PSYCHOPATHS’ SENSITIVITY TO EMOTIONAL METAPHORS

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ABSTRACT

The results of this study provide further evidence for the hypothesis that psychopaths display an insensitivity to the emotional valence of language and assist in generalizing this finding to relatively complex linguistic stimuli. Using a Q-Sort format, it was determined that psychopathic subjects not only made more mistakes than nonpsychopathic subjects when using the emotional valence of metaphors as a sorting criteria, but also that their mistakes were more likely to involve sorting errors that identified metaphors as being extreme members of the opposite valence category. This suggested that psychopaths were confident in their misidentification of emotional valence. The inclusion of a task that assessed metaphor interpretive ability ensured that these results were not due to an inability to comprehend metaphoric sentences. Further, age, years of formal education, and reading level were ruled out as potentially confounding variables. Recommendations were made for future research that examines other aspects of the psychopath's use of metaphor.
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INTRODUCTION: PSYCHOPATHY

The concept of psychopathy as a clinical entity has been comprehensively described by Cleckley in his 1976 volume, "The Mask of Sanity." In this influential work, the psychopath is portrayed as possessing elevated levels of such behavioural and personality characteristics as manipulativeness, irresponsibility, impulsivity, lack of empathy, egocentricity, and diminished affect. Cleckley believed that the fundamental characteristic of the psychopath is an inability to experience deep emotion (Cleckley, 1976). This inability carries destructive ramifications; being unmoved by emotion, psychopaths do not recognize that certain events, objects, and people carry emotional impact and significance for the individuals around them. A psychopath may claim to have an appreciation of this affective domain, but any such appreciation is intellectual rather than visceral. Colourblindness provides a suitable analogy: a colourblind individual may intellectually understand that the colours green and red clash, but this understanding is not experienced perceptually. For the psychopath who lacks first-hand emotional knowledge, an opportunistic world view ensues in which people and objects are evaluated solely in terms of how potentially beneficial or damaging they may be. Little or no consideration is given to others' personal rights, feelings, or reactions; such matters are irrelevant to the psychopath beyond the extent to which these phenomena can be used for personal advantage. The result is a persistent pattern of interpersonal disregard, often manifesting as criminal and unethical activity in a variety of forms.

Cleckley proposed that the emotional dysfunction at the heart of the psychopath’s pathological personality involved a central rift between the affective and cognitive/semantic components of his or her thought processes (Cleckley, 1976). One can think of this rift as the separation of the connotative and the denotative qualities of the psychopath's experience of meaning. Connotation consists of the affective overtones and associations that are produced by a stimulus, whereas denotation involves the concrete, referential meaning that a stimulus triggers. For example, the word "hood," has both connotational and denotational aspects. Denotationally, it means a cloth garment that is worn over the head. Connotationally, it carries ominous overtones and evokes, among other things, the image of the executioner or the leather-clad juvenile delinquent. Investigations of the connotative aspects of word meanings in normal populations
suggest that the affective component of words comprises approximately half of the variance of word meanings (Russell, 1983). For the psychopath, however, the emotional information that connotation evokes in most people is not forthcoming. All that seems to be available are essentially intact denotative processes. Consequently, the psychopath exists at a shallow, referential level of experience that is composed of only sterile, superficial meaning.

A number of studies conducted by Hare and others have provided some support for this contention at a linguistic level. These projects have examined the cerebral organization of psychopaths' language functions and have investigated the salience that emotional words carry for psychopaths. The research conducted by Hare and his colleagues has used Hare's Psychopathy Checklist (PCL) (1980) or, more recently, the Psychopathy Checklist - Revised (PCL-R) (1991) to assess levels of psychopathy in their subjects. Before this research is reviewed, the nature of the PCL-R, the instrument used in the present study, will be discussed.

ASSESSING PSYCHOPATHY: THE PCL-R

The Psychopathy Checklist (PCL) (1980) and its subsequent version, the Psychopathy Checklist - Revised (PCL-R) were developed by Hare in an effort to address the perceived shortcomings of existing instruments that claimed to assess psychopathy (Hare, 1991). At the time of the PCL's development, the most widely used method of identifying the psychopath was the DSM-III's diagnostic criteria for Antisocial Personality Disorder, also known as APD (American Psychiatric Association, 1980). The DSM-III criteria for APD as well as those of the DSM-III-R (American Psychiatric Association, 1987) had the advantage of being explicit and easily rated; they focused largely on the criminal and aberrant interpersonal behaviours of an individual. Unfortunately, by focusing almost exclusively on behaviour, the APD criteria failed to address many of the aspects of psychopathy that are central to the disorder (e.g., shallow affect, grossly inflated ego, failure to accept personal responsibility, callousness). It had been hoped that this deficiency would be rectified in the DSM-IV (American Psychiatric Association, 1994), but this did not occur.
The PCL-R is a 20 item checklist (see Appendix A for a complete list of items), each item scored on a scale from 0 (the item is not at all typical of the subject) to 2 (the item is typical of the subject). Consequently, PCL-R total scores range from 0 to 40. Use of the PCL-R requires that the subject be interviewed at length regarding his or her personal history and that collateral information on the subject be reviewed. The collateral review is considered essential as a means of checking the veracity of the information gathered during the interview. Previous research strongly suggests that the PCL-R is an instrument that can be reliably administered and scored given suitable training (Hare, 1991; Hare et al., 1990; Harpur, Hakstian, & Hare, 1988). The PCL-R is also a valid instrument, as demonstrated through its ability to identify psychopaths and differentiate them from nonpsychopaths on a variety of experimental, demographic, and behavioural variables and its ability to predict recidivism and other criminal behaviours (for reviews, see Hare, 1991; Hare, Williamson, & Harpur, 1988; Hart, Hare, & Harpur, 1992).

The PCL-R has been subjected to factor analysis, uncovering two highly stable and replicable factors that correlate at approximately 0.50 (Hare, R. D. et al., 1990; Hare, Hakstian, & Harpur, T. J., 1988). Factor 1 consists largely of the personality traits that are central to the disorder as described by Cleckley (1976), characterized by a superficial emotional life and a lack of concern for the welfare of others. Items from this factor include: shallow affect, callousness, manipulativeness, lack of remorse, and grandiose sense of self-worth. Factor 2 consists of items that are more closely aligned with the socially deviant interpersonal behaviours of APD specified by the various editions of the DSM. Items from this factor include: poor behavioural controls, early behaviour problems, irresponsibility, and impulsivity (see Appendix A for a complete list of items from both factors).

**PREVIOUS RESEARCH**

**Divided Visual Field Study:** Hare & Jutai (1980):

In 1979, Hare conducted his first study that examined psychopaths' use and organization of language. This study used a divided visual field (DVF) paradigm that examines perceptual asymmetries in order to infer the functional specializations of the brain's hemispheres; a
tachistoscope was employed to present three-letter words to either the right visual field (RVF) or the left visual field (LVF) of right-handed incarcerated male psychopaths and nonpsychopaths, thus allowing projection of the stimulus, via the contralaterally organized visual neural pathways, to the opposite hemisphere of the brain. This was done in order to test the hypothesis that psychopaths suffer from a left hemispheric dysfunction. The results failed to confirm the hypothesis; however, since the experimental task involved only simple recognition of the words, it was suggested that a task engaging higher semantic processes might produce group differences. Subsequently, Hare and Jutai (1980) conducted another DVF experiment, this time requiring the psychopathic and nonpsychopathic subjects to either recognize the presented words or to categorize them in either concrete or abstract categories. Reaction time and error rates during task completion were recorded. The results indicated that, as before, psychopaths and nonpsychopaths did not differ significantly when their performance involved simple recognition. However, while the nonpsychopaths exhibited a decided left-hemispheric superiority when required to categorize at both concrete and abstract levels, this pattern did not hold for the psychopaths. The psychopathic group exhibited a right-hemispheric advantage when the task involved abstract categorization. This difference did not achieve statistical significance, but was substantial enough to encourage future research.

**Dichotic Listening Study: Hare & McPherson (1984):**

There exists a large and consistent body of literature which indicates that language processes are lateralized in the left hemisphere of the brain for the vast majority of right handed individuals (see, e.g., Beaumont, 1982; Bryden, 1982, for reviews). The results of the DVF studies suggested to Hare that perhaps psychopaths are different in this regard. Hare and McPherson (1984) investigated this possibility by administering a verbal dichotic listening task to white incarcerated male psychopathic and nonpsychopathic subjects; the degree of psychopathy exhibited by the subjects was assessed by means of the Psychopathy Checklist. The dichotic listening task involves presenting acoustically-matched pairs of one-syllable words in sets of three to the left and right ears of the subject; the subject must then recall all the words that he is able to from that trial. Because the neural pathways of the auditory system are thought to be organized
contralaterally, superior performance in one ear indicates processing in the opposite hemisphere; as a consequence, a right ear advantage is the norm, reflecting language processing in the left hemisphere (Kimura, 1961; 1967). The results of the Hare and McPherson (1984) study indicated that the nonpsychopaths (as well as a comparison sample of undergraduates) did indeed exhibit the expected right ear advantage. The psychopaths did not. Their performance on the task suggested a lack of language lateralization; there was no significant ear advantage and so both hemispheres were inferred to be approximately equally involved (Hare & McPherson, 1984).

**Divided Visual Field Study #2: Hare & Jutai (1987):**

Hare and Jutai (1987) decided to rerun the 1980 DVF study, this time using more trials per task, a larger sample size, and the addition of a comparison group of noncriminals. Again, the DVF paradigm was used, with the subjects having to perform the recognition and two categorization tasks. On the basis of the earlier study, it was predicted that psychopaths would demonstrate left hemispheric processing during the recognition and concrete categorization tasks but would show reduced or reversed processing asymmetry during the abstract categorization task. The performance of the nonpsychopaths and the noncriminals was not inconsistent with the predictions made in the general literature on perceptual asymmetries during semantic processing (e.g., Cohen, 1982; Day, 1977; Gibson, Dimond, & Gazzaniga, 1972; Wood et al, 1980): they exhibited a greater RVF advantage (indicating superior left hemispheric processing) during the abstract categorization task than during either the simple recognition or concrete categorization task. As predicted by Hare and Jutai, however, the psychopathic subjects' error rates violated this pattern; they exhibited a significant RVF deficit during the abstract categorization task, indicating a reduced left hemispheric involvement during the processing of this task (Hare & Jutai, 1987). A reasonable interpretation of the results of this study and the preceding studies is that psychopaths have unusual cerebral organization of language processes; specifically, it would appear that the psychopath's left hemisphere has only limited language resources.

