alpha values of 0.61 to 0.79. The alpha reliabilities reported in the SRP-III manual for the subscales were 0.81,

0.79, 0.74, and 0.82 for IPM, CA, ELS, and CT respectively (Paulhus et al., in press). Paulhus and colleagues reported an overall SRP-III scale alpha of 0.81. In summary, compared to these other studies the current sample showed comparable but slightly lower reliabilities for subscale scores and a comparable if not slightly higher reliability for the SRP-III total scale.

It is possible that the diminished reliability in this sample is due to the large proportion of women in the study. Williams and colleagues (2007) reported that there were differences in men and women in terms of total SRP-E scores; however, there was no apparent difference in factor structure. Additionally, the sample for the current study was comprised of different ethnic makeup than the study by Williams and colleagues. They had a sample that was primarily European (43.1%) and East Asian (38.0%), whereas the current study was primarily Hispanic (49.6%) and European (23.4%). They found that their East Asian participants had a significantly different factor structure than the rest of their participants. This further suggested that cultural factors may be relevant for measuring psychopathy.

The computer based questionnaire medium used in this study may have affected the way participants responded to the items. In a paper and pencil format, participants are able to review previous answers while answering items. This may allow them to be more consistent in their responding. In the computerized version participants were given a chance to return to the prior questionnaire item if they wanted to change their answers, but they were not given a chance to go back more than one item to change answers. Furthermore, because the questionnaire was given at the end of the study fatigue may have affected the reliability of responses. Additionally, Williams and colleagues (2007)

and Paulhus and colleagues (in press) had larger sample sizes ($N = 274$, $N = 194$, respectively) than the current study ($N = 140$) which may have affected the scale reliability as smaller samples are more vulnerable to the effects of outliers.

Furthermore, Williams and colleagues (2007) made strong arguments for the utility of the CT scale in the normal population. However, in the current study this scale was not found to have a normal distribution. This finding could have been due to many different factors. The CT scale distribution may have been affected by gender differences in criminal behavior. The large proportion of women may explain why the scale was not normally distributed, because women are less likely to report and/or engage in criminal behavior. Additionally, although precautions were taken to ensure that the participants felt comfortable responding honestly to each questionnaire item, they may have underreported their criminal activity leading to a less than normal distribution of this scale. This in turn may have affected the CT subscale alpha reliability.

Furthermore, when compared to Paulhus et al.'s (in press) norms no differences in mean subscale or total scale scores on the SRP-III were found for males in the current study. This suggested that this study's sample of males was similar to Paulhus and colleagues norms. When comparing the women all of the scales means were found to be similar except for the IPM scale and the overall SRP-III total scale. These findings suggest that the women in the current study reported slightly less interpersonal manipulation and slightly less overall psychopathic characteristics than Paulhus and colleagues sample. This difference was unexpected and deserves follow up to determine what differences between the current study and Paulhus et al.'s norms may account for this difference.

Subscale Intercorrelations

All of the SRP-III subscales and the total scale were found to be significantly positively correlated. Based on the size of the correlations, the CT subscale was the least related to the other psychopathy subscales as well as the total scale score. This indicated that criminal behavior (1) was as a poorer predictor than the other subscales of overall psychopathic characteristics (2) was less related the callous affect, interpersonal manipulation, and erratic life style dimensions of psychopathy (3) may arise in many types of individuals, not just those who have diminished emotional responding. It should also be noted that the non-normal distribution of the CT subscale may have affected its correlation to the other scales.

Overview

Overall, this study's results suggested that physiological research on psychopathy in the normal population is a useful area for further research. Even at a subclinical level, individuals with psychopathic characteristics showed meaningful differences in physiology.

These findings also suggested that the CA subscale of the SRP-III is a meaningful self-report measure for investigating differences in physiology in the normal population. Of particular interest, was the implication of the latency results, which suggested that even at a subclinical level, individuals with psychopathic characteristics take longer than those without such characteristics to respond physiologically to negative images. The interpretation of these results was that as these individuals required more time to emotionally process threatening and empathy evoking stimuli. This delay in processing

is an interesting area for future investigation. Particularly interesting, would be whether the size of the delay seen is sufficient to inhibit learning from emotional stimuli.

