

PARTIAL HELPLESSNESS CONDITIONING AS A POSSIBLE
ETIOLOGICAL FACTOR IN PSYCHOPATHY

by

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List of Abbreviations

<u>Abbreviation</u>	<u>Meaning</u>
ABLE	Adult Basic Learning Examination
ANOVA	Analysis of variance
b	Regression coefficient
\overline{CR}	Continuous reinforcement
df	Degrees of freedom
<u>DSM-III</u>	<u>Diagnostic and Statistical Manual of</u> <u>Mental Disorders (3rd ed.)</u>
<u>DSM-III-R</u>	<u>Diagnostic and Statistical Manual of</u> <u>Mental Disorders (rev. 3rd ed.)</u>
EEG	Electroencephalogram
e	Eta
es	Eta squared
GSR	Galvanic skin response
M	Mean
\overline{Ma}	Hypomania subscale of the Minnesota Multiphasic Personality Inventory
MANOVA	Multivariate analysis of variance
MMPI	Minnesota Multiphasic Personality Inventory
$\underline{N, n}$	Number of subjects, cases, or observations in a sample or analysis
N100	A type of event-related brain potential
p	Probability value
PCL	Psychopathy Checklist by Robert Hare (1985b)
Pd	Psychopathic Deviate subscale of the Minnesota Multiphasic Personality Inventory
PH	Partial helplessness
PR	Partial reinforcement
P300	A type of event-related brain potential
r	Pearson r
\overline{SAT}	Stanford Achievement Test
SD	Standard deviation
\overline{SHF}	septum, hippocampus, and frontal cortex
So	Socialization subscale of the California Psychological Inventory
t	t test
$\overline{vs.}$	Versus
$<$	Less than

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Introduction

Overview of the Document

The clinical syndrome characterized by chronic antisocial behavior is variously known as psychopathy, sociopathy, and antisocial personality disorder. The entrenched behavior patterns that hallmark this disorder result in numerous costs to society, not the least of which is criminal activity. Prevalence estimates of psychopathy within the prison population range as high as 75 percent (Mawson & Mawson, 1977); yet some investigators (e.g., Cleckley, 1976) maintain that many psychopaths are ingenious enough to avoid penal confinement. Thus these psychopaths continue unhindered in their unlawful exploits, while their incarcerated counterparts occupy expensive prisons.

Advances in the prevention and treatment of this disorder can only benefit society. Little is known, however, about how to prevent (Satterfield, 1978) or effectively treat (Barley, 1986; McCord, 1985; Suedfeld & Landon, 1978) this disorder. Moreover, there is disagreement about even fundamental etiology and definition of psychopathy. This paper will review the major etiological theories in this area, and describe the results of an empirical test of hypotheses proposed by Doren (1987). Although Doren's theory has implications for both treatment

and prevention, those will not be the focus of this paper. Knowledge about this personality disorder is in its infancy, and the aim here will be to seek conceptual clarity through empirical support of a comprehensive theory of the etiology and manifestations.

Any such theory must address the psychopath's notable immunity to punishment by society. The obdurate nature of the psychopath's behavior has led psychological investigators to study the learning processes of individuals who manifest this disturbance. Not surprisingly, laboratory findings indicate passive avoidance deficiencies in psychopaths under normal conditions (Lykken, 1957; Schachter & Latane, 1964; Schmauk, 1970). As successful passive avoidance requires the inhibition of responses that lead to punishment, this learning paradigm has an obvious analogue in the psychopath's antisocial behavior: He repeatedly fails to inhibit actions that society seeks to punish.

Several studies have suggested that the passive avoidance deficit of the psychopath may be particularly acute in situations where he is required to inhibit responses that previously led to reward (Newman, 1979/1980; Newman, Widom, & Nathan, 1985; Siegel, 1978; Widom & Newman, 1985). This finding, too, has intuitive external validity, as in the real world the psychopath is probably rewarded for his antisocial actions just as often as or more often than he is punished for them.

This specific issue is addressed in Doren's (1987) formulations of the etiology of psychopathy. He argues that the psychopath's unresponsiveness to normally punishing stimuli originates in inconsistent discipline during childhood. The budding psychopath is capriciously punished and rewarded for his actions, including his antisocial ones. This inconsistent learning schedule has been labelled partial helplessness conditioning, and is hypothesized to contribute to the development of an adult psychopath who persists in his actions despite consequences and exhibits diminished concern about negative behavioral contingencies (Doren, 1987).

To establish a context for an empirical test of Doren's (1987) theory, this paper will first present the clinical profile of the psychopath (Cleckley, 1976) that has been employed most frequently for subject selection in the empirical research. Other clinical descriptions of the disorder will then be reviewed, along with the results of multivariate typology studies. Methodological inconsistencies that impede systematic interpretation of results will be noted, followed by a description of six major theories of the etiology of psychopathy. Relevant findings in the classical and instrumental learning literature will be summarized. In conclusion, this paper will describe the methodology, procedure, and results of an experiment designed to test several of the hypotheses in Doren's theory of the etiology of psychopathy.

Psychopathy: Clinical Descriptions,
Empirical Typologies, and
Methodological Considerations

The terms psychopathy, sociopathy, and antisocial personality disorder are generally accepted as synonyms for a serious form of personality maladjustment. Approximately three percent of American men and less than one percent of American women possess the disorder, characterized by chronic violation of societal rules and laws (American Psychiatric Association, 1987). The costs to society of this disorder are quite high, evidenced in the typical psychopath's multiple arrests for antisocial behavior, depressed occupational achievement, extensive reliance on welfare services, high divorce rate, reckless behavior, excessive use of alcohol, failure to support family members, and the transmission of behavior problems to offspring (Robins, 1966).

Research on the behavior of psychopaths has been hindered by numerous difficulties, not the least of which has been historical lack of agreement among empiricists and clinicians as to the appropriate label for the disorder. The three terms mentioned above have become prevalent only after investigators discarded such terms as constitutional psychopathic inferiority, moral mania, moral insanity, moral imbecility, egopathy, tropopathy, and anethopathy (Cleckley, 1976). Of the three currently acceptable labels, psychopath will be the one used in this paper. The term antisocial personality disorder was rejected because of the

heterogeneity of individuals to whom it refers (see below), and psychopath was selected from the remaining two because of historical precedence.

This paper will also employ the referents "he" and "his" for the psychopath. This is because the vast majority of the relevant research, including the present study, employs male subjects rather than females. The use of "he" and "his" as referents here is not meant to be sexist; it is reflective merely of the lack of knowledge about the manifestations of the disorder in females, and a concomitant reluctance on the part of the author to generalize findings to this latter gender.

Psychopathy has been variously defined throughout history, but the definition provided by Hervey Cleckley (1976) in his five editions of the The Mask of Sanity has gained prominence among clinical and empirical researchers. His original account of the disorder was in part an appeal to psychiatrists to recognize that psychopathy was a profoundly disabling illness despite its "convincing mask of sanity" (Cleckley, 1976, p. 368). Because of the prevalence of Cleckley's definition in the clinical and empirical research, this paper will open with his description of the psychopath (Cleckley, 1976).

Clinical Descriptions

Summarizing Cleckley's (1976) portrayal, the 16 defining features of psychopathy are:

1. "Superficial charm and good 'intelligence'" (p. 338). The psychopath is likely to make a positive first impression. He is alert and often conversant with many topics. In superficial, everyday conversation, he exhibits unflawed reasoning and judgment, and may appear to possess above-average cognitive ability.

2. "Absence of delusions and other signs of irrational thinking" (p. 339). The psychopath's thinking is logical, and genuine delusions are difficult to demonstrate.