**Language-Related Hand Gestures Study: Gillstrom & Hare (1988):**

Following the DVF and dichotic listening studies, attempts were made to find other methods that would tap the psychopath's use, organization, and processing of both language and
emotion. One such measure was found in the psychopath's use of language-related hand gestures. This measure relies on the theory that language production and hand gestures derive from closely associated mental processes, such that hand gestures produced during speech can give clues about the internal organization and processes that produced that speech (Cicone, Wapner, Foldi, Zurif, & Gardner, 1979; Kimura, 1973; McNeill, 1985; McNeill & Levy, 1982). Gillstrom and Hare (1988) examined the psychopath's use of language-related hand gestures, dividing these hand gestures into iconic gestures (graphic, intentional gestures that reflect and clarify the semantic content of speech) and beats (small, rapid, unintentional gestures that are not conceptually related to the speaker's narrative) on the basis of research by Ekman and Friesen (1969) and McNeill and Levy (1982). Subjects were 30 white male prison inmates, divided into equally-sized psychopathic, mixed, and nonpsychopathic groups on the basis of their scores on Hare's PCL. The investigators found that not only did psychopaths use more language-related hand gestures in general than did nonpsychopaths, but they also used significantly more beats than did nonpsychopaths. The use of iconic gestures did not differ significantly among the groups. Gillstrom and Hare interpreted the psychopaths' excessive use of beats as indicating that the language processes of psychopaths are structured into conceptual units that are comparatively small, perhaps reflecting limited language resources. This speculation follows from McNeill's (1985) proposition that beats are used to divide the flow of speech into discrete conceptual units. Another possibility is that the psychopath's primary language coordinator has poor temporal organization, giving rise to semantic units that are not efficiently integrated over time (Gillstrom & Hare, 1988).

**Emotional Valence Study: Word Triads And Affective Picture/Sentence Tasks:**

Williamson, Harpur, and Hare (1990):

Williamson, Harpur, and Hare (1990) looked at the denotative/connotative rift in psychopaths in two experiments: a word triad task developed by Brownell, Potter, and Michelow (1984) and tasks developed by Cicone, Wapner, and Gardner (1980) requiring the subject to match phrases and pictures on the basis of emotional polarity. The former task taps an individual's sensitivity to the emotional valence of words by presenting the subject with sets of three words
and having him group together the two words that "go together the best." Brownell et al. identified six strategies that could be used to group words: a) Antonym (e.g. deep-shallow), b) Domain (e.g. loving-foolish; both are relevant to the domain of humans), c) Metaphor (e.g. wise-deep), d) Polarity (e.g. foolish-shallow; both have a negative connotation), e) Domain and Polarity (e.g. loving-wise; both are positively-toned and pertain to humans), and f) No relation (e.g. warm-foolish). Williamson et al. (1990) hypothesized that psychopaths would use connotation (polarity and metaphor) as a grouping strategy less often than nonpsychopaths, and that psychopaths and nonpsychopaths would use denotation (antonymy and domain) about equally often. Using a pool of eight words (foolish, hateful, shallow, cold, warm, loving, deep, wise), 56 triads were formed and presented in random order to 78 male inmates. The subjects were assessed for psychopathy via the PCL and accordingly split into psychopathic, mixed, and nonpsychopathic groups. The results demonstrated that the psychopathic group used the polarity strategy significantly less often than did the nonpsychopathic group and that the other three grouping strategies (antonymy, domain, and metaphor) were used approximately equally by all subject groups. These results suggested to the investigators that psychopaths, relative to nonpsychopaths, do not make full use of emotional polarity when grouping words.

The Cicone, Wapner, and Gardner (1980) tasks consisted of the affective phrases and affective pictures subtasks. In the affective phrases task, subjects were presented with a series of fourteen emotionally valenced target phrases. Each target phrase was accompanied by four additional phrases, one of which matched the emotional tone of the target phrase. The three distractor phrases were of the following types: similar descriptive characteristics and different emotional tone; similar descriptive characteristics and neutral emotional tone; different descriptive characteristics and neutral tone. The affective pictures task shared the same presentation format but substituted drawn pictures for phrases. Both tasks were printed in the same testing booklet and administered to 63 male criminals who had been assessed with the Psychopathy Checklist - Revised (PCL-R) (Hare, 1991). Results were calculated in terms of opposite errors (a target phrase or picture matched with a distractor phrase or picture of opposite emotional valence) and nonopposite errors (a target phrase or picture matched with either of the remaining incorrect
A 2 Group (psychopaths and nonpsychopaths) X 2 Error Type (opposite and nonopposite) X 2 Presentation Type (phrases and pictures) analysis of variance was conducted, producing a significant three-way interaction. Examination of the interactions revealed that the psychopathic group made significantly more opposite errors than did the nonpsychopathic group and that this error pattern was significantly greater for phrases than for pictures. Importantly, the insensitivity exhibited by the psychopathic subjects was limited to identification of the emotional polarity of the linguistic stimuli and not to the identification of emotionality itself. In other words, for linguistic material, psychopathic subjects seemed sensitive to the existence of stimulus affect but were unable to accurately identify that affect.

Dichotic Listening Study: Raine et al. (1990):

Support for the results of the Hare and McPherson (1984) dichotic listening study has been provided by Raine et al. in their 1990 examination of dichotic listening in an adolescent forensic sample of 40 delinquent boys. The study’s methodology was similar to Hare and McPherson’s (1984), with some exceptions. Subjects were assessed for psychopathy not with the PCL-R but through the use of a cluster analysis technique that utilized data from two behavioural and two personality assessment procedures. Also, the stimuli used during the lexical decision task consisted of pairs of consonant-vowels (e.g., ba, da, ta) rather than one-syllable words. Despite these differences in subject ages, psychopathy assessment procedure, and type of dichotic listening task, the results closely paralleled Hare and McPherson’s (1984) results: the psychopathic subjects exhibited a lack of ear asymmetry, suggesting a corresponding lack of hemispheric specialization in the processing of the stimuli. It would thus appear that this effect is relatively robust.

Lexical Decision And ERP Study: Williamson, Harpur, and Hare (1991):

At this point, Hare and colleagues decided to more directly investigate Cleckley’s concept of semantic dementia in psychopaths. Specifically, they wanted to determine whether emotional words carried the same impact and amount of information for psychopaths as they did for nonpsychopaths. The prediction was that psychopaths would not be able to effectively access this connotative component of meaning and that, for them, emotionally-laden words would have only
a superficial, denotative meaning. There exists evidence to suggest that normal individuals exhibit different behavioral and electrocortical responses to affective and neutral words (Graves, Landis, & Goodglass, 1981; Kostandov & Arzumanov, 1971). In particular, the greater amount of available information means that lexical decisions (deciding whether or not a stimulus is a word) are made more quickly when the stimulus word is emotional rather than neutral, and certain event-related potentials (ERPs) are larger and with shorter latencies when the stimulus word is emotional. Consequently, Williamson, Harpur, and Hare (1991) used these measures to examine psychopaths' processing of affective words. A sample of male criminals was assessed using Hare's PCL-R and divided into psychopathic, mixed, and nonpsychopathic groups. The subjects performed a lexical decision task using neutral words, emotional words (of both positive and negative connotation), and pronounceable nonwords projected to either the LVF or the RVF. Subjects were required to decide whether or not each stimulus was a legitimate word and then respond as quickly as possible on the basis of that decision. Both reaction time (RT) and ERPs recorded at frontal, central, parietal, and occipital midline sites as well as left and right parieto-temporal sites were used as the dependent variables. In terms of RT, when the results were collapsed across visual field there existed a significant Group X Word interaction, such that only the psychopathic group did not respond significantly faster to the emotional words than to the neutral ones. One interpretation of these RT results is that, for psychopaths, the affective component of the emotional words did not contribute to a greater pool of information upon which to make a lexical decision. Regarding the ERP data, Rugg (1983, 1984) has identified the P670, a late, positive ERP component which occurs during lexical decisions. The recordings made at the parietal midline site (P_x) revealed significant main effects for word type (emotional words resulted in larger P670 responses than did neutral words) and for group (psychopaths had smaller P670 responses than did nonpsychopaths). The Group X Word interaction did not achieve significance; however, the psychopathic group tended to show less amplitude variation between the emotional and neutral words. Williamson et al hold the assumption that P670 amplitude reflects the amount of information processed as a result of stimulus presentation. Consequently, they interpreted the
psychopathic group's smaller P670 amplitude as indicating that psychopaths extract less information from words than do nonpsychopaths.

Brain Imaging (SPECT) Study Of Semantic And Affective Processing:
Intrator et al. (in progress)

In a study presently in progress, Intrator and colleagues used single photon computed tomography (SPECT) to examine the regional cerebral blood flow (rCBF) of psychopathic (P), nonpsychopathic (NP), and control (C) subjects during a modified lexical decision task similar to that employed by Williamson, Harpur, and Hare (1991). The P (n = 8) and NP (n = 9) subjects were two groups of male patients participating in a Veterans Administration inpatient substance abuse program. The C (n = 9) group was composed of male hospital employees. Two blocks of stimuli, each constituting an experimental condition, were used: 48 neutral words (e.g., carpet, coach, ounce) interspersed with 48 pronounceable nonwords (the neutral condition), and 48 negative emotional words (e.g., corpse, maggot, torture) also interspersed with 48 pronounceable nonwords (the emotional condition). These blocks of stimuli were presented separately to each subject, in a counterbalanced order, over two sessions one week apart. The subject sat in front of a computer screen (the means by which each stimulus letter-string was presented) and was required to press a button with his right hand as quickly as possible whenever a given stimulus letter-string was a real word. Repeated measures ANOVA of decision times and accuracy levels revealed no significant group or condition effects, suggesting no significant group differences in motivation or alertness within this experimental context.

After the subject had been engaged in the lexical decision task for ninety seconds he was injected with a quantity of the isotope that enables the SPECT scanner to measure rCBF. The subject continued the task for five minutes and was then moved to the SPECT scanner. The scanner acquired five axial "slices" of the brain's rCBF activity over a ten minute period. Of these five slices, two (slices 1 and 5) were dropped from the analyses for anatomical reasons. The remaining slices are described as follows: "Slice 2 (supra-ventricular), 7 cm above and parallel to the OML [orbitomeatal line], encompassing prefrontal, central, and parietal cortex; Slice 3 (mid-ventricular and basal ganglia), 5 cm above and parallel to the OML, encompassing prefrontal,
anterior-temporal, posterior-temporal, temporal parietal, and occipital cortex, and the basal ganglia and medial aspects of the frontal lobes; Slice 4 (inferior to basal ganglia), encompassing frontal, temporal, and occipital cortex, and a small part of the cerebellum" (Intrator et al, in progress, pp. 8-9).

Initial analyses of the SPECT data examined differences in rCBF among the P, NP, and C groups during both the neutral and emotional conditions of the lexical decision task. It was revealed that group P showed significantly greater occipital rCBF in Slice 3 than did group C (and, less dramatically, group NP). In addition, group C (and, to a lesser degree, group NP) demonstrated more rCBF in the frontal and right frontal-temporal areas of Slice 2 than did group P. Broadly, for the lexical decision task as a whole, the posterior, occipital areas of the brain were more active for the psychopathic subjects and the anterior, frontal areas of the brain demonstrated more activity in the nonpsychopathic subjects.