Results of the current study also suggested, with a marginally reliable finding, that non-criminal individuals with higher levels of CA had stronger fear responses than empathy responses. Individuals lower on CA had stronger empathy responses than fear responses.

The CT subscale of the SRP-III may have been more subject to underreporting issues as evidenced by its non-normal distribution. The CT subscale may have been affected by the larger number of women in this sample. Forth, Brown, Hart, and Hare (1996) found a marginally reliable ($p = 0.08$) effect which indicated that male university students might be more likely to self-report contact with the criminal justice system than female students. Additionally, they found correlations between level of psychopathy and nonviolent antisocial behavior for both women ($r = 0.43$, $p < 0.001$, one-tailed) and men ($r = 0.49$, $p < 0.001$, one-tailed). However, they found a correlation between psychopathy and violent antisocial behavior for men ($r = 0.40$, $p < 0.001$, one-tailed), but not for women ($r = 0.22$, n.s.). This potential gender issue may have affected the distribution of the CT scale and merits further study.

Limitations and Areas for Future Study

Replication of this study with a greater variety of stimuli would be useful to verify the results were specific to emotional processing. The IAPS images evoked emotion through visual means. Other methods of evoking emotion such as through guided imagery or auditory stimuli would be useful replications. For example, would SCR magnitude for auditory threat stimuli (e.g. hissing snake, barking dog, person yelling

aggressively) be differentiated from auditory empathy stimuli (e.g. baby crying, dog yelping in pain, person gasping fearfully) based on CA scores? Future studies of this sort would help determine if emotional processing produced the effects of the current study.

Furthermore, the difference between empathy and threat images based on levels of CA was only a marginally reliable effect. Examination of the effect size suggested that, if this result turns out to be meaningful and non-spurious, then the size of the effect likely required a larger number of participants in order to verify it. If future studies verify these finding, this has interesting implications for clinical treatment. The current study results suggested that while individuals higher in CA were impaired in responding with empathy they show more normal responding to threat. If they are able to process emotional stimuli for self preservation this ability might be useful in treatment. If therapy with these individuals can focus more on meeting personal needs, and reducing personal threat, this may be more effective than attempting to help them generate empathy or remorse. This would support the therapy approach suggested by Templeman and Wollersheim (1979). In this way the limited emotional processing they have shown could be utilized.

Generalizability. Due to the characteristics of the sample, the results of this study are likely best generalized to undergraduate females in their early 20s, particularly those of Hispanic descent.

It is likely that the predominance of female participants was in a large part due to two factors. First there are typically a greater percentage of women taking psychology courses. Second, there were other studies being advertised via the same online message board that offered greater incentives for participation and only accepted male

participants. Finally, women are generally thought to be more willing to participate in research. The predominance of Hispanic participants is likely due to the fact that the sample was drawn from a state university in Southern California. It is possible that these results will not generalize to future studies with samples that have different demographic characteristics.

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Informed Consent Document

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Informed Consent Document
For
Variations in Emotional and Interpersonal Behavior as a Function of Personality Type

Principal Investigator: Paul Haerich
Co-Investigators: Julie Alberty,
Kristen Godenick, Veronica Llamas, Kim Rose

Purpose

You are invited to participate in this research study to help us better understand the interplay of individual differences in personality and experience with human reflexes, human cognition, and human interpersonal interaction. This research study will investigate the way people respond to various pictures and sounds in the context of certain aspects of personality and experience evaluated with a series of questionnaires. The pictures you will be viewing have been chosen to cover a variety of things individuals might encounter in their life. Your responses on the personality and experience questionnaires indicate how much you agree or disagree that each statement accurately describes you, and your responses will indicate, yes or no, if the statement reflects your experience.