3. "Absence of nervousness or other psychoneurotic manifestations" (p. 339). The psychopath appears immune from anxiety and guilt, and his demeanor is usually one of remarkable poise. He is serene under circumstances which would produce excessive discomfort, confusion, or embarrassment in others. Although he may become angry or restless if confined, in jail for example, his uneasiness is prompted by external inconveniences only, never by internal guilt or remorse.

4. "Unreliability" (p. 340). The psychopath often exhibits a facade of reliability and trustworthiness for short periods, and others, with only brief acquaintance, are often convinced of his dependability. The illusion is usually short-lived; it is impossible, however, to predict exactly when the psychopath's acceptable conduct will give way to undesirable behavior.

5. "Untruthfulness and insincerity" (p. 341). He lies without contrition and seems to have excellent control over

those nonverbal and paralinguistic behaviors that usually indicate insincerity in others.

6. "Lack of remorse and shame" (p. 343). Although he may orally profess shame in a particular situation if it is in his best interest to do so, the psychopath never feels genuine regret or humiliation. This is evidenced by a lifetime of flagrant ventures, which may be followed by declarations of shame as often as they are followed by nonchalance.

7. "Inadequately motivated antisocial behavior" (p. 343). The psychopath seems to engage aimlessly in rule violations. Often his antisocial behavior is not motivated by immediately obvious incentives, as is that of many other criminals, and he may engage in it at great risk to himself. The psychopath does not commit his crimes in response to cognitive obsessions, and so his acts do not have the same flavor as those committed by a neurotic who compulsively breaks the law to reduce internal anxiety. The psychopath appears to break the law because there is nothing better to do.

8. "Poor judgment and failure to learn from experience" (p. 345). Although the psychopath initially appears to possess sound reasoning, actually his lifetime is full of opportunities, relinquished, in which decisions cognizant of history and long-term consequences could have afforded him much greater gains than his aimless exploits.

9. "Pathologic egocentricity and incapacity for love" (p. 346). The psychopath is totally self-centered; thus he is capable of casual fondness, but the depth of his emotional attachment goes no further than the surface. Because of his egocentricity, he is only transiently affected, if at all, by social reinforcement.

10. "General poverty in major affective reactions" (p. 348). Although the psychopath experiences mild vexations and shallow attractions, his range of affective response is severely curtailed. His emotions lack depth and profundity.

11. "Specific loss of insight" (p. 350). The psychopath is unable to empathize with the reactions of those he affects, neither their astonishment nor their pain. He may verbalize awareness of others' feelings, but this awareness is of little personal significance.

12. "Unresponsiveness in general interpersonal relations" (p. 354). He may exhibit small courtesies or even seem generous at times, but such displays usually represent a means to an end.

13. "Fantastic and uninviting behavior with drink and sometimes without" (p. 355). The behavior of the psychopath can become exceedingly strange after sometimes only a few drinks. Alcohol lowers the inhibitions of an already uninhibited psychopath.

14. "Suicide rarely carried out" (p. 358). Suicidal threats and quasi-attempts are common, but the psychopath is rarely successful. He rarely intends to be.

15. "Sex life impersonal, trivial, and poorly integrated" (p. 359). Objectionable sexual conduct is common and appears to be motivated by trivial whims. Indeed, the psychopath appears to actually receive less gratification from the sexual act than do others.

16. "Failure to follow any life plan" (p. 364). The psychopath's behavior is motivated, if at all, by only short-range incentives. He does not maintain effort toward a lifetime goal. In fact, his life seems no more than a nonsensical wandering from one thrill to another (Cleckley, 1976, pp. 338-364).

To summarize, Cleckley (1976) conceives of the psychopath as an individual who breaks societal rules because of supreme egocentricity and a notable lack of anxiety and guilt. He is impulsive and sometimes aggressive. He commits appalling actions and views them with lack of shame and remorse. Normal punishers do not faze him. He is insincere and unreliable, but can, at least temporarily, convince others of exactly the opposite, as he is a charming dissembler. He is the ultimate con man. His apparent emotional reactions are just that: apparent. The psychopath has no substantive understanding of affective bonding, although he can play the part as well as any good actor. "We are dealing here not with a complete man at all but with something that suggests a subtly constructed reflex machine which can mimic the human personality perfectly" (Cleckley, 1976, p. 369).

Although Cleckley's definition of psychopathy is used widely in clinical and empirical research (e.g., McCord & McCord, 1964; Hare, 1978), the diagnosis of this disorder in clinical practice is based on the criteria for "Antisocial Personality Disorder" outlined by the Diagnostic and Statistical Manual of Mental Disorders (3rd edition revised; American Psychiatric Association, 1987) or the DSM-III-R. This most recent edition of the diagnostic manual, and its predecessor, the DSM-III (American Psychiatric Association, 1980), are noted for their focus on the behavioral aspects of psychological disorders; and so, in contrast to Cleckley's (1976) description of primarily underlying, trans-situational personality traits, the diagnostic manuals offer an objective description of the behaviors exhibited by the psychopath.

According to the DSM-III-R (American Psychiatric Association, 1987), this personality disorder must manifest before age 15 in the form of at least three of the following: (a) truancy, (b) running away from home, (c) frequent initiation of physical altercations, (d) use of weapons during the course of such altercations, (e) forced sex acts with others, (f) physical cruelty to animals, (g) physical cruelty to humans, (h) destroying others' property deliberately and other than by fire-setting, (i) deliberate fire-setting, (j) frequent lying, (k) stealing without confrontation of victims, and (l) stealing with confrontation of victims. In addition, the disorder is

characterized by a pattern of antisocial behavior since the age of 15, with at least four of the following manifestations: (a) inconsistent work history; (b) failure to conform to norms of lawful behavior; (c) irritability and aggression; (d) consistent defaulting on debts or failure to financially support dependents; (e) impulsivity, demonstrated by traveling without preplanned goals or the absence of a fixed address for at least a month; (f) disregard for honesty, demonstrated by lying, use of aliases, or conning; (g) recklessness, demonstrated by frequent speeding or driving under the influence of psychoactive substances; (h) irresponsible parenting; (i) lack of sustained monogamy; and (j) absence of remorse. In addition, the disorder must not manifest exclusively during schizophrenic or manic episodes (pp. 344-346).

One problem is immediately apparent in comparing the DSM-III-R (American Psychiatric Association, 1987) criteria for antisocial personality disorder with the description of the psychopath offered by Cleckley (1976). Some individuals who exhibit the cluster of behaviors outlined by the DSM-III-R do so, not because of the personality traits described by Cleckley, but because of underlying emotional turmoil. Such individuals have been described as neurotic, symptomatic, and secondary psychopaths, although many investigators have objected to juxtaposition of the label psychopathy and terms suggesting neurotic disturbance (e.g., Hare & Cox, 1978). As McCord and McCord (1964) have

suggested, the term acting out neurotic is more appropriate when referring to individuals whose antisocial behavior is motivated by internal conflict grounded in anxiety.

Thus the DSM-III-R (American Psychiatric Association, 1987) criteria for antisocial personality disorder, although objective and behaviorally based, identify a heterogeneous population of antisocial individuals, only a subclass of whom would be labelled as psychopathic according to Cleckley's (1976) definition. To ensure conceptual clarity, the term primary psychopath is sometimes used by investigators to distinguish the disorder described by Cleckley.

Descriptions of the primary psychopath similar to Cleckley's (1976) have been offered by other clinical researchers. Craft (1966) has specified the essential features of psychopathy as lovelessness/affectionlessness and impulsivity. Deriving from these primary features are secondary characteristics of aggressiveness, lack of shame and remorse, inability to profit from experience, and lack of appropriate motivation.