The left posterior-temporal region of the brain showed significantly increased rCBF during the emotional condition for all groups, suggesting that all groups were able to differentiate between neutral and affective words. However, significant Group X Condition interactions in a number of anterior cortical and contiguous subcortical regions of Slice 3, namely the left and right frontal-temporal cortex and left and right subcortical regions, indicated that the psychopathic subjects differed from the nonpsychopathic subjects in their processing of affective versus neutral words. The NP and C groups showed less rCBF in these regions for the emotional words and more rCBF for the neutral words. The P group displayed the opposite pattern: the emotional condition was associated with more rCBF in these anterior regions while the neutral condition elicited less rCBF. While this was not the pattern that the investigators anticipated, they note that there exists evidence that metabolic demands (including rCBF) decrease as cognitive operations become more familiar and overlearned. They speculate that the processing of affective linguistic material is so deeply embedded in nonpsychopaths as to be automatic and consequently involves minimal metabolic demands. For psychopaths, however, emotional stimuli are less familiar and thus require more cognitive effort (and associated metabolic activity) to process.
A number of tentative conclusions about the character of psychopaths' language organization and processing may be drawn on the basis of the above studies. In terms of the cerebral organization of language functions, the Dichotic Listening studies (Hare & McPherson, 1984; Raine et al., 1990) suggest that psychopaths exhibit a lack of language lateralization. The Divided Visual Field studies (Hare & Jutai, 1987) supported this conclusion by demonstrating that psychopaths also exhibited a left hemisphere deficit when performing a more complex linguistic task such as the Abstract Categorization task. Gillstrom and Hare's (1988) Hand Gestures study suggested that the language processes of psychopaths are composed of relatively small conceptual units and that perhaps these units are poorly integrated over time. The studies examining the psychopath's sensitivity to emotional valence (Williamson, Harpur, & Hare, 1990) and the influence of connotation on the psychopath's electrocortical activity and lexical decision making ability (Williamson, Harpur, & Hare, 1991) indicate that psychopaths do not have the same level of access to emotional valence and connotational meaning as do nonpsychopaths. Finally, the SPECT study (Intrator et al., in progress.) provides evidence suggesting that the linguistic differences between psychopaths and nonpsychopaths are physiologically reflected in patterns of rCBF.

It is important to note, however, that the majority of the above studies, the Divided Visual Field task, the Dichotic Listening task, the Word Triads task, and the Lexical Decision task, employed stimuli consisting of single, isolated words. It can be argued that because the Word Triads task assesses perceived relationships among sets of three words it captures a more complex linguistic level. While this may be so, it can also be argued that the triad format lacks ecological validity; rarely in our everyday use of language are we forced to interpret sets of three non-syntactically related words. This does not invalidate the triad format but does indicate that caution should be taken when generalizing these results to everyday language. The same care must be taken when interpreting the results of the single-word stimuli studies mentioned above. These studies have made a thorough investigation of the building blocks of language, namely, words. This is an appropriate starting point for the study of the language of the psychopath, as new avenues of inquiry should begin by examining the elemental aspects of a phenomenon.
There do exist two studies that have examined psychopaths' language beyond the level of single words. These are Gillstrom and Hare's (1988) study of language-related hand gestures and Williamson, Harpur, and Hare's (1990) affective phrase study. The hand gesture study is particularly interesting because it utilized byproducts of language processing rather than focusing on the language itself. A variable was chosen that gave some indication of how language was being processed as it was spontaneously and naturally produced. The results of the affective phrase task are also important as they are the product of the first attempt to examine the psychopath's denotative/connotative rift using stimuli more complex than isolated words.

The primary aim of the present study as it was originally conceived was to further this avenue of investigation by assessing the psychopath's sensitivity to emotionally valenced linguistic stimuli that more closely capture language as it is used in everyday life. It was thought that the use of metaphors as stimuli might be appropriate for three main reasons: (1) their ubiquity in spoken and written language, (2) their ability to be expressed in whole, complete sentences, and (3) their ability to convey emotional information (Brownell, 1988; Brownell et al., 1984).

METAPHOR AND PSYCHOPATHY

After the decision to use metaphor as the study's stimuli was made, it was proposed that the psychopath's ability to produce and process metaphoric language might be particularly deserving of empirical attention. Metaphor is a fundamental and ubiquitous component of language (Beck, 1987; Brownell, 1988). It can form the basis of many types of figures of speech (e.g., simile, idiom, slang, metonymy, synecdoche, irony, analogy, proverb) and assists us in making our communications more vivid, memorable, comprehensible, and aesthetically pleasing. Current definitions of metaphor vary across authors (Crider & Cirillo, 1991) but commonalities do exist. For the purposes of this paper, metaphor is considered to be any linguistic device whereby "aspects of one object are carried over or transferred to another object so that the second object is spoken of as if it were the first" (Bernstein, 1987). This involves a comparison between a **topic** and a **vehicle** on the basis of a **ground** (Bernstein, 1987). For example, the
metaphor, *The sun is a lightbulb in the sky*, has "sun" as the topic, "lightbulb" as the vehicle, and the ground involves the fact that both suns and lightbulbs give off light (as well as being round and hot).

Metaphor is often used to illuminate relationships and qualities hitherto unrecognized. Perhaps most importantly in the context of research on the language processing of psychopaths, it can convey subtle shades of meaning and emotion that are difficult to capture with cut-and-dried literal language (Woodman, 1990; Bernstein, 1987; Jamieson, 1985). Politicians (or, at least, their speech writers) have long been aware of the impact that metaphor can have on an audience and that "good metaphor use is linked to charismatic leadership in some way" (Beck, 1987, p. 14). In short, metaphor adds a richness and depth to language that can move us, persuade us, impress us, and inform us. Given what is known about psychopaths and their ability to process language, it can be hypothesized that their use of metaphor differs from that of nonpsychopaths. Just how this difference may manifest itself is an unexamined empirical question. To date, the only study in this area that this author is aware of that included a metaphor component is Williamson et al's (1990) word-triad investigation. The results of that study indicated that psychopaths made use of a grouping strategy based on metaphor about as often as did nonpsychopaths. It may be tentatively concluded from this result that psychopaths are capable of comprehending metaphoric relationships. In fact, Williamson, Harpur, and Hare (1990) note, "Psychopaths are able to form metaphorical relationships at the single word level and this may compensate for their insensitivity to affective valence" (p. 13). Such a conclusion would, however, be premature. The stimuli used in that study consisted of sets of three individual words, two of which had to be grouped because they "went together best." Consequently, the metaphoric relationship (if it existed for a given word pair) consisted of only two words. This is clearly metaphor at its most elemental. Such simplicity is necessary at the outset of the investigation of a new area but can unfortunately lack external validity. Shakespeare's "I hold the world as but world, Gratiano - A stage, where every man must play a part." loses its impact when expressed as the word pair, "world, stage." Another aspect of the potential metaphoric relationships between the stimuli used in the word triad study concerns their triteness. It could be argued that words such as, for example, "wise" and "deep"
might be grouped on the basis of frequent experience with a phrase or cliché rather than on the ability to directly perceive the relationship as metaphorical and therefore fitting.

In fact, there are grounds to propose that psychopaths may be prone to using metaphor in their conversation. This follows from the vivid and impactful nature of figurative language in general and metaphor in particular. As Swanson (1978) notes, metaphor may be used "in the creation of a persuasive argument or an evocative description" (p. 161). Similarly, Crider and Cirillo (1991) describe metaphoric comparisons as "graphic and, therefore, memorable" (p. 175). In their attempts to con, persuade, manipulate, and impress the people around them, psychopaths may find metaphor a valuable tool. By using figures of speech that are florid, unusual, and impressive, psychopaths may try to "dazzle" their interpersonal audiences by directing attention away from the content of their utterances to their flashy, figurative style. Anecdotal evidence is replete with reports from psychopaths' victims who recall, "You know, he sounded great at the time, really convincing. It wasn't until after that I realized he hadn't actually said anything." In this sense, metaphoric, figurative language could be thought of as a distracting linguistic mechanism that impresses with form what it lacks in substance. This view is consonant with the observation that psychopaths often use jargon and technobabble liberally in their conversations in an attempt to impress and overwhelm the audience with a false front of unsupported knowledge (Hare, Forth, and Hart, 1989). Similarly, psychopaths, in an attempt to inspire confidence, may use metaphor in an attempt to convince audiences that they are more sensitive and open to aesthetics than is actually the case. For example, in an unpublished study conducted by Strachan, Harpur, and Hare (1991), an investigator requested inmates to write about three emotional events in their lives. One inmate, a psychopath, wrote at length about his idyllic life with his wife. He stated that with her love, he "became a citizen of distinction in the celestial empire," and describes feeling "born again." He describes how he was at her beck and call, serving her breakfast in bed, doing laundry, housework, and gardening. All was not to last for eternity, however, and "the crack in the wall that shielded us began to widen" when the subject was arrested and convicted. What the subject failed to communicate to the investigator was that he had already moved out at the time of his conviction, that he was implicated in the burning down of her dwelling, and that he was in fact
arrested for appearing drunk at her place of employment and shooting two employees. It is this author's interpretation that the inmate was trying to impress the investigator with his apparent sensitivity, devotion, and suitability as an ideal mate. His use of metaphor was an attempt to bolster this image. Given the above considerations, one might predict that psychopaths (particularly the more glib and manipulative psychopaths) may use metaphor and other forms of figurative speech more frequently than do nonpsychopaths. As noted, this is an empirical question that has yet to be addressed.

However, the questions of how frequently the psychopath uses figurative language and his possible motivations for doing so do not examine a more fundamental issue, namely, do psychopaths understand metaphor? As previously noted, psychopaths often use technical jargon and professional slang that they do not fully understand. To an individual familiar with the area that the psychopath is professing knowledge of, these attempts are usually transparent and sometimes comical. To someone unfamiliar with the area, however, these efforts may have enough of a ring of plausibility to be convincing. Psychopaths also sham and fake emotions and loyalties that they do not genuinely feel (Hare, Forth, and Hart, 1989). Similarly, psychopaths may use metaphor and figurative language in a superficial manner that is independent of any deep-seated comprehension. If this is indeed the case, then one would expect that psychopaths would perform poorly on tasks that are dependent on metaphoric understanding.

There are a number of factors that might lead one to predict that psychopaths' understanding of metaphor might be abnormal. Research by Gillstrom (1995) examined the psychopath's ability to operate at a cognitively abstract level. Analyses have indicated that the psychopathic subjects are significantly less able to correctly interpret proverbs in the Gorham Proverbs Test (Gorham, 1956) than the nonpsychopathic subjects. The metaphorical nature of many proverbs raises the possibility that it is an inability to accurately process metaphor that is interfering with the psychopaths' performance on this task. This does not seem implausible given that both metaphor and proverbs tap the ability to process abstract linguistic material and also given the results of Hare and Jutai's (1987) Divided Visual Field study. Recall that
nonpsychopathic subjects exhibited a RVF (left hemisphere) advantage for the Abstract Categorization task whereas the psychopathic subjects did not.

Interpersonally, the capacity to understand metaphor correctly may be dependent upon one's ability to recognize the perspective of the other (in a dyadic relationship) and the current, salient commonalities between these perspectives. Gibbs (1987) comments on this aspect of some metaphor comprehension:

Your understanding of (a) metaphorical expression can only occur if you share the same presuppositions I have at the moment... It is clear that the interpretation of (a) metaphorical expression can only be accomplished if the speaker and the hearer share certain assumptions. That is, which properties of a metaphor are the salient ones depends precisely on what knowledge is shared between speaker and hearer on any given occasion (p. 40).