Procedure

During this study, you will first view a series of pictures depicting various subjects including (listed alphabetically): animals, guns, household objects, human nudes, nature scenes, mutilations, plants, rocks, snakes, spiders, sports scenes, etc. From time to time while viewing these slides, a brief, loud noise also will occur. The sounds used in this study are similar in loudness and duration to a loud handclap, or a book being dropped.

This procedure also will involve collecting information regarding the activity of the heart and of the muscles involved in the eye blink. A small device that clips onto the end of one finger will measure heart rate activity. Eye muscle activity will be measured by small, button-like sensors, which will be taped below your left eye and one behind the ear. Finally, two larger sensors will be taped to the palm of your left hand. These

sensors will be used to measure small changes in the amount of sweat being produced –
an indicator of small changes in the activity level of part of the nervous system.

In the second portion of the study, you will be asked to complete the computerized
personality and experiences questionnaires. On the questionnaires you will be asked to
rate a series of statements about your feelings, opinions and attitudes on a numerical scale
using the computer keyboard. On the experiences questions you will be asked to indicate
whether or not you have experienced specific events involving unwanted sexual contact.
The items ask only for a yes or no answer.

It should take approximately 70 minutes to complete your participation in this study.

Risks

There is no increased risk associated with participation in this study beyond that of
everyday life. Therefore, the committees at both CSU San Bernardino (Department of
Psychology Institutional Review Board Sub-Committee) and Loma Linda University
(Institutional Review Board) that review human studies have determined that
participating in this study exposes you to minimal risk. The official stamp appearing on
this form indicates this approval.

Although this study has been deemed of minimal risk, you should be aware that some of
the content of certain slides may lead to feelings of surprise or may make you feel uneasy
or uncomfortable. The sounds may be relatively loud and may cause surprise or be
startling, but in no case will the sounds be louder than 110 dB, which, for the type of
sounds used, has been determined by the Occupational and Safety Health Administration
to be below the level that could cause temporary or permanent hearing problems.

Benefits and Reimbursement

You should not expect to receive any direct benefit from your participation in this
research study other than the educational experience of participating in a scientific
psychological research project. It is anticipated that the results of this study will help
advance our understanding of how different people, with different personalities respond
to emotional stimuli and situations. We hope that this information will eventually be
useful in improving or targeting psychotherapy techniques.

Compensation

Although not a benefit from the research study itself, you may receive extra credit for a
course. If you are a student at CSUSB your extra credit will be in the form of a slip for 5
units of extra credit and, at the discretion of your instructor, you may receive extra credit
points for your class.

Confidentiality

All of the information gathered during your participation in this research study is confidential and will be handled anonymously. That means that your name will not be attached to or stored with any of your responses or physiological data. The responses of individual participants will not be disclosed to anyone. The information you provide will be grouped with that of other participants. Any publications or presentations resulting from this study will refer only to the grouped results.

Third Party Contact & Questions

If at any time you have any other questions regarding your participation in this study, you should feel free to contact Paul Haerich, PhD at the Department of Psychology, Loma Linda University. (phone: 909-558-4770).

If you wish to contact an impartial third party not associated with this study regarding any complaint about the study, you may contact the Office of Patient Relations, Loma Linda University Medical Center, Loma Linda, CA 92354 (phone: 909-558-4647), for information and assistance.

Participant's Rights

Participation in this study is voluntary. If, after signing this consent form, you decide to discontinue the session at any time, for any reason, you are free to do so. Discontinuing the session will not jeopardize your class standing or grade. You will receive extra credit for your participation whether you complete the session or not. If you have any questions regarding this study, we will be happy to answer them.

Consent Statement

By placing an X in the space below I acknowledge that I have been informed of, and that I have understand, the nature and purpose of this study, and I freely consent to participate. I have read the contents of the consent form and have been given the opportunity to ask questions concerning the study. I have been offered a copy of this form. I acknowledge that I am at least 18 years of age. I hereby give my voluntary consent to participate in this study. Signing this consent form does not waive my rights nor does it release the investigators or institution(s) from their responsibilities. I may call Paul Haerich, Ph.D. at (909) 558-4770 if I have additional questions or concerns.

Participant's X _____

Date: _____