McCord and McCord (1964), after an extensive review of the literature, concluded that the defining features of psychopathy were lovelessness and guiltlessness. They also described the disorder as characterized by impulsivity, aggressiveness, and asocial tendencies. Harrington (1972) depicted the psychopath as unable to form attachments or learn from experience, and as lacking in guilt, anxiety, and

inhibitions. Buss (1966) portrayed the psychopath as an unreliable and chronic thrill-seeker who rejects authority and discipline, exhibits poor judgment, lies frequently, lacks guilt, and is unable to control impulses, delay gratification, or form meaningful relationships.

Fotheringham (1957) described the essential features of the disorder as egocentricity, lack of sympathy with individuals and society, absent or weak conscience, and poorly motivated antisocial behavior.

Although different researchers emphasize different characteristics as primary, it is obvious that a common thread underlies these clinical descriptions of psychopathy. All the descriptions make reference to an absence of anxiety and guilt and disturbed interpersonal functioning.

Empirical Typologies

Typologies derived from the results of multivariate studies show close correspondence to clinical conceptions of psychopathy (Hare & Cox, 1978). Most of these discriminate the psychopath from his neurotic antisocial counterpart mentioned previously, and also distinguish these two disorders from a third criminal type that has been termed the dysocial psychopath. This refers to a category of offenders whose antisocial behavior results from being reared in an environment that rewards such behavior. Unlike the primary psychopath, the secondary (neurotic) and dysocial psychopaths can experience loyalty to others and guilt.

Quay (1964) reported a factor analytic study of behavioral ratings of 115 male delinquents made by five parole officers. Four factors were derived, which Quay labelled as unsocialized-psychopathic, disturbed-neurotic, socialized-subcultural, and inadequate-immature. The first three correspond to primary, neurotic, and dysocial psychopathy, respectively, while the fourth reflected a delinquent type characterized by laziness, distractibility, excessive daydreaming, and affective instability. In a similar study, Peterson, Quay, and Tiffany (1961) subjected self-report data from delinquents to factor analysis and derived factors closely approximating the primary, neurotic, and dysocial psychopathic types.

Hare and Cox (1978) reported statistical cluster analysis of data on 48 male inmates, including self-report and case history data and global ratings of psychopathy based on Cleckley's (1976) criteria. One cluster which emerged from the analysis included high psychopathy ratings, early age for first criminal conviction, and self-report data suggestive of impulsivity, sensation-seeking behavior, and impaired socialization. Another cluster reflected a high level of trait anxiety. These clusters are similar to the primary and neurotic psychopathic syndromes. Blackburn (1971) derived similar types from cluster analysis of Minnesota Multiphasic Personality Inventory (MMPI) profiles of 56 male murderers, along with a third type reflecting

paranoia and extreme aggressiveness, and a fourth suggestive of hysterical denial and avoidance.

In summary, multivariate studies have derived empirical typologies which identify a subclass of criminals and delinquents that closely approximates the primary psychopath as described by Cleckley (1976). These studies have typically distinguished this type from other subclasses of criminals, including the neurotic and dysocial psychopaths.

Methodological Considerations

The problems in research with psychopaths are numerous, with most centering on difficulties of subject identification and selection. As psychopaths by definition experience little subjective distress, it is only when their actions cause distress for others that they come to the attention of the mental health and legal systems. Those not so identified had, until recently, been largely ignored by researchers in this area, making it questionable as to what extent findings with institutionalized subjects could be generalized to non-institutionalized psychopaths.

Three studies, however, have employed non-institutionalized psychopaths as subjects. Their findings at least tentatively suggest some comparability between the two groups. Sutker (1970) contacted psychopaths referred by mental health personnel in New Orleans. Using electric shock as an unconditioned stimulus in a classical conditioning paradigm, she found that the psychopaths failed to condition a fear response, as measured by the galvanic

skin response (GSR). This report is similar to those of researchers employing incarcerated psychopaths as subjects (e.g., Hare, 1965a, 1965c).

Similarly, Widom and Newman (1985), using cleverly constructed advertisements to attract subjects, demonstrated that noninstitutionalized psychopaths exhibit deficits in passive avoidance, which is consistent with much of the research with incarcerated psychopaths (e.g., Lykken, 1957). In another study, Widom (1978) found unincarcerated psychopaths in Boston to be highly similar to incarcerated psychopaths on a number of psychometric indices. Although her noninstitutionalized group was characterized by somewhat higher educational and socioeconomic status, the most meaningful difference between groups was a lower frequency of convictions for antisocial behavior in the noninstitutionalized sample. Of importance, however, is the fact that the groups did not differ with respect to frequency of arrests.

In addition to the difficulties in making inferences about noninstitutionalized psychopaths from data with institutionalized subjects, the situation is muddied even more by variable subject selection techniques among investigators studying incarcerated psychopaths. The criteria outlined by Cleckley (1976) in his five editions of the Mask of Sanity have been widely, but not universally, employed by investigators (e.g., Hare & McPherson, 1984a; Schachter & Latane, 1964; Siegel, 1978). Some studies have

classified subjects using the criteria for antisocial personality disorder found in the DSM-III-R (American Psychiatric Association, 1987) and its predecessors (e.g., Fox & Lippert, 1963; Lippert & Senter, 1966; Smith, 1976). Frances (1980) has pointed out, however, that approximately 80 percent of prisoners can be diagnosed with antisocial personality disorder when the DSM-III (American Psychiatric Association, 1980) guidelines are employed. This suggests that these formal diagnostic criteria specify a heterogeneous group of individuals, only a subset of whom is likely to be psychopathic as defined by Cleckley (1976).

Many studies have employed self-report measures of psychopathy, with the MMPI used most frequently (e.g., Bernard & Eisenman, 1967; Schmauk, 1970). Other researchers (e.g., Gutierrez & Eisenman, 1971; Johns & Quay, 1962) have used a factorially derived delinquency questionnaire by Peterson et al. (1961). Still others have used the Socialization scale from the California Psychological Inventory (e.g., Jaffee & Polansky, 1962), while some researchers have used a combination of self-report inventories (e.g., Heilbrun & Heilbrun, 1985). Investigators' use of self-report measures is problematic in view of the fact that psychopaths are characterized by chronic lying. Of importance, Hare (1985a) has demonstrated that MMPI Psychopathic Deviate (Pd) and Hypomania (Ma) scores correlate poorly with behavioral measures of psychopathy. And Hundley and Ross (1977), in comparing six

self-report measures of psychopathy, found a lack of substantial agreement among the scales.

Other interpretive difficulties arise in attempting to compare the results of studies employing male versus female subjects, black versus white subjects, and delinquents versus adult offenders. Conflicting empirical findings seem almost guaranteed with this variety of subject selection procedures.

Another dilemma in psychopathy research is deciding what type of control group to employ. Some studies have controlled for effects of incarceration by comparing psychopaths with non-psychopathic inmates (e.g., Hare, 1965a), or with secondary psychopaths (e.g., Doctor & Craine, 1971), but not with non-incarcerated controls. Other studies have compared psychopaths with different types of normal controls and have not controlled for effects of incarceration (e.g., Bernard & Eisenman, 1967). A few studies have used inmate controls and non-incarcerated controls (e.g., Hare & Thorvaldson, 1970; Schmauk, 1970).