Gibbs uses the following example to illustrate this point:

Suppose that you are upset with the high cost of auto insurance and that, because of recently paying your yearly insurance premium, you have no money to take a vacation. I recognize your point and add to the conversation by saying Those tires are my vacation, to indicate that I too am now unable to afford a vacation because of the price of the new tires. Your understanding of this metaphorical expression can only occur if you share the same presuppositions I have at the moment about the high cost of tires and about how my buying tires prevents me from taking a vacation (p. 40).

The point made is that metaphors often have multiple interpretations. The selection of the correct interpretation will depend on the hearer's ability to recognize his/her shared assumptions with the speaker, choose which assumptions are most salient in the present context, and then apply those salient assumptions to the metaphor.

Given the above, it seems reasonable to propose that psychopaths may have difficulty in accurately interpreting metaphors. Psychopaths are often described as egocentric, self-centered, callous, and lacking in empathy and remorse. All of these characteristics preclude an appreciation of the viewpoint of the other. Research by Williamson (1993) supports this possibility by indicating that psychopaths have difficulty sharing the perspective of others. Consequently, the psychopath when confronted with a metaphor may not search for the most salient interpretation for that particular interpersonal context. Rather, he may simply select the interpretation that is most salient to his own outlook.
Finally, there exists a considerable quantity of empirical evidence that points to aberrations in the psychopath's processing of language in general and emotional language in particular. As metaphor is a component of language particularly suited to emotional expression, it is appropriate that the psychopath's ability to operate at a metaphorical level be examined. Doing so will extend our understanding of the psychopath's linguistic competence.

OVERVIEW OF PRESENT STUDY

The research project described here examines the psychopath's ability to interpret metaphor and make decisions based on his ability to correctly identify the emotional valence that a metaphor carries. In order to achieve this goal, a new task, the Emotional Metaphor Q-Sort, was developed by the author. This task requires the subject to divide a pool of 60 metaphors into two groups of 30 on the basis of each metaphor's emotional valence (i.e., either negative or positive). The subject must then further sort each emotional category into three clusters of decreasing emotional intensity in such a way as to approximate a normal distribution. Thus, the most extreme positive cluster contains two metaphors, the next most extreme positive cluster contains nine metaphors, and the remaining positive cluster contains nineteen metaphors; the same pattern holds for the negative category. Because the subject must make initial sorting decisions on the basis of positive or negative emotional valence, it is hoped that the ability to distinguish between positive and negative valence will be assessed at a gross level. Further, by forcing the subject to make additional sorting decisions on the basis of emotional intensity, it is hoped that emotional sensitivity within each valence category will be assessed at a more fine-grained level. Additionally, a major advantage of this type of research paradigm is that it extends previous research on the psychopath's sensitivity to emotional language to a level that exceeds the individual word. As mentioned, there is a dearth of empirical evidence that examines the psychopath's language skills at the sentence level or above.

Naturally, if psychopaths are unable to process and interpret metaphor accurately, they should perform quite poorly on the above task and it will be undetermined as to whether it is a metaphoric comprehension dysfunction or an insensitivity to emotional valence that is responsible
for poor performance. For this reason, a Metaphor Interpretation component was also formulated. This task consists of a subset of ten of the metaphors used in the Q-Sort task, five positive metaphors and five negative metaphors, which the subject must verbally interpret. These interpretations are then compared with an exhaustive list of possible interpretations for each metaphor and rated for interpretive aptness accordingly.

To minimize the possibility of confounding variables influencing the results, the age, years of formal education, and reading level of the subjects were also assessed and compared.

**METHOD**

**SUBJECTS**

Subjects (n = 35) were male federal inmates recruited from Matsqui Institution, a medium-high security federal prison that has been the site of extensive research on psychopathy by Hare and colleagues. Subject participation was voluntary as well as confidential, with recruitment by poster and word-of-mouth. All inmates who volunteered were allowed to participate, however only inmates who, by their own admission, were fluent in English were included in the data analyses. Three subjects had to be dropped from the analyses because of a lack of English fluency despite their belief that they were fluent. This decision was based on the experimenter's subjective impression of the subjects' ability to communicate fluently in English. Consequently, the final number of subjects included in the analyses was 32. Subjects were paid $5.00 an hour for their participation.

All Ss were assessed for levels of psychopathy using the Psychopathy Checklist - Revised (PCL-R), already described above (Hare, 1991). The mean PCL-R score for the Ss as a whole was 25.8 (s.d. = 7.2). Subjects were than divided into three groups on the basis of their PCL-R scores: the nonpsychopathic (NP) group had scores less than 23 (n = 10; x = 17.5; s.d. = 3.2); the mixed group (M) had scores from 23 to 29 (n = 10; x = 24.8; s.d. = 1.8); and the psychopathic group (P) had scores greater than 29 (n = 12; x = 33.5; s.d. = 2.7). These cut-off scores were selected for the following reasons. First, the PCL-R cut-off of 30 and above has been well established in the literature as useful for identifying psychopathic subjects (Hare, 1991). This same
literature suggests that a cut-off of 20 and under is adequate for identifying nonpsychopathic subjects. Unfortunately, utilizing this cut-off would have resulted in an under-representation of nonpsychopaths in the sample. A compromise of using a score of 22 and under as the nonpsychopathic cut-off was thus settled on as it captures approximately the lower third of the sample and differs from the traditional cut-off by less than one third of one standard deviation.

Attempts were made to control for the possible confounding influence of demographic confounding variables. Subject ages were analyzed via a one-way ANOVA, demonstrating no significant differences among groups, $F(2, 26) = 1.56, p > .05$. The Ss' reading ability was assessed via the Wide Range Achievement Test, Revised (WRAT-R) (Jastak, Bijou, & Jastak, 1984). Mean scores and associated grade levels were as follows: Group NP = 56.67 (grade 9); Group M = 60.67 (grade 11); Group P = 56.78 (grade 9). The WRAT-R data were subjected to a one-way ANOVA, revealing no significant differences among groups, $F(2, 24) = .29, p > .05$.

Because it seems likely that metaphoric interpretive ability is associated with formal education, the number of years of formal education was also coded and analyzed. Formal education was defined as including schooling both outside and inside of the prison environment. Thus, subjects who had dropped out of high school and then upgraded to a grade twelve equivalency while in prison were considered to have the same amount of formal education as subjects who had completed their grade twelve in regular high school. The data were subjected to a one-way ANOVA, revealing no significant differences among groups, $F(2, 26) = .107, p > .05$. Mean years of formal education for each group were as follows: Group NP = 10.67; Group M = 11.00; Group P = 10.73.

**MATERIALS**

**The Emotional Metaphor Q-Sort:** The primary task used in this investigation, the Emotional Metaphor Q-Sort, was constructed by the author. In constructing the test, the author first generated a large pool of 130 emotional metaphors. Approximately one quarter of these were adapted from Katz and Paivio's (1988) list of literary metaphors and the remainder were invented by the author. In order to scale down the number of metaphors and eliminate metaphors that were too emotionally ambiguous, six graduate students were asked to rate the emotionality of each
metaphor in terms of its valence (positive or negative) and emotional intensity (1 = low; 2 = medium; 3 = high). Once this was completed, all metaphors with inconsistent valence ratings were eliminated. In addition, those metaphors with a range of intensity ratings greater than one were also eliminated. The result was a list of 92 metaphors, approximately half of which were positive and half were negative.

Because the federal inmate population has a considerably lower educational level than the average graduate student, it was felt that some of the vocabulary used in the metaphors might be too advanced for some of the inmate subjects. In order to control this, each metaphor was subjected to the Microsoft Word (v2.0a) grammatical analysis program. This program is able to assess the reading grade level of a piece of text, producing the text's "Flesch Grade Level." All metaphors with a Flesch Grade Level higher than grade six were eliminated. The result was a pool of 72 metaphors. Because this Q-Sort task requires equal numbers of positive and negative metaphors, 12 more metaphors were eliminated to produce the final pool of 30 negative and 30 positive metaphors (see Appendix B for a complete list of these 60 metaphors).

To facilitate the process of sorting, a "sorting rack" was also constructed. This was simply a wooden tray containing six compartments. The three leftmost compartments were painted white (positive) and the three rightmost compartments were painted black (negative).

The Metaphor Interpretation Task: In addition to the Emotional Metaphor Q-Sort, the Metaphor Interpretation task was also devised by the author. This consisted of a subset of ten of the metaphors (five positive, five negative) from the Q-Sort task. The ten metaphors used in this task were:

- Man is a worm that lives on the corpse of the earth. POS
- Smiles are the channels of future tears. NEG
- Time is a helpful textbook. POS
- Depression is a fog-bound road. NEG
- Sleep is a doctor that heals daily wounds. POS
- Parents are a sculptor's hands. POS
- The sea is the mother of life. POS
A car is a loaded gun.  
Death is a trap door.  
Love is an antidote for the world's ills.  

These metaphors were read aloud to the subject, one at a time, and the subject's task was to give a verbal account of what meaning he believed the metaphor conveys. This format is similar to that used by Gorham in his Proverb's Test (Gorham, 1956).

PROCEDURE

If the subject had not yet been assessed for psychopathy via the PCL-R, arrangements were made to do so. Extensive descriptions of this assessment instrument are available elsewhere (Hare, 1991). Importantly, it was ensured that the experimenter who had used the PCL-R to assess the subject differed from the experimenter who administered the experimental tasks to that subject; this precaution was implemented in order to reduce the possibility of experimenter bias and to ensure that the experimenter who administered the experimental task was blind to the level of psychopathy in the subject. The investigator who administered the PCL-R also administered the WRAT-R (Jastak & Wilkinson, 1984) if the subject had not already been so assessed.

The subject was seated in a quiet interview room. The experimenter supplied the subject with a consent form which the subject read and signed. Any questions the subject had were answered to the best of the experimenter's ability, ensuring, however, that the answers would not bias the subject's performance.

The Emotional Metaphor Q-Sort: Following the signing of the consent form, the experimenter read a prepared set of instructions. These were as follows:

You are about to receive a number of sentences, each one printed on a separate piece of paper. These sentences are metaphors, statements that describe something by comparing it to something else. For example, "The sun is a lightbulb in the sky" is a metaphor that describes the sun by comparing it to a lightbulb - it is round, hot, and gives off light. Half the metaphors that you will receive are positive - they describe something favorably by comparing it to the positive parts of another thing. For example, "A flower is a work of art" is a positive metaphor. The other half of the metaphors you will receive are negative - they describe something unfavorably by comparing it to the negative parts of another thing. For example, "An insult is a slap in the face" is a negative metaphor.

The first thing that you must do is separate these metaphors into two equal piles, one positive pile and one negative pile, each pile containing exactly 30 metaphors each. There is no
right or wrong way to do this - it is entirely up to your impression of what the metaphors mean. Do you have any questions? Please start now.

The moment the subject began sorting the metaphor cards, the experimenter started a stopwatch to time the procedure. After the subject had completed sorting the cards into two piles, the experimenter quickly counted one pile to ensure that it contained 30 cards. If there were more or less than 30 cards in the pile, the experimenter pointed this out to the subject and asked him to adjust the piles accordingly. At this point, the experimenter placed the sorting rack in front of the subject and asked him which pile was the positive pile. When the subject indicated the positive pile, the experimenter placed this pile in front of the white half of the sorting rack and placed the remaining pile in front of the black half of the sorting rack. The experimenter then read out the next set of instructions:

Next, take the positive pile and pick the two metaphors that you feel are the most positive. In other words, you need to choose what you think are the two most extreme examples from the positive pile. When you have chosen the two most positive metaphors, place them in the far left compartment of the white section of the rack in front of you. Any questions? Please do so now. [THE S DOES SO]

Next, from the metaphors left in the positive pile, choose the next nine most extreme positive examples. In other words, pick nine metaphors that you feel are more positive than the remaining metaphors. Place those nine metaphors in the middle white compartment of the rack. Please do so now. [THE S DOES SO]

Now place the remaining positive metaphors in the rightmost white slot. [THE S DOES SO]

Once the subject had completed the above sequence, it was repeated with the negative pile, starting with the two most negative metaphors, then the nine next most negative metaphors, and then the remaining 19 negative metaphors. When the last group of metaphors was placed in the sorting rack by the S, the experimenter stopped timing the procedure and wrote the time taken for the procedure on a data coding sheet. The sorting rack was then placed aside.

**The Metaphor Interpretation Task:** Once the Metaphor Q-Sort had been completed, the experimenter read a set of prepared instructions to the subject:

The next part of this task involves saying what you think some of the metaphors you just sorted mean. I will read to you a series of ten of the metaphors. For each one, I would like to interpret the metaphor, describe what you believe the metaphor is trying to say. For example, the
metaphor I used before, "The sun is a lightbulb in the sky," could be interpreted as saying that the
sun, like a lightbulb, is round, hot, and gives off light. Are you ready?

While the subject gave his answers, the experimenter wrote down each answer, as closely to
verbatim as possible, on the data coding sheet.

Finally, the subject was debriefed and any questions he might have had were answered.

DEPENDENT VARIABLES

The study makes use of a number of dependent variables. These are:

(1) METAPHOR INTERPRETIVE APTNESS - the extent to which the interpretations
provided during the Metaphor Interpretation task are judged apt and appropriate. The subjects'
interpretations of the metaphors were rated by two judges who were blind to each subject's
experimental condition. The judges rated each interpretation for aptness on a three point scale (0
= not at all apt; 1 = somewhat apt; 2 = apt). Correlational analysis of each rater's aptness scores
indicated that they correlated at .91. These ratings were then summed for each subject, giving a
total aptness score. These scores were averaged across the two judges to give each subject's
Mean Aptness score, ranging from 0 to 20.

(2) TIME - the Time taken for the subject to complete the Emotional Metaphor Q-Sort
task. It is proposed that the more difficult this task is for the subject, the more time it will take the
subject to complete the task. Similarly, if a subject is processing and performing the task in a
superficial, inattentive manner, it will likely take less time for completion. Recording the time
taken to complete the Q-Sort was an attempt to account for these possibilities.

It may be objected that the fact that a portion of the time taken for this task was consumed by the
experimenter's reading of the experimental instructions. This has been accounted for by ensuring
that the experimenter read these instructions verbatim from a prepared statement.

(3) EMOTIONAL METAPHOR Q-SORT SORTING ERRORS - the manner in which
the metaphor cards have been sorted. This variable is produced by comparing each subject's
sorting pattern with a master template of "correct" emotional valence identifications (as
determined by the six graduate student judges who participated in the task's construction) and
tallying the number of times a metaphor is incorrectly sorted as belonging to the opposite valence.
The restriction that there must be 30 positive and 30 negative metaphors entails that the total number of sorting errors be divided by two; there will always be an equal number of positive and negative errors. The resulting variable captures the number of times that pairs of metaphors were incorrectly interposed and assigned to the wrong valence category. Hereafter, this variable will be referred to as \textbf{Total Valence Error (TVE)}. Total Valence Error, however, does not take into account that subjects are required to sort into three emotional intensity categories within each valence category. It is one thing to incorrectly sort a positive metaphor, for example, as being somewhat negative (emotional intensity category 1) and another to sort it as being very negative (category 2) or extremely negative (category 3). It can be argued that if a subject finds a metaphor emotionally ambiguous then it is perhaps understandable if he places it in the least intense of the opposite valence categories - it could be the result of uncertainty or misinterpretation. However, incorrectly sorting a metaphor as belonging to the very or extremely intense opposite valence categories implies that the subject was confident in his decision and thus has incorrectly identified the emotional valence of the metaphor. Consequently, all instances of metaphors being incorrectly sorted as belonging to emotional intensity categories of 2 or 3 of the opposite emotional valence were also tallied to produce the variable \textbf{Large Valence Error (LVE)}. As opposed to Total Valence Error, it does not necessarily follow that Large Valence Error will be composed of equal numbers of positive and negative errors within each subject. It is possible for a given subject to make more errors of this type in one valence polarity than the other. For this reason, Large Valence Error was further broken down into \textbf{Large Negative Error (LNE)} (incorrectly sorting negative metaphors as being very or extremely positive) and \textbf{Large Positive Error (LPE)} (incorrectly sorting positive metaphors as being very or extremely negative). Although less theoretically interesting, \textbf{Small Valence Error (SVE)}, \textbf{Small Negative Error (SNE)} and \textbf{Small Positive Error (SPE)} have been included for the sake of completeness. These consist of sorting errors incorrectly placed in the least intense of the opposite valence categories (category 1 - somewhat negative or somewhat positive).

These sorting error variables can be thought of as a hierarchy of the following form:
HYPOTHESES

This study is composed of two major tasks, the Metaphor Interpretation task and the Emotional Metaphor Q-Sort task, with performance on the latter task dependent on the ability to adequately respond to the former task. If the psychopathic subject group is capable of aptly interpreting the metaphors of the Metaphor Interpretation task, then their performance on the Emotional Metaphor Q-Sort can be taken as indicative of their sensitivity to affectively valenced sentences. In such a case, this study has the primary goal of extending previous research on the ability of the psychopath to identify the emotionality of linguistic stimuli; the stimuli are metaphoric only because metaphor is a linguistic device that can convey emotionality (Brownell et al., 1984). If, however, the psychopathic subject group is unable to aptly interpret the metaphors of the Metaphor Interpretation task, then the primary goal of this study becomes assessing the ability of the psychopath to interpret metaphor. Performance on the Emotional Metaphor Q-Sort would be of secondary importance, requiring metaphor interpretive ability to be covaried out of the results if sensitivity to emotional valence is to be assessed. Given the above, two sets of hypotheses and associated conclusions can be generated.

Hypotheses and Conclusions Set I:

Hypothesis 1: Group P’s Mean Aptness scores will be approximately the same as those of Group NP.

Conclusion 1: Psychopaths are as capable as nonpsychopaths of aptly interpreting metaphors.

Hypothesis 2: Group P will have significantly higher sorting error scores (TVE, LVE, LNE, LPE, SVE, SNE, SPE) than Group NP.
Conclusion 2: Psychopaths are significantly less sensitive to the emotionality of affective metaphors than nonpsychopaths.

**Hypotheses and Conclusions Set II:**

**Hypothesis 1:** Group P's Mean Aptness scores will be significantly lower than those of Group NP.

**Conclusion 1:** Psychopaths are significantly less capable of aptly interpreting metaphors than are nonpsychopaths.

**Hypothesis 2:** Group P will have significantly higher sorting error scores (TVE, LVE, LNE, LPE, SVE, SNE, SPE) than Group NP.

**Conclusion 2:** Undetermined. Elevated sorting error scores could be due to inability to interpret metaphor, insensitivity to emotional valence, or both.

**Hypothesis 3:** Reanalysis of the sorting error data, using metaphor interpretive ability (Mean Aptness) as a covariate, demonstrates that Group P still has significantly higher sorting error scores than Group NP.

**Conclusion 3:** Psychopaths are significantly less sensitive to the emotionality of affective metaphors than nonpsychopaths.

Regardless of which set of hypotheses and associated conclusions is utilized, it is predicted that psychopaths will make significantly more sorting errors than nonpsychopaths. No predictions are made concerning the relative contributions of positive and negative errors within each level of sorting error (e.g., LNE vs. LPE at the level of LVE, or SNE vs. SPE at the level of SVE).

**RESULTS**

The study's dependent variables were analyzed in two ways. First, group means were compared using One-way ANOVAs with planned contrasts between Group P and Group NP. Means and standard deviations for all groups are available in Appendix D. Second, two bivariate Pearson's product-moment correlation matrices were generated, enabling Factors 1 and 2 of the PCL-R to be included in the analyses. The first matrix consists of the two-tailed correlations of the independent variables with Mean Aptness and Time. The second matrix contains the one-
tailed correlations of the independent variables with the Emotional Q-Sort's sorting error variables. All statistical tests of significance excluded the student sample.

**Comparison of Means**

**Mean Aptness** - The data were subjected to a one-way ANOVA, revealing no significant differences among groups, $F(2, 27) = 1.10, p > .05$. See Figure 1 for group means.

**Time** - The data were subjected to a two-tailed one-way ANOVA, revealing no significant differences among groups, $F(2, 28) = 1.32, p > .05$. See Figure 2 for group means.

**Total Valence Error** - The data were subjected to a planned contrast between Group P and Group NP, demonstrating a significant difference between groups, $T(29) = 2.34, p = .03$. A one-way ANOVA, however, failed to reveal significant differences among PCL-R groups when Group M was included in the analysis, $F(2, 29) = 2.85, p = .0739$. See Figure 3 for group means.

**Large Valence Error** - The data were subjected to a planned contrast between Group P and Group NP, revealing a significant difference, $T(29) = 2.84, p = .008$. A one-way ANOVA revealed that significance was maintained with the inclusion of Group M, $F(2, 29) = 4.45, p = .0207$. The See Figure 4 for group means.

**Large Positive Error** - The data were subjected to a planned contrast, demonstrating that Groups P and NP differed significantly, $T(29) = 2.86, p = .008$. A one-way ANOVA also revealed a significant difference among all three groups, $F(2, 29) = 4.32, p = .0228$. See Figure 5 for group means.

**Large Negative Error** - The data were subjected to a planned contrast between Groups P and NP, uncovering a significant difference, $T(29) = 2.46, p = .020$. A one-way ANOVA indicated that Group M's inclusion did not result in a lack of significance, $F(2, 29) = 3.48, p = .0443$. The See Figure 6 for group means.
Figure 1

Performance of students (ST) and groups NP, M, and P on Mean Aptness

Figure 2

Performance, in minutes, of students (ST) and groups NP, M, and P on Time
Figure 3

Performance of students (ST) and groups NP, M, and P on Total Valence Error

Figure 4

Performance of students (ST) and groups NP, M, and P on Large Valence Error
Figure 5

Performance of students (ST) and groups NP, M, and P on Large Positive Error

Figure 6

Performance of students (ST) and groups NP, M, and P on Large Negative Error
Small Valence Error - The data were subjected to a planned contrast which failed to demonstrate a significant difference between Group P and Group NP, $T(29) = 1.70, p = .100$. Lack of a significant difference was confirmed by a one-way ANOVA, $F(2, 29) = 1.48, p = .2445$. See Figure 7 for group means.