Another troublesome issue in this area of research is whether to conceptualize psychopathy as a typology or a dimension. Several investigators have drawn conclusions about psychopathy based on studies that classified college students into psychopathic and non-psychopathic groups based on MMPI Pd and/or Ma scores (Hare, 1965c; Hetherington & Klinger, 1964; Stewart & Resnick, 1970; Warren & Grant, 1955). Implicit in this subject selection procedure is the

assumption that psychopathy represents a spectrum of behaviors that can be ordered along a dimension. There is no difficulty with this approach as long as it is assumed that all behavioral manifestations of psychopathy are equally important and pathognomic, and that severity of the disorder is reflected simply by the number of behaviors exhibited. If different assumptions are made, then the most appropriate data analysis should involve differential weighting of behaviors in terms of the magnitude of their influence in defining psychopathy (Hare, 1970).

Further research may suggest that the dimensional and typological approaches to psychopathy are not mutually exclusive. It is even possible that "the conflict between typology and dimensionality may be a pseudoconflict dependent upon the state of knowledge of the field" (Zubin, 1967, p. 398).

The methodological issues noted above should be carefully considered in designing and evaluating research on psychopathy. The reader may wish to refer again to this section when reviewing later portions of this document.

Theories of the Etiology of Psychopathy

Most of the theories that have been advanced to explain psychopathy implicate biological factors in the development of this severe personality maladjustment. Five major theories in this area will now be described, with a brief review of research relevant to each. Following this will be a presentation of a theory recently advanced by Dennis Doren (1987). Doren's conceptualizations are unusual in their ability to explain and predict a majority of the behavioral manifestations of psychopathy. An empirical test of several of Doren's assumptions will be described after a summary of the learning literature on psychopathy.

Gough

Harrison Gough's 1948 theory of psychopathy is the only one reviewed here that ignores biological factors. From a sociological perspective, Gough argued that the basis for psychopathy is a deficiency in role-playing ability. The psychopath cannot identify with the viewpoint of another, or assume another's role. Put simply, he cannot empathize. He is unable to see himself as a part of a larger societal whole, so to speak, or to understand how his actions adversely affect others. Because the psychopath cannot foresee the social consequences of his behavior, he does not experience contrition or emotional attachment; he develops neither group identification nor behavioral inhibitions. Gough (1948) said that this lack of socialization manifested most prominently in disturbed interpersonal relationships.

Much support for the proposed role-playing deficiency of the psychopath has derived from research with the Socialization (So) scale from the California Psychological Inventory (Gough, 1957). Many of the items on this true-false inventory are face valid in their assessment of ability or desire to alter behavior in conjunction with social consequences, e.g., "I often act on the spur of the moment without stopping to think," "Before I do something I try to consider how my friends will react to it," and "I go out of my way to meet trouble rather than try to escape it." Essentially, the scale measures the degree to which societal standards have been internalized and modulate behavior (Gough, 1960; Gough & Sandhu, 1964).

A number of studies testify to the ability of the So scale to discriminate between persons who do and do not exhibit antisocial behavior, although most of this research has been with delinquents and nondelinquents (e.g., Gough, 1965; Jaffee & Polansky, 1962; Peterson, Quay, & Anderson, 1959). Research with adult psychopaths is conflicting. Results of two validity studies indicated that the scale could discriminate successfully between psychopaths and non-psychopaths, one by Widom (1974) that classified subjects with Cleckley's criteria (from an earlier edition of the 1976 The Mask of Sanity), and another by Widom and Newman (1985) that used behavioral criteria by Robins (1966) and Spitzer, Endicott, & Robins (1975, cited in Widom & Newman, 1985). Interestingly, Hare, Frazelle, and Cox

(1978) found that the So scale could successfully discriminate between inmates with normal and low electrodermal responsiveness to 120 decibel tones. This latter finding is consistent with other research that has found psychopaths to exhibit abnormal electrodermal responses (e.g., Hare & Quinn, 1971; Lykken, 1957).

Two studies do not support use of the So scale as a viable self-report measure of psychopathy. Hare (1984) reported no differences in So scores among groups representing high, medium, and low levels of psychopathy and classified according to his early version (Hare, 1980) of a psychopathy research checklist. In a later study, he found low correlations between So scores and behavioral measures of antisocial behavior, but somewhat higher correlations between So scores and scores on other self-report indices of psychopathy (Hare, 1985a).

The role-playing deficiency theory has been tested more directly in other studies. Using Cleckley's criteria (from an earlier edition of the 1976 The Mask of Sanity) to classify subjects into primary, secondary, and non-psychopathic groups, Moss (1975) found that both groups of psychopaths were much less able than controls to "postdict" the behaviors of stimulus persons. However, a confound of intelligence may have substantially influenced these results. Smith (1976) replicated this finding, controlling for intelligence when classifying subjects into groups with MMPI data and information from prison files.

Another relatively direct test did not support Gough's (1948) theory, in that Palumbo (1976) found that psychopaths were no more or less skilled at role playing than controls in situations requiring leadership.

In summary, there is conflicting research on the usefulness of the role-playing deficiency theory (Gough, 1948) in explaining the phenomenon of psychopathy, although clinical descriptions of the disorder (e.g., Cleckley, 1976) certainly include a lack of ability to empathize. In addition, the role-playing deficiency theory has been criticized for its lack of comprehensiveness (Doren, 1987), ambiguous terminology (Smith, 1978), and failure to provide an account of why or how psychopaths acquire the hypothesized core deficiency (Hare, 1970).

Quay

Herbert Quay (1965) has argued that the aberrant behavior of the psychopath stems from a pathological need for stimulation, which results from a low level of internal, biologically based arousal. Quay viewed impulsivity and lack of tolerance for routine and sameness as the defining features of psychopathy. He described the psychopath's sensation-seeking actions as motivated by a restless search for external stimulation to restore an optimal level of internal arousal. Quay (1965) identified two possible etiologies for this deficient internal arousal: reduced basal reactivity to stimuli and/or increased adaptation, or habituation, to stimulation.

Supporting research for Quay's contentions comes from studies of psychopaths' and controls' responses on measures of sensation-seeking behavior. Zuckerman's Sensation Seeking Scale (Zuckerman, Kolin, Price, & Zoob, 1964) is probably the most widely used instrument in this area. Factor analysis has revealed four underlying dimensions of the scale (Zuckerman, 1978): (a) thrill and adventure seeking, reflecting a desire to engage in socially acceptable behaviors involving elements of danger, such as some outdoor sports; (b) experience seeking, reflecting an affinity for unusual sensory and cognitive experiences, such as traveling and enjoyment of modern art; (c) disinhibition, reflecting a tendency to engage in party-going behaviors, alcohol consumption, and sexual promiscuity; and (d) boredom susceptibility, reflecting dislike for routine, repetition, and predictability. Zuckerman (1979) has demonstrated that scores on the Sensation Seeking Scale are, in various populations, related to social attitudes and behavior, cognitive processing, occupational choice, and physiological indices.

The disinhibition factor has been described by Zuckerman (1978) as most directly related to psychopathic behavior. Blackburn (1978), classifying subjects according to an empirically derived MMPI typology, found that primary and secondary psychopaths scored significantly higher than controls on all four factors and the overall general sensation-seeking score. Emmons and Webb (1974), using

anxiety scale and MMPI scores to classify prison inmates, found significantly higher scores for psychopaths on the experience seeking, disinhibition, and boredom susceptibility factors. In contrast, Shostak and McIntyre (1978), employing samples of college students, juvenile delinquents, and young adult offenders, failed to find a relationship between Sensation Seeking Scale scores and psychopathy as defined by responses to a self-report delinquency questionnaire developed by Peterson et al. (1961). Of interest, however, is that although Shostak and McIntyre did not establish group differences in Sensation Seeking Scale scores, their psychopathic subjects showed the greatest tendency to increase sensory input in a behavioral task involving visual stimuli.