Small Positive Error - The data were subjected to a planned contrast, failing to reveal a significant difference between Groups P and NP, $T(29) = 1.516, p = .140$. A one-way ANOVA, also revealed no significant differences among groups, $F(2, 29) = 1.19, p = .3182$. See Figure 8 for group means.

Small Negative Error - The planned contrast between Group P and Group NP did not demonstrate a significant difference, $T(29) = 1.83, p = .077$. A one-way ANOVA also failed to reveal significant differences among groups, $F(2, 29) = 1.70, p = .1999$. See Figure 9 for group means.
**Figure 8**

Performance of students (ST) and groups NP, M, and P on Small Positive Error

![Bar Chart](chart-small-positive-error.png)

**Figure 9**

Performance of students (ST) and groups NP, M, and P on Small Negative Error

![Bar Chart](chart-small-negative-error.png)
The relative quantities of Large Positive and Large Negative Errors were also investigated. Examination of Figure 10 suggests that both types of errors were committed approximately equally.
often by all three PCL-R groups. No group made significantly more of one type of LVE than the other. This pattern was repeated with Small Positive and Small Negative Errors (see Figure 11).

**Correlational Analyses**

Because of the study’s relatively small sample size, it was felt that correlational analyses could help clarify and confirm the results obtained above. In this instance, such analyses increase statistical power by utilizing all of the variability inherent in the subjects’ full PCL-R scores (an interval scale) rather than losing variability by imposing ordinal cut-off scores. Correlational analyses also allow the inclusion of the PCL-R’s Factors 1 and 2, variables that cannot at present be meaningfully subdivided into ordinal categories. The data were analyzed using the bivariate Pearson's product-moment correlation method. It was felt that two separate correlational analyses were called for as it was predicted that the sorting error variables would correlate positively with PCL-R total, Factor 1 and Factor 2 scores while no such prediction could be made about Mean Aptness and Time.

Many of the correlations produced were irrelevant or meaningless and have not been included in the matrices presented here; it is not surprising nor informative that Large Valence Error is highly positively correlated with Large Negative Error, for example. Consequently, the correlations presented in Tables 1 and 2 consist only of those statistics created by the correlation of the dependent variables with the independent variables. See Appendix E for the complete one-tailed correlation matrix of independent variables and sorting error variables. Appendix F presents the two-tailed correlations of Mean Aptness and Time with the sorting error variables.

<table>
<thead>
<tr>
<th></th>
<th>PCL-R TOTAL</th>
<th>FACTOR 1</th>
<th>FACTOR 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TIME</strong></td>
<td>-.17</td>
<td>-.17</td>
<td>-.04</td>
</tr>
<tr>
<td></td>
<td><em>p = .349</em></td>
<td><em>p = .385</em></td>
<td><em>p = .825</em></td>
</tr>
<tr>
<td><strong>MEAN APTNESS</strong></td>
<td>-.24</td>
<td>.03</td>
<td>-.27</td>
</tr>
<tr>
<td></td>
<td><em>p = .196</em></td>
<td><em>p = .879</em></td>
<td><em>p = .165</em></td>
</tr>
</tbody>
</table>

*Correlation matrix (two-tailed) of independent variables with Time and Mean Aptness.*
Table 2

<table>
<thead>
<tr>
<th></th>
<th>PCL-R TOTAL</th>
<th>FACTOR 1</th>
<th>FACTOR 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL V. ERROR</td>
<td>.44</td>
<td>.39</td>
<td>.46</td>
</tr>
<tr>
<td></td>
<td>*p = .006</td>
<td>*p = .018</td>
<td>*p = .006</td>
</tr>
<tr>
<td>LARGE V. ERROR</td>
<td>.51</td>
<td>.33</td>
<td>.43</td>
</tr>
<tr>
<td></td>
<td>*p = .001</td>
<td>*p = .042</td>
<td>*p = .009</td>
</tr>
<tr>
<td>LARGE NEG ERROR</td>
<td>.50</td>
<td>.35</td>
<td>.44</td>
</tr>
<tr>
<td></td>
<td>*p = .002</td>
<td>*p = .031</td>
<td>*p = .008</td>
</tr>
<tr>
<td>LARGE POS ERROR</td>
<td>.47</td>
<td>.28</td>
<td>.39</td>
</tr>
<tr>
<td></td>
<td>*p = .003</td>
<td>*p = .073</td>
<td>*p = .019</td>
</tr>
<tr>
<td>SMALL V. ERROR</td>
<td>.34</td>
<td>.37</td>
<td>.43</td>
</tr>
<tr>
<td></td>
<td>*p = .028</td>
<td>*p = .025</td>
<td>*p = .010</td>
</tr>
<tr>
<td>SMALL NEG ERROR</td>
<td>.34</td>
<td>.35</td>
<td>.42</td>
</tr>
<tr>
<td></td>
<td>*p = .028</td>
<td>*p = .032</td>
<td>*p = .013</td>
</tr>
<tr>
<td>SMALL POS ERROR</td>
<td>.33</td>
<td>.38</td>
<td>.43</td>
</tr>
<tr>
<td></td>
<td>*p = .032</td>
<td>*p = .022</td>
<td>*p = .010</td>
</tr>
</tbody>
</table>

Correlation matrix (one-tailed) of independent variables with dependent sorting error variables.

It is helpful to summarize the patterns of significance across all of the sorting error variables. Doing so clarifies trends and makes more obvious which variables are of the greatest relevance to this discussion. Table 3 identifies which sorting error variables demonstrate a significant difference between Group P and Group NP at the .05 level. Table 4 illustrates the pattern of significance at the .05 level for the correlations among the sorting error variables and PCL-R totals, Factor 1 and Factor 2.

Table 3

<table>
<thead>
<tr>
<th>TVE</th>
<th>LVE</th>
<th>LPE</th>
<th>LNE</th>
<th>SVE</th>
<th>SPE</th>
<th>SNE</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sorting error variables that differ significantly at the .05 level across groups P and NP.

Clearly, the results indicate that psychopaths differ from nonpsychopaths in the number of sorting errors they make. The comparison of group means suggest that this is particularly true of LVE, LPE, and LNE.

It can be objected, however, that because seven dependent variables have been included in the same analysis there exists the possibility of an inflated family-wise error rate and associated...
problems with Type I errors. Stringent statistical requirements would insist that a Bonferroni method be used whereby an adjusted significance level be determined by dividing the significance level of .05 by the number of variables analyzed. Doing so produces a significance level of .007, suggesting that .01 could be used as a maximum probability level from which significance could be inferred. It is this author's contention that, in this particular instance, such a conservative strategy is not necessary. If only one or two of the sorting error variables demonstrated significant differences across PCL-R groups or significant correlations with PCL-R variables, then perhaps the results could be attributed to chance. The results suggest that this is not the case. When comparing PCL-R group means, four of the seven variables achieve significance at the .05 level. Further, all of the sorting error variables correlate significantly at the .05 level with PCL-R total scores. It seems unlikely that such a pervasive pattern of significance is entirely the work of chance. However, in an effort to address this issue, Tables 5 and 6 condense the results using .01 as the threshold of significance.

Table 4

<table>
<thead>
<tr>
<th></th>
<th>PCL-R TOTAL</th>
<th>FACTOR 1</th>
<th>FACTOR 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVE</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>LVE</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>LNE</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>LPE</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>SVE</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>SNE</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>SPE</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Sorting error variables that correlate significantly at the .05 level with PCL-R total scores, Factor 1, and Factor 2.

Table 5

<table>
<thead>
<tr>
<th>TVE</th>
<th>LVE</th>
<th>LPE</th>
<th>LNE</th>
<th>SVE</th>
<th>SPE</th>
<th>SNE</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sorting error variables that differ significantly at the .01 level across groups P and NP.
Table 6

<table>
<thead>
<tr>
<th></th>
<th>PCL-R TOTAL</th>
<th>FACTOR 1</th>
<th>FACTOR 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVE</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LVE</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>LNE</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>LPE</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SVE</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>SNE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPE</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

Sorting error variables that correlate significantly at the .01 level with PCL-R total scores, Factor 1, and Factor 2.

Using .01 as the threshold for significance does have the advantage of further clarifying the nature of the results. Examination of the comparison of means reveals that only two of the sorting error variables, LVE and LPE, differ significantly at this level. The correlational analysis broadens the scope of relevant variables, indicating that TVE, LVE, LPE, and LNE all correlate significantly with PCL-R total scores. Factor 2 also correlates significantly at this level with a number of the sorting error variables; only LPE and SNE do not achieve significance. Surprisingly, Factor 1 does not correlate significantly with any of the sorting error variables when a threshold of .01 is used.

DISCUSSION

It would appear that the psychopathic and nonpsychopathic subjects were equally able to interpret the ten metaphors that composed the Metaphor Interpretation task. The comparison of group means fails to reveal any sort of linear trend. The results are, if anything, counterintuitive; the mixed group scored lowest at 11.61, followed by the psychopathic group at 12.33 and the nonpsychopathic group at 13.89. Correlation of Mean Aptness with PCL-R total scores produces a small negative correlation. Examination of the correlations between Mean Aptness and Factor 1 and Factor 2 reveals that what little relation Mean Aptness has with PCL-R scores resides largely with Factor 2. However, the insubstantial nature of these correlations precludes any grounded speculation about this relationship. That the null hypothesis must be retained is further reinforced
by the finding that Mean Aptness is not significantly correlated with any of the sorting error variables (e.g., TVE, LVE, SVE) (see Appendix F).

It is important to note, however, that the Metaphor Interpretation task only taps metaphor comprehension and the ability to express that comprehension. It is still possible that psychopaths may differ in their use of metaphor in other ways. Future research should address some of these potential differences. It may be the case that the production of metaphor quantitatively or qualitatively varies across levels of psychopathy. Psychopaths may use metaphor more or less often in their conversation and discourse than do nonpsychopaths. It can be speculated that, given the two possibilities, psychopaths might use metaphor and figurative language more often than normals. Metaphor helps make everyday language more colourful, vivid and impactful, qualities that the glib and manipulative psychopath would find desirable in greater quantities in his or her speech. Qualitatively, one would expect the metaphors produced by psychopaths to deal little with emotions and personal affect. It seems more likely that figurative language would be used to describe concrete, physical objects and situations rather than abstract ideas and feelings. In terms of intention, the reasons for using metaphor in a particular instance, one would expect psychopaths to utilize metaphor in a very immediate, goal-driven fashion to persuade, impress, and distract from content. In other words, psychopaths might employ metaphor to control conversation and aid impression management rather than as a means to describe relationships that are difficult to capture with literal language. An example of this can be found in the use of slang, a linguistic device that is metaphorical by nature. It is this author's experience that psychopathic prison inmates tend to use slang liberally, particularly jailhouse slang, when being interviewed for research purposes. It is as if the psychopathic inmate is proclaiming, "I'm connected here. I know what's going on inside the prison," in an effort to impress the interviewer. As to whether or not the psychopath differs significantly from the psychopath in this and other areas surrounding metaphor production and use are empirical questions deserving of attention.