With respect to the proposed physiological bases of sensation-seeking behavior, low basal reactivity and/or increased habituation to stimuli, empirical findings have been equivocal. Hare (1965d) and Hare and Quinn (1971) found that psychopaths, compared to controls, exhibited lower resting levels of skin conductance and were less responsive electrodermally to electric shock. Lykken (1957) found that psychopaths' GSR was less reactive to electric shock than was controls'. Hare (1968) also reported less autonomic responsiveness to loud tones in psychopaths when compared to non-psychopaths.

Two findings from the learning literature are also relevant: both Schachter and Latane (1964) and Chesno and

Kilmann (1975) found that when psychopaths' arousal was increased by external stimulation, they no longer exhibited passive avoidance deficits in tasks employing electric shock. These investigators used injections of adrenalin and loud background auditory stimulation, respectively, to increase subjects' arousal. Problems with manipulation checks in these last two studies, however, make their results difficult to interpret.

In a report that conflicts somewhat with the above findings, Sutker (1970) found that non-incarcerated psychopaths demonstrated greater skin conductance reactivity than college student controls. Four studies reported no difference between skin conductance reactivity in primary psychopaths and controls (Blackburn, 1979; Goldstein 1965; Jutai & Hare, 1983; Lippert & Senter, 1966). Of relevance to Quay's (1965) predictions concerning pathological habituation to stimuli, two studies failed to find differences between psychopaths and controls in habituation of cardiac responses to electric shock (Hare & Craigen, 1974; Hare & Quinn, 1971), while two studies reported larger cardiac responses in psychopaths in anticipation of 120 decibel tones (Hare, 1982a; Hare et al., 1978). Mawson and Mawson (1977), after an extensive review of relevant literature on arousal, concluded that the psychopath was not characterized exclusively by a low level of arousal but rather by greater extremes and rate of change of arousal.

In summary, Quay's (1965) theory of the etiology of psychopathy has received mixed support in the literature on sensation-seeking behavior and physiological arousal, reactivity, and habituation. In addition, with the exception of impulsivity and sensation-seeking behaviors, Quay's theory addresses very few of the behavioral manifestations of psychopathy. It can also be criticized for ambiguity, as Quay never specified which indices of physiological arousal should be used in testing his formulations. Findings from the research on cortical arousal are also important and will be described in the next section.

Eysenck

Hans Eysenck's (1964, 1977; Eysenck & Eysenck, 1978) formulation of the etiology of psychopathy was based in a three-dimensional model of personality. Briefly, this model specified the existence of three independent, largely genetically determined personality variables, labelled extraversion, neuroticism, and psychoticism. Eysenck envisioned these variables as spheres in a multidimensional space. He said that the personality of any individual could be located at some point within these three spheres, depending upon the relative importance of each of the variables in influencing the individual's behavior.

The three dimensions of personality specified by Eysenck (1977) were: (a) extraversion/introversion, which reflected impulsivity and sociability, and was related to

cortical arousal; (b) neuroticism/stability, which reflected affective intensity, or strength of emotional response, and was related to sympathetic nervous system arousal; and (c) psychoticism, which reflected social alienation, lack of empathy, and little regard for danger. A related physiological basis for the third dimension was not specified, but it too was seen as largely genetically determined (Eysenck & Eysenck, 1978).

The personality of the primary psychopath was perceived as reflecting mainly the psychoticism dimension but also extraversion, and the personality of the secondary psychopath as reflecting extraversion and neuroticism (Eysenck & Eysenck, 1978). Of importance is the fact that Eysenck's (1964, 1977; Eysenck & Eysenck, 1978) definitions of psychoticism and neuroticism differ in many respects from those employed by most other researchers and endorsed by the American Psychiatric Association (1987).

Eysenck (1977; Eysenck & Eysenck, 1978) hypothesized that the low cortical arousal of the primary psychopath, related to the influence of the extraversion factor, resulted in decreased ability to inhibit behavior. This decreased inhibition predisposed the psychopath to sensation-seeking behavior and increased habituation to stimuli, resulting in a generalized deficit in ability to condition to environmental stimuli.

Eysenck's (1977) theory is similar to Quay's (1965), but is more complete. As noted in the review of Quay's

theory, the research does not support the notion that psychopaths have a general tendency to habituate quickly to stimuli (Hare, 1982a; Hare & Craigen, 1974; Hare et al., 1978; Hare & Quinn, 1971). In addition, psychometric findings are mixed with respect to differences between psychopaths and non-psychopaths on Zuckerman et al.'s (1964) Sensation Seeking Scale (Blackburn, 1978; Emmons & Webb, 1974; Shostak & McIntyre, 1978), although clinical observation certainly supports the existence of sensation-seeking behavior in psychopaths (e.g., Cleckley, 1976; McCord & McCord, 1964).

Psychometric studies with the Eysenck Personality Questionnaire (EPQ; e.g., Eysenck & Eysenck, 1970, 1971) have generally supported the notion that the psychoticism factor and, to a lesser extent, the extraversion and neuroticism factors are related to criminality and delinquency. These studies, however, do not employ exclusively psychopaths as subjects when making comparisons with control groups. One study by Hare (1982b) revealed a significant correlation between EPQ psychoticism scores and two factors of Hare's (1980) psychopathy research checklist, unstable lifestyle and early-onset behavior problems; but a significant relationship was not found between psychoticism scores and the factor accounting for most of the variance in the research checklist ratings, egocentricity/lack of empathy.

The learning literature, summarized in detail in a later section, does not uniformly support the existence of the general conditionability deficit in psychopaths (e.g., Bryan & Kapche, 1967; Doctor & Craine, 1971) proposed by Eysenck (1977; Eysenck & Eysenck, 1978). Perhaps the most consistent finding is that psychopaths demonstrate passive avoidance deficits under many conditions (e.g., Lykken, 1957; Widom & Newman, 1985).

Evidence that addresses Eysenck's (1977; Eysenck & Eysenck, 1978) hypothesis of low cortical arousal in the psychopath comes from studies of electroencephalogram (EEG) activity and other physiological measures of cortical arousal. Ellingson (1955) reviewed 14 early studies in this area and concluded that the prevalence of EEG abnormality lay between 47 and 58 percent in psychopaths, and that this abnormality was primarily manifest in excessive diffuse, moderately slow wave activity. Craft (1965, as cited in Gregory, 1974) reported a 71 percent EEG abnormality rate, primarily of diffuse slow wave theta activity, in a sample of psychopaths, versus a 17 percent rate in controls. Syndulko (1978) reviewed the EEG research and described the results as inconsistent but concluded that "it seems clear that a subset of subjects labelled sociopaths do show an excessive incidence of EEG abnormalities" (p. 149).

In contrast, Mawson and Mawson (1977) reviewed evidence reflecting no significant difference between psychopaths and controls in EEG activity. Shagass (1983) reviewed

literature on the prevalence in psychopaths of abnormalities of the contingent negative variation and event-related slow potentials, but reported only a morass of inconsistent findings. One study subjected psychopaths and non-psychopaths to a phonetic discrimination task and found group differences in slow-wave activity but not in N100 or P300 event-related brain potentials (Jutai, Hare, & Connolly, 1987, cited in Hare, Williamson, & Harpur, 1988).

In summary, as with the other theories of psychopathy reviewed thus far, Eysenck's (1964, 1977; Eysenck & Eysenck, 1978) perspective has received inconsistent empirical support. It is possible that psychopaths, or a significant proportion, exhibit the physiological abnormalities postulated by Eysenck, but the evidence is not definitive. As pointed out by Hare (1970), one of the difficulties in interpreting specifically the EEG research is that approximately 15 percent of the general population is behaviorally normal and yet manifests EEG abnormalities.

Although Eysenck's (1964, 1977; Eysenck & Eysenck, 1978) theory of psychopathy is relatively comprehensive, the problem of variable subject selection techniques looms large in attempts to synthesize relevant findings. Eysenck's (1977) own technique is markedly disparate from those of other investigators in this area. He can be justly criticized for employing idiosyncratic definitions for standard diagnostic terms, such as psychosis and neurosis.

Such idiosyncracies will likely continue to impede verification of his theory of psychopathy.

Gorenstein

Ethan Gorenstein has proposed that psychopathic behavior may be viewed as a functional cognitive deficit similar to that exhibited by animals with lesions of the septum, hippocampus, and frontal (SHF) cortex (Gorenstein, 1982; Gorenstein & Newman, 1980). He argued that the impaired response modulation observed in SHF animals is analogous to psychopaths' impulsivity and sensation-seeking behavior described by clinical researchers (e.g., Cleckley, 1976; McCord & McCord, 1964) and their deficient classical and passive avoidance conditioning reported in some empirical studies (e.g., Hare, 1965a; Lykken, 1957). He described psychopathic behaviors as representing a disinhibition syndrome with a primary basis of impaired control of dominant responses or response sets. The dominance of a given response was presumed to be determined by specific stimulus conditions, learning, or genetic predisposition.

Hare (1970) offered a similar interpretation of the etiology of psychopathy. Although he later rejected this perspective (Hare, 1984), his original formulations are offered to clarify Gorenstein's (1982) position.

In an early integration of the research on psychopathy, Hare (1970) focused on a concept of response perseveration and speculated that psychopaths are characterized by

dysfunction in temporal and/or limbic brain structures. Because limbic mechanisms appear to be important in the regulation of fear-motivated behavior, he reasoned that limbic lesions impaired psychopaths' ability to inhibit responses that lead to punishment. Specifically, such lesions resulted in perseveration of responses that were most dominant in a given situation; thus the psychopath tended to execute repeatedly the response or response class with the highest probability of occurrence, regardless of contingencies.

This response perseverative tendency was viewed by both Gorenstein (1982; Gorenstein & Newman, 1980) and Hare (1970) as the behavioral deficit that expressly interfered with passive avoidance conditioning in the psychopath. One major difference between the perspectives of the investigators is that Gorenstein depicted the inhibitory deficit as functional, whereas Hare related it to organic impairment.

Relevant to Gorenstein's (1982; Gorenstein & Newman, 1980) proposed model of psychopathic behavior are studies of animals with experimenter-induced brain lesions. Studies have indeed found that lesions in the limbic area interfere with passive avoidance learning (e.g., Kimble, 1963; Lubar, 1964). Also important are studies that demonstrate that limbic lesions produce perseveration of previously effective responses after changed stimulus conditions reduce the adaptiveness of such responses (e.g., Schwartzbaum, Kellicutt, Spieth, & Thompson, 1964; Zucker & McCleary,

1964), although perseveration is attenuated by repeated exposure to the altered stimulus conditions.

Response perseveration and its concomitant interference with passive avoidance conditioning have also been demonstrated in learning studies with psychopaths (Newman, 1979/1980; Newman et al., 1985; Ross & Doody, 1973; Siegel, 1978; Widom & Newman, 1985). Two of these studies, however, found that this perseverative deficit disappeared with the introduction of reward for successful avoidance responses (Newman, 1979/1980; Newman et al., 1985). Several studies of cognitive deficiencies in psychopaths, using tasks sensitive to frontal lobe dysfunction, have produced conflicting findings: Gorenstein (1982) reported that psychopaths, compared with controls, exhibited a performance pattern that included excessive perseveration and was similar to that of patients with frontal lobe lesions. Hare (1984) and Sutker and Allain (1987) attempted to replicate Gorenstein's findings but found no differences between psychopaths and non-psychopaths in performance on tasks associated with frontal lobe functioning.

To summarize, research on passive avoidance in psychopaths has generally supported Gorenstein's (1982; Gorenstein & Newman, 1980) hypothesis that this group is characterized by a deficit in modulation of dominant response sets. Studies of cognitive deficiencies related to frontal lobe functioning, however, have produced conflicting findings. The obvious shortcoming of Gorenstein's

perspective is that it is descriptive and not explanatory. In all fairness, however, it should be noted that Gorenstein (1982) acknowledged this limitation. He deliberately avoided proposing a neuroanatomical substrate for psychopaths' response perseveration, although he suggested that such a substrate would fit nicely with evidence of a genetic contribution to psychopathy (e.g., Mednick & Hutchings, 1978).

Another criticism of Gorenstein's (1982; Gorenstein & Newman, 1980) theory is that, like Gough's (1948) and Quay's (1965), it concentrates on several behavioral manifestations of psychopathy but ignores others, e.g., lack of depth in emotional responding. In addition, Gorenstein fails to explain why his framework should be more applicable to psychopathy than to other psychiatric syndromes characterized by impulse control difficulty.

Hare

Since the mid-1960's, Robert Hare has generated a great deal of research on psychopaths incarcerated in the federal prison system in Canada. His early formulation of psychopathy that focused on response perseveration grounded in organic deficit (Hare, 1970) was reviewed previously, and it was noted that Hare (1984) later rejected this perspective. Not all of his early conceptualizations, however, have been discarded; those he retains (Hare, 1986) and his most recent conceptualizations of psychopathy are described here.

In 1978, Hare reviewed research on the physiological characteristics of psychopaths and argued that these individuals possessed a biologically-based coping mechanism that influenced their reaction to punishment. He proposed that the physiological coping mechanism inhibited fear arousal in psychopaths by reducing the impact of premonitory cues and impending aversive events (Hare, 1978). The coping mechanism was assumed to operate primarily through abnormal cardiac acceleration prior to the onset of aversive stimulation. This cardiac acceleration was considered to be a defensive response, associated with decreased sensitivity to the environment and attenuation of aversive sensory input. (Conversely, cardiac deceleration was assumed to be associated with increased sensitivity to the environment and considered to be an orienting, rather than a defensive, response.)

Hare (1978) hypothesized that the effectiveness of the defensive cardiac response in attenuating aversive stimulation should be reflected in electrodermal activity. Small increases or fluctuations in skin conductance upon presentation of the aversive stimulus would indicate that fear had been effectively inhibited by the defensive cardiac response, while large increases or fluctuations in skin conductance would suggest an ineffective defensive response.

As depicted by Hare (1978), then, the psychopath is relatively unaffected by punishment because of a coping mechanism that allows him to screen out aversive cues and

reduce the mediating effects of anticipatory fear. Hare (1965b, 1965d) also theorized that the psychopath has a steep gradient of fear arousal: Fear is not experienced in the presence of cues associated with future punishment, and can be elicited, if at all, only by cues for imminent punishment. Concomitantly, the psychopath develops little ability to generalize fear responses, including avoidance behaviors, across situations. Hare (1965b) hypothesized that the steep fear gradient interferes with the process of socialization in the psychopath, as socialization is partially dependent upon the ability to generalize avoidance tendencies. Poor judgment and impulse control were seen as sequelae of the psychopath's steep discounting of future events.

Support for Hare's (1965b, 1965d, 1978) early conceptualizations is found in much of the research that has examined psychopaths' reaction to aversive stimulation. Instrumental conditioning research with electric shock has demonstrated that psychopaths are deficient in passive avoidance under normal conditions (Chesno & Kilmann, 1975; Lykken, 1957; Schachter & Latane, 1964; Schmauk, 1970). In addition, studies of classical conditioning have consistently shown that psychopaths, compared to normals, develop muted anticipatory GSRs to shock, if they are developed at all (Hare, 1965a, 1965c, 1965d; Hare & Craigen, 1974; Hare et al., 1978; Hare & Quinn, 1971; Lykken, 1957).