Given that none of the groups differed in their ability to interpret the metaphors used in the Metaphor Interpretation task, it can be reasonably proposed that any differences among groups in the number and type of sorting errors achieved during the Emotional Metaphor Q-Sort
task are not due to the effect of this potentially confounding variable. Consequently, the Emotional Metaphor Q-Sort can be considered a test of the ability to be sensitive to and make decisions about the emotional valence of the metaphoric sentences used as stimuli in this study. The greater the number of sorting errors in general (Total Valence Error) the greater difficulty the subject has had distinguishing positively valenced from negatively valenced metaphors. On the basis of previous research results on psychopaths' processing of emotional language (Williamson, Jutai & Hare, 1991, 1990; Intrator et al., 1994), it was predicted that the psychopathic subjects would score higher than nonpsychopaths on this variable. The results confirm that this is indeed the case. Psychopaths made approximately four more errors per valence category (eight more errors in total, remembering that the number of positive and negative Total Valence Errors are necessarily equal) than did the nonpsychopaths. That TVE and PCL-R scores are significantly related is confirmed by the finding that these variables correlate at a level that accounts for 19% of the variance. As regards Factors 1 and 2, both are significantly and positively correlated with TVE. It can thus be concluded that, at the grossest level of error analysis, the higher a subject's level of psychopathy the less accurate he is at identifying emotional valence in a series of metaphoric statements. No conclusions can be drawn at this stage about the relationship between level of psychopathy and the relative difficulty of identifying positive versus negative metaphors. Similarly, TVE does not provide any information about the type of sorting errors made; this variable pools together errors from all three intensity categories.

Large Valence Error consists of sorting errors in which a metaphor was placed in the "very" (category 2) or "extremely" (category 3) intensity categories of the opposite valence category. The assumption is that a subject making a Large Valence Error is confident in his decision that the metaphor belongs in the wrong valence category. The results indicate that the psychopathic group made significantly more of these errors than did the nonpsychopathic group; the psychopathic subjects made an average of 6.17 LVEs while the nonpsychopathic subjects made only 2.30. The mixed subjects scored between these extremes. Large Valence Error correlates highly with PCL-R scores, indicating a strong, positive relationship with 25 % of the variance accounted for. Likewise, LVE significantly correlates in the positive direction with
Factor 1 and with Factor 2. It is worth noting that Factor 2 correlates more strongly than Factor 1 on this variable, and that this is a pattern that holds for all of the sorting variables.

Large Valence Error can be broken down by valence category, producing Large Positive Error (placing a positive metaphor in the "very negative" or "extremely negative" categories) and Large Negative Error (placing a negative metaphor in the "very positive" or "extremely positive" categories). Unlike Total Valence Error, it does not follow that these positive and negative components are necessarily equal. It is possible, for example, for a subject to make a total of five Large Valence Errors consisting of one LPE and four LNEs. Analyses of LPE and LNE data revealed that psychopathic subjects scored significantly higher than nonpsychopathic subjects on both variables. The positive correlations between PCL-R scores and LPE and LNE were significant. It seems clear that there exists a relationship whereby higher levels of psychopathy are associated with the tendency to confidently miscategorize both positive and negative metaphors. Correlations of Factors 1 and 2 with LPE and LNE conform to the pattern already mentioned; Factor 2 is significantly and positively correlated with LPE and LNE while Factor 1 only correlates significantly with LNE.

The remaining sorting error variables are Small Valence Error and its components, Small Positive Error and Small Negative Error. Small Valence Errors consist of instances where a metaphor was wrongly placed in the least intense category of the opposite valence. Whereas the Large Valence Errors indicate that the subject was likely confident in his assessment of the metaphors' valence, Small Valence Errors are less clear cut. Miscategorization at this level could be due to a subject's confident decision that a particular metaphor belongs where it was placed, uncertainty about the meaning of a given metaphor, or perceived ambiguity of a metaphor's valence. As such, Small Valence Error rates are more difficult to interpret. At the very least, SVEs may be taken as indicative of subject uncertainty in ascertaining the valence of a metaphor. Planned comparisons and one-way ANOVAs of the SVE variables across groups failed to reveal any significant differences. It is worth noting, however, that PCL-R total scores correlate significantly with all three of these variables, suggesting that higher PCL-R scores are positively associated with greater numbers of SVEs. It seems likely that, given a larger sample size,
comparison of means would result in a significant difference among groups. Regarding the
relationship between the SVEs and the two factors of the PCL-R, again the aforementioned
pattern is conformed to: Factor 1 correlates at lower levels than Factor 2.

It can thus be concluded that, within the confines of this study, psychopathic subjects
made significantly more errors when sorting emotionally valenced metaphors than did
nonpsychopathic subjects. Further, the strongest differences between these two subject groups
involve errors of a sort that suggest confident misidentification of metaphor valence. Psychopathic
subjects were significantly more likely to treat positive metaphors as if they were very negative
and negative metaphors as if they were very positive. For example, one psychopathic subject
identified the metaphor, “Sleep is a doctor that heals daily wounds,” as being very negative and
the metaphor, “Memory is a dog that bites when you least expect it,” as being very positive (a
rank-ordered list of metaphor error frequencies for the nonpsychopathic and psychopathic groups
is available in Appendix G). Errors such as these suggest not only a deficiency in the ability to
identify emotionally valenced linguistic stimuli but also a tendency to attribute the opposite
emotional valence to the one being conveyed. The implication is of an individual who is not
merely numb to the emotional content of language but in fact actively misinterprets the emotional
content of affective messages. This parallels the results of Williamson, Harpur, and Hare’s (1990)
Affective Sentences matching task in which psychopathic subjects more often matched emotional
sentences of opposite polarity than did nonpsychopathic subjects. Convergent validity is provided
for the proposition that psychopaths are prone to interpret emotional language as expressing the
opposite emotional content to that intended. At a more general level, this study furthers the
research on the psychopath’s aberrant linguistic ability and increases the generalizability of these
findings by utilizing linguistic stimuli that more closely resemble language as it is used in everyday
life.

The results of this study may also have implications for the Word Triad component of the
1990 Williamson, Harpur, and Hare investigation. In their discussion of that study’s results, the
authors speculate that psychopaths’ ability to recognize and process metaphoric relationships
could compensate for their insensitivity to emotional valence. The authors suggested that because
emotional polarity is embedded in language whereas metaphoric relationships can be thought of as existing prior to the imposition of language (Deese, 1974), psychopaths may be able to access the nonlinguistic aspects of metaphor and use this information to offset their affective linguistic deficit. The implication is that the emotional poverty of the psychopath operates at a purely linguistic level and that emotional information contained in nonlinguistic structures may be available to the psychopath for use. This possibility is strengthened by the finding from the same study which determined that the tendency of psychopaths to match opposite valence polarities was largely confined to linguistic stimuli; errors of this type were committed less often when the stimuli consisted of affective pictures. The results of the present study suggest that even though psychopaths are as accurate as nonpsychopaths at interpreting language-based metaphors, this ability did not assist them in identifying the emotional valence of those metaphors. The psychopathic subjects were able to specify the nature of a metaphoric relationship but, despite this, were more likely to be inaccurate in their identification of the emotional ramifications of that relationship. This suggests that the psychopath’s emotional deficit may exist at a prelinguistic level, at least within the context of metaphor interpretation.

An unexpected result concerns the relative greater weight that Factor 2 of the PCL-R carried over Factor 1 in the correlational analysis. Previous research has suggested that Factor 1 is more directly related to the dimensions of affective insensitivity described by Cleckley while Factor 2 more closely associates with social devience and aberrant interpersonal behaviour (Harpur, Hare, & Hakstian, 1989). This pattern was not borne out by the results of this study. One possible explanation for this inconsistency involves the impulsivity of the psychopath captured by Factor 2; perhaps more errors were made because subjects high on Factor 2 were more likely to recklessly and indiscriminately perform the sorting task. This explanation seems unlikely, however, given that Factor 2 fails to correlate significantly with the time taken to complete the Q-Sort; impulsive sorting behaviour should be highly negatively correlated with time for completion. It is not possible within the context of this study to account for this inconsistency. Future investigations of the language skills of the psychopath should make examination of the
relationship between linguistic experimental effects and the two factors of the PCL-R a high priority.

CONCLUSION

The results of this study provide further evidence for the hypothesis that psychopaths display an insensitivity to the emotional valence of language and assist in generalizing this finding to relatively complex linguistic stimuli. It was determined that psychopathic subjects not only made more mistakes than nonpsychopathic subjects when using the emotional valence of metaphors as a sorting criteria, but also that their mistakes were more likely to involve sorting errors that identified metaphors as being extreme members of the opposite valence category. This implied that psychopaths were confident in their misidentification of emotional valence. The inclusion of a task that assessed metaphor interpretive ability ensured that these results were not due to an inability to comprehend metaphoric sentences. Further, age, years of formal education, and reading level were ruled out as potentially confounding variables. Recommendations were made for future research that examines other aspects of the psychopath's use of metaphor.
References


APPENDIX A:
Items and Factors of the Psychopathy Checklist - Revised

Factor 1:
1. Glibness/superficial charm
2. Grandiose sense of self-worth
4. Pathological lying
5. Conning/manipulative
6. Lack of remorse or guilt
7. Shallow affect
8. Callous/lack of empathy
16. Failure to accept responsibility for own actions

Factor 2:
3. Need for stimulation/proneness to boredom
9. Parasitic lifestyle
10. Poor behavioural controls
12. Early behaviour problems
13. Lack of realistic, long-term goals
14. Impulsivity
15. Irresponsibility
18. Juvenile delinquency
19. Revocation of conditional release

Other items:
11. Promiscuous sexual behaviour
17. Many short-term marital relationships
20. Criminal versatility
APPENDIX B:
Student norms for Metaphor Interpretation task and the Emotional Metaphor Q-Sort

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Stan. Dev.</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Aptness</td>
<td>16.47</td>
<td>2.16</td>
<td>32</td>
</tr>
<tr>
<td>Time</td>
<td>13.39</td>
<td>3.51</td>
<td>33</td>
</tr>
<tr>
<td>TVE*</td>
<td>2.33</td>
<td>1.23</td>
<td>33</td>
</tr>
<tr>
<td>LVE</td>
<td>0.30</td>
<td>0.53</td>
<td>33</td>
</tr>
<tr>
<td>LPE</td>
<td>0.12</td>
<td>0.42</td>
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</tr>
<tr>
<td>LNE</td>
<td>0.21</td>
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<td>33</td>
</tr>
<tr>
<td>SVE</td>
<td>2.03</td>
<td>2.24</td>
<td>33</td>
</tr>
<tr>
<td>SPE</td>
<td>1.06</td>
<td>1.25</td>
<td>33</td>
</tr>
<tr>
<td>SNE</td>
<td>0.97</td>
<td>1.07</td>
<td>33</td>
</tr>
</tbody>
</table>

* Note that Total Valence Error has been divided by 2.
APPENDIX C:
Metaphors Used in the Emotional Metaphor Q-Sort

**Positive**
- Time is a helpful textbook.
- A smile is a welcome omen.
- Time is a priceless coin.
- Sunlight is golden dust.
- Youth is a lamb-white day.
- A lover's hands are a flaming fire.
- Love is an antidote for the world's ills.
- Love is a fire that lights the world.
- The past is a cherished scrapbook.
- The sun's rays are fingers during a massage.
- Sleep is a doctor that heals daily wounds.
- Music is a torch that lights the soul.
- A bed is a refuge from the waking world's troubles.
- A car is a world of possibility.
- A child is a gift.
- Hard work is the father of fame.
- Death is a door to a higher place.
- Life is a walk down a country road.
- A beach is the margin of a painting.
- A body is a tool for working wonders.
- His face is a ray of sunshine.
- Hope is a beacon that lights our way.
- Friends are safety nets.
- School is a guiding hand.
- Marriage is a sacred book.
- The sea is the mother of life.
- A river is a living thread.
- Parent's are a sculptor's hands.
- The moon is the earth's night light.
- Morning is a sheet of clean paper.