The specific physiological coping mechanism described by Hare (1978), accelerated cardiac response followed by muted increase in skin conductance, was observed in one study that used electric shock (Hare & Craigen, 1974) and two studies that employed 120 decibel tones as the unconditioned stimuli (Hare, 1982a; Hare et al., 1978), although group differences were of only marginal significance in one of the latter two studies. Fenz (1971), measuring only cardiac responsiveness to electric shock, reported findings consistent with Hare's predictions, in that primary psychopaths exhibited greater cardiac acceleration when compared to normals.

As previously noted, findings with respect to electrodermal reactivity are mixed. Lykken (1957) reported that psychopaths exhibited decreased skin conductance reactivity to electric shock, while Sutker (1970) reported just the opposite. Lippert and Senter (1966) and Blackburn (1979), employing shock and cold pressor stimulation, respectively, reported no difference between psychopaths and normals in electrodermal reactivity.

In summary, Hare's (1965b, 1965d, 1978) early conceptualizations have received support from most of the psychopathy research employing aversive stimulation. This support is not limited to Hare's own research but is also found in the work of other investigators. Comparisons among Hare's own findings, however, are made particularly easily and straightforwardly because of consistency of subject

selection techniques in his research program. All such subject classification is based on Cleckley's criteria (from the 1976 The Mask of Sanity and earlier editions), with some studies using global ratings of psychopathy (e.g., Hare, 1982a) and others employing scores on Hare's (1980, 1985b) psychopathy research checklist. The ratings and checklist scores have been shown to be highly correlated (Hare, 1985a).

Hare's more recent research has shifted from psychopaths' reactions to noxious events to their processing of language. He has provided evidence indicating that cerebral organization of language in psychopaths may differ from that of normal individuals. Hare and McPherson (1984a) administered a verbal dichotic listening task to a male noncriminal control group and also to inmates jointly classified according to Hare's psychopathy research checklist (Hare, 1980) and the DSM-III (American Psychiatric Association, 1980). Subjects were asked to orally report words they could recall from each trial, and a small subset also completed a second dichotic listening task with instructions to attend only to the words presented to a specific ear. The psychopathic subjects demonstrated a significantly smaller right-ear advantage under both the divided attention and selective attention instructions, indicating that their performance was less lateralized than that of the other subject groups.

Related research by Hare has examined the performance of psychopaths in tasks employing the divided-visual field procedure, in which information is presented through a tachistoscope to either the left visual hemifield or to the right visual hemifield (Hare, 1986). Information presented to each visual hemifield projects to the contralateral brain hemisphere (Kalat, 1981). Hare and Jutai (in press) presented a divided-visual field task to a male noncriminal control group and to inmates classified according to Hare's (1985b) psychopathy research checklist. All subjects were right-handed. Concrete nouns were presented to subjects' two visual fields under three conditions. The first condition involved simple recognition, where subjects decided whether the stimulus word matched a cue word previously presented. In the second and third conditions, subjects decided whether the stimulus word belonged to specific or more abstract, respectively, semantic categories. Group differences in task errors appeared only on the abstract categorization task, in that psychopaths demonstrated superior left visual field/right hemisphere performance, while the opposite was true of the noncriminal controls and the non-psychopathic inmates. The findings of this experiment replicated those of an earlier study that employed a smaller sample size (Jutai, 1980, cited in Hare, Williamson, & Harpur, 1988).

Hare has interpreted the results of the dichotic listening and divided visual studies as indicating that,

when compared with normals, psychopaths' language processing may not be as strongly lateralized and may be supported by limited left-hemisphere resources (Hare, 1986; Hare, Williamson, & Harpur, 1988). Hare also reviewed other research by himself and his associates and suggested a possibility that psychopaths are distinguished by "poor integration of the referential and affective components of language, perhaps because of impaired inter-hemispheric communication . . . or . . . inefficient distribution of processing resources" (Hare, Williamson, & Harpur, 1988, p. 88).

Hare's research program on psychopathy has great strength and breadth; however, his two branches of research, examining fear reactions and language processes, are highly specific, not yet integrated, and fail to address the importance of environmental variables. Although generalization of fear responses is certainly related to socialization, as Hare (1965b) has stated, the lack of such generalization cannot explain the full range of antisocial behaviors exhibited by the psychopath. Neither can the anomalies of language processing in psychopaths explain all their actions, although Hare has noted vaguely that "language may not have the same controlling influence over behavior that it has for normal individuals" (Hare, Williamson, & Harpur, 1988, p. 88). In addition, Hare has yet to publish an explanation of how his two branches of research are interrelated.

Doren

Dennis Doren (1987) has proposed that two factors together are necessary and sufficient for the development of psychopathy, with neither being sufficient alone. The first of these is low cortical arousal, genetically inherited and affecting, though not necessarily centered in, the limbic system. The resulting deficient limbic functioning is presumed to result in excessive stimulation seeking on the part of the child, and also in poor ability to inhibit ongoing activity, leading to perseveration within a limited repertoire of behavior. The present research project will not address this biological component of Doren's theory, with the exception of the postulate regarding the psychopath's tendency to repeat a relatively limited repertoire of behaviors.

The second factor hypothesized as necessary in the development of psychopathy is a peculiar learning process that Doren (1987) has labelled partial helplessness conditioning. Inconsistent discipline from parents and other adults in the life of the potential psychopath is presumed to comprise this unusual conditioning schedule, wherein the same behavior by the child is reinforced on some occasions but punished on others.

Doren's (1987) term, partial helplessness conditioning, represents an extension of the learned helplessness concept described by Seligman (1975). In learned helplessness conditioning, an individual is exposed to contingencies that

are independent of his behavior. The consequence is that when the individual is then placed in a situation affording control over the contingencies, he fails to learn to exercise this control. He exhibits reduced volition, presumably because of expectations that action will be futile, and his emotional response is depression (Seligman, 1975).

In contrast, as a result of the somewhat different partial helplessness conditioning process (Doren, 1987), the child psychopath learns from inconsistent parental discipline that the same behavior results in reward on some occasions and punishment on others. Unlike the individual exposed to learned helplessness conditioning, the budding psychopath acquires the cognitive expectation that persistent responding will lead to reward, although punishment may be occasionally forthcoming. He comes to expect an unpredictable reinforcement schedule, in that the outcomes of his behavior cannot be foreseen at any specific time. The behavioral sequelae of partial helplessness conditioning and associated cognitive expectations are an increased tendency to persist in responding until goal attainment, and a diminished concern about negative behavioral consequences. Effectiveness of punishment is thus attenuated, leading the child to focus on methods of obtaining reward; and his sensation-seeking tendencies dictate that he will be preoccupied by short-term physical reward rather than long-term goal reinforcement.

The partial helplessness conditioning process during childhood renders the psychopath-to-be helpless only to the extent that he cannot control the reward schedule for his behavior. The aberrant conditioning process also activates the child, in that he constantly pursues short-term physical gratification and, secondarily, control over an environment that provides short-term rewards (Doren, 1987).

As a result of the resistance to contingencies exhibited by the child psychopath, his interactions with his parents result in frustration for both parties; thus he is exposed to few early positive socialization experiences, and this is another sequela of partial helplessness conditioning. The child fails to develop an appreciation of emotional closeness. In his focus on short-term reward, he does not attend to all the important cues in the environment, which is reflected in his pathologic egocentricity. Because of his dedicated pursuit of immediate gratification and lack of early positive socialization, the growing psychopath either ignores other people or views them as the means to an end of obtaining desired reinforcement. People are seen as objects that sometimes impede the attainment of immediate gratification, and sometimes serve as sources of that gratification (Doren, 1987).