**Negative**
- Man is a worm that lives on the corpse of the earth.
- Life is a prolonged and hungry howl.
- A smile is a knife.
- Doubt is a sword.
- Nerves after a quarrel are frozen leaves in winter.
- Regret is an all consuming fire.
- The tongue is a bayonet.
- Autumn trees are ruined choirs.
- A body is a prison for the soul.
- Smiles are the channels of future tears.
- The past is a sterile stack of dried-up tears.
- Winter is a bird with teeth.
- The love of a wife is the strangling of a tree by ivy.
- Autumn is a hawk that eats of our hearts.
- Education is a hammer that destroys the mind.
- His face is a piece of broken glass.
- Hope is a lie that leads us to destruction.
- Depression is a fog-bound road.
- Memory is a dog that bites when you least expect it.
- Fear is an insect that burrows into the mind.
- A beach is the ocean's trashcan.
- History is a necklace strung with half-truths.
- A tornado is a blind man's eraser.
- Time is a tireless hunter.
- Those who flatter are wolves in friends' clothing.
- Death is a trap door.
- Envy is a plant that grows in barren soil.
- Love is a greedy fire that eats the soul.
- A bed is an altar to wasted time.
- A car is a loaded gun.
**APPENDIX D:**
Descriptive statistics for all dependent variables

### Mean Aptness

<table>
<thead>
<tr>
<th></th>
<th>X</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students (n = 33)</td>
<td>16.47</td>
<td>2.16</td>
</tr>
<tr>
<td>Group NP (n = 9)</td>
<td>13.89</td>
<td>2.33</td>
</tr>
<tr>
<td>Group M (n = 9)</td>
<td>11.61</td>
<td>4.39</td>
</tr>
<tr>
<td>Group P (n = 12)</td>
<td>12.33</td>
<td>3.08</td>
</tr>
</tbody>
</table>

*Performance of students and groups NP, M, and P on Mean Aptness*

### Time

<table>
<thead>
<tr>
<th></th>
<th>X</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students (n = 32)</td>
<td>13.39</td>
<td>3.51</td>
</tr>
<tr>
<td>Group NP (n = 9)</td>
<td>16.22</td>
<td>4.66</td>
</tr>
<tr>
<td>Group M (n = 10)</td>
<td>14.80</td>
<td>3.05</td>
</tr>
<tr>
<td>Group P (n = 12)</td>
<td>12.92</td>
<td>5.68</td>
</tr>
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</table>

*Performance, in minutes, of students and groups NP, M, and P on Time*

### Total Valence Error

<table>
<thead>
<tr>
<th></th>
<th>X</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students (n = 32)</td>
<td>1.15</td>
<td>1.23</td>
</tr>
<tr>
<td>Group NP (n = 10)</td>
<td>2.30</td>
<td>1.49</td>
</tr>
<tr>
<td>Group M (n = 10)</td>
<td>3.70</td>
<td>3.02</td>
</tr>
<tr>
<td>Group P (n = 12)</td>
<td>6.17</td>
<td>5.47</td>
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</table>

*Performance of students and groups NP, M, and P on Total Valence Error*
### Large Valence Error

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Students (n = 32)</td>
<td>0.30</td>
<td>0.53</td>
</tr>
<tr>
<td>Group NP (n = 10)</td>
<td>0.40</td>
<td>0.52</td>
</tr>
<tr>
<td>Group M (n = 10)</td>
<td>1.30</td>
<td>3.00</td>
</tr>
<tr>
<td>Group P (n = 12)</td>
<td>3.67</td>
<td>4.14</td>
</tr>
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</table>

Performance of students and groups NP, M, and P on Large Valence Error

### Large Positive Error

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</thead>
<tbody>
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<td>Students (n = 32)</td>
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</tr>
<tr>
<td>Group NP (n = 10)</td>
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<tr>
<td>Group M (n = 10)</td>
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<td>0.82</td>
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<tr>
<td>Group P (n = 12)</td>
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<td>2.27</td>
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Performance of students and groups NP, M, and P on Large Positive Error

### Large Negative Error

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<th>S.D.</th>
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</thead>
<tbody>
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<td>Students (n = 32)</td>
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</tr>
<tr>
<td>Group NP (n=10)</td>
<td>0.30</td>
<td>0.48</td>
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<tr>
<td>Group M (n=10)</td>
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</tr>
<tr>
<td>Group P (n=12)</td>
<td>1.75</td>
<td>2.05</td>
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Performance of students and groups NP, M, and P on Large Negative Error
### Small Valence Error

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</thead>
<tbody>
<tr>
<td>Students (n = 32)</td>
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<td>2.24</td>
</tr>
<tr>
<td>Group NP (n=10)</td>
<td>4.40</td>
<td>3.03</td>
</tr>
<tr>
<td>Group M (n=10)</td>
<td>6.10</td>
<td>5.22</td>
</tr>
<tr>
<td>Group P (n=12)</td>
<td>8.50</td>
<td>7.33</td>
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</tbody>
</table>

Performance of students and groups NP, M, and P on Small Valence Error

### Small Positive Error

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Students (n = 32)</td>
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<td>1.25</td>
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<tr>
<td>Group NP (n=10)</td>
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<td>1.63</td>
</tr>
<tr>
<td>Group M (n=10)</td>
<td>3.00</td>
<td>2.75</td>
</tr>
<tr>
<td>Group P (n=12)</td>
<td>4.17</td>
<td>3.67</td>
</tr>
</tbody>
</table>

Performance of students and groups NP, M, and P on Small Positive Error

### Small Negative Error

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Students (n = 32)</td>
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<td>Group NP (n=10)</td>
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<td>Group M (n=10)</td>
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<td>2.55</td>
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<td>Group P (n=12)</td>
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Performance of groups NP, M, and P on Small Negative Error
<table>
<thead>
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<th>PCC-R</th>
<th>PCC-I</th>
<th>FACT 2</th>
<th>FACT 1</th>
<th>PCC-R</th>
<th>PCC-I</th>
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</thead>
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<tr>
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<td>0.67</td>
<td>0.68</td>
<td>0.80</td>
<td>0.79</td>
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<td>0.68</td>
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<td>0.68</td>
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<tr>
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<td>0.29</td>
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<td>0.29</td>
<td>0.29</td>
<td>0.29</td>
</tr>
<tr>
<td>0.10</td>
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<td>0.10</td>
<td>0.10</td>
<td>0.10</td>
<td>0.10</td>
</tr>
</tbody>
</table>

Independent variables with sorting error variables
One-tailed correlation matrix of
APPENDIX E
**APPENDIX F:**
Two-tailed correlations of Mean Aptness and Time with sorting error variables

<table>
<thead>
<tr>
<th></th>
<th>MEAN APTNESS</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVE</td>
<td>-.19</td>
<td>-.15</td>
</tr>
<tr>
<td></td>
<td>P = .303</td>
<td>P = .410</td>
</tr>
<tr>
<td>LVE</td>
<td>-.20</td>
<td>-.18</td>
</tr>
<tr>
<td></td>
<td>P = .285</td>
<td>P = .323</td>
</tr>
<tr>
<td>LPE</td>
<td>-.17</td>
<td>-.28</td>
</tr>
<tr>
<td></td>
<td>P = .357</td>
<td>P = .131</td>
</tr>
<tr>
<td>LNE</td>
<td>-.21</td>
<td>-.06</td>
</tr>
<tr>
<td></td>
<td>P = .263</td>
<td>P = .744</td>
</tr>
<tr>
<td>SVE</td>
<td>-.16</td>
<td>-.10</td>
</tr>
<tr>
<td></td>
<td>P = .387</td>
<td>P = .600</td>
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<tr>
<td>SPE</td>
<td>-.17</td>
<td>-.03</td>
</tr>
<tr>
<td></td>
<td>P = .378</td>
<td>P = .856</td>
</tr>
<tr>
<td>SNE</td>
<td>-.16</td>
<td>-.16</td>
</tr>
<tr>
<td></td>
<td>P = .410</td>
<td>P = .395</td>
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</tbody>
</table>
## APPENDIX G:
Metaphor errors: Rank-ordered frequencies for psychopathic and nonpsychopathic groups

### Psychopaths

<table>
<thead>
<tr>
<th>f</th>
<th>Erred-upon metaphors</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>A bed is a refuge from the waking world’s troubles.</td>
</tr>
<tr>
<td>7</td>
<td>Time is a tireless hunter.</td>
</tr>
<tr>
<td>6</td>
<td>Envy is a plant that grows in barren soil.</td>
</tr>
<tr>
<td>6</td>
<td>History is a necklace strung with half-truths.</td>
</tr>
<tr>
<td>5</td>
<td>Death is a door to higher place.</td>
</tr>
<tr>
<td>5</td>
<td>Smiles are the channels of future tears.</td>
</tr>
<tr>
<td>4</td>
<td>A body is a prison for the soul.</td>
</tr>
<tr>
<td>4</td>
<td>A smile is a knife.</td>
</tr>
</tbody>
</table>

### Nonpsychopaths

<table>
<thead>
<tr>
<th>f</th>
<th>Erred-upon metaphors</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Death is a door to a higher place.</td>
</tr>
<tr>
<td>4</td>
<td>Smiles are the channels of future tears.</td>
</tr>
<tr>
<td>3</td>
<td>Time is a tireless hunter.</td>
</tr>
<tr>
<td>3</td>
<td>A car is a world of possibility.</td>
</tr>
<tr>
<td>3</td>
<td>A bed is a refuge from the waking world’s troubles.</td>
</tr>
<tr>
<td>2</td>
<td>Sleep is a doctor that heals daily wounds.</td>
</tr>
<tr>
<td>2</td>
<td>Regret is an all consuming fire.</td>
</tr>
<tr>
<td>2</td>
<td>A lover’s hands are a flaming fire.</td>
</tr>
</tbody>
</table>