The psychopath's view of people as objects and his history of frustrating interpersonal experiences result in the development of antisocial behavior (Doren, 1987). The

psychopath revels in destructive actions because they bring short-term sensory stimulation, and because they serve as a means to strike back at people, who are viewed as sources of unpredictable punishment and as the cause of the psychopath's failures. Impaired limbic functioning leads to tendencies to repeat a relatively small repertoire of responses regardless of punishing contingencies, which have lost their power to effect behavior change due to partial helplessness conditioning. Because people are seen as either the source of or obstacles to immediate gratification, they are manipulated by the psychopath as he attempts to control the reinforcers in his environment. His existence centers on the constant challenge of obtaining short-term reinforcement despite all possible environmental impediments. Doren (1987) concludes that for psychopaths:

The challenge of gaining . . . control over their environment and the perception of control become stimulating in and of themselves through being associated with intermittent rewards in a process called secondary conditioning. . . . Psychopaths stop needing successful outcomes to reinforce their enjoyment of a challenge and the experience of environmental control. Those experiences become rewarding by themselves. As secondary reinforcers, the products of secondary conditioning, the perception of environmental challenge and control become self-perpetuating goals for the psychopath. (pp. 91-92)

Thus Doren (1987) portrays the psychopath as engaged in focused, persistent attempts to control the rewards in his environment, and as reinforced by the challenge of obtaining control. He fails to learn fear of social and legal punishers because of abnormal conditioning; however, as Doren specifies, the psychopath will show conditioning with

some short-term, stimulating, positive reinforcers if--and only if--he is motivated to attend to all pertinent aspects of the environment. The psychopath perseverates in antisocial activities, including manipulation and exploitation of others, because they allow him to control the environment and also bring short-term physical gratification.

Doren's (1987) theory contains many elements of the theories previously reviewed. Gough's (1948) hypothesis regarding deficient role-playing ability is incorporated in Doren's description of the psychopath's manipulateness, which results from defective socialization and focus on short-term rewards. Quay's (1965) theory of pathological sensation seeking is directly incorporated, except that Doren specifically identifies the basis of this as low cortical arousal, similar to Eysenck's (1964, 1977; Eysenck & Eysenck, 1978) formulations. Also included is the conditionability deficiency postulated by Eysenck, although Doren presents a circumscribed view of this deficiency and views it as resulting from the interaction of environmental and genetic causes. Gorenstein's (1982; Gorenstein & Newman, 1980) response perseveration theory is explicitly incorporated, except that Doren relates the perseverative tendencies specifically to low cortical arousal. Although the specific physiological coping mechanism described by Hare (1978) is not included, Doren retains Hare's

description of the psychopath as lacking in normal fear responses.

Much of the research relevant to Doren's (1987) formulations has already been reviewed and will not be repeated. Only theoretical support from Luria (1973, cited in Doren, 1987) is offered to substantiate Doren's hypothesis that low cortical arousal can impair limbic system functioning, as no empirical studies were found that directly address this issue. Evidence exists, however, to support Doren's hypothesis regarding the importance of genetic inheritance in psychopathy. Crowe (1974) concluded that heredity played a role in antisocial personality after finding a significantly higher incidence of the disorder in female offenders' biological children who were adopted than among control adoptees. Reviews of relevant research by Cadoret (1986), Mednick and Hutchings (1978), Gregory (1974), and Satterfield (1978) all support the existence of a genetic component in antisocial behavior.

That psychopaths fail to attend to all relevant environmental cues has been supported in a study by Jutai and Hare (1983), using inmates classified according to Cleckley's (1976) criteria, and another by Orris (1969), using delinquents classified according to self-report data. Conflicting findings, however, were reported by Kosson and Newman (1986), who used Hare's (1980) research checklist to classify psychopathic and non-psychopathic subjects.

One study was found that addressed the psychopath's hypothesized preoccupation with control and challenge. Widom (1974), using the Prisoner's Dilemma game to assess interpersonal cooperation and conflict, found psychopaths to be much more likely than controls to view themselves and other individuals as competitors and opponents.

Two studies have indirectly addressed Doren's (1987) hypothesis that the child psychopath receives inconsistent discipline from his parents. Both Hetherington, Stouwie, and Ridberg (1971) and Megargee and Golden (1973) found an increased incidence of reports of unsatisfactory parental relationships among psychopathic delinquents. The finding of abnormal discipline processes in the childhood of psychopaths was also given support by Robins (1978), who reviewed findings of two longitudinal studies that followed hundreds of white and black children into adulthood.

Only one study was found that directly spoke to the hypothesized behavioral sequelae of partial helplessness conditioning. Ross and Doody's (1973) experiment, although conceived and executed much earlier than the publication of Doren's (1987) theory, offers mixed support for the ideas that psychopaths persist in responding with a diminished concern for negative consequences, and also for the assertion that they are characterized by perseveration within a limited behavioral repertoire, which Doren links to low cortical arousal affecting the limbic system. This study has many limitations, and will be discussed in detail

in the next section describing the literature concerning conditionability in psychopaths.

In summary, Doren's (1987) formulations comprise the most comprehensive theory of the etiology of psychopathy of all those reviewed. It includes both genetic (low cortical arousal) and environmental (partial helplessness conditioning) components, and describes their interaction. It has received empirical support from studies of genetic influence, perceptions of competition in psychopaths, and parental discipline. Mixed support exists in the findings regarding attentional processes. As noted in reviews of previous theories, findings are conflicting in the areas of sensation-seeking behavior and deficient empathy in psychopaths, although clinical observations support the existence of both. The research is also inconsistent with regard to the low cortical arousal hypothesized by Doren. Findings on instrumental passive avoidance and classical conditioning of the GSR, reviewed in the next section, support Doren's notions that the psychopath perseverates within a limited class of responses and is relatively unaffected by punishment. The hypothesized effects of partial helplessness conditioning, crucial to Doren's premises, are afforded support in Ross and Doody's (1973) experiment and in the present research project.

Learning Research with Psychopaths

A variety of studies have attempted to delineate the nature and scope of the apparent learning deficiencies in psychopaths. Both classical and instrumental paradigms have been employed.

Classical conditioning

Eyelid conditioning. Gendreau and Suboski (1971) studied classical discrimination eyelid conditioning in psychopathic and non-psychopathic prisoners defined by MMPI Pd score, Welsh Anxiety Index, and Cleckley's criteria (from an earlier edition of the 1976 The Mask of Sanity). Psychopaths produced fewer conditioned responses to both the positive and negative conditioned stimuli (tones) across three instructional sets, two designed to facilitate or inhibit the conditioned response and the third neutral. A signal detection analysis of the data, however, indicated that the psychopaths were not poorer discrimination learners even though they were less responsive. The authors suggested that this was due to differing response sets in psychopaths and non-psychopaths, which might be particularly pronounced under conditions of negative reinforcement.

Another study of classical discrimination eyelid conditioning employed college students selected on the basis of MMPI Pd scores (Warren & Grant, 1955). There was no difference between subject groups in how quickly they learned to respond in the presence of the positive conditioned stimulus. The "psychopathic" group, however,

failed to discriminate between the positive and negative conditioned stimuli. This poorer discrimination was due to excessive responding to the negative conditioned stimulus, or a large number of false positive responses. This finding appears to be in conflict with the results reported by Gendreau and Suboski (1971), and may be attributable to the different subject populations employed by the researchers.

Autonomic nervous system conditioning. Studies of the autonomic nervous system in psychopaths are largely based upon the assumption that autonomic indices are a reasonable measure of subjective fear and anxiety. The typical study has employed electric shock or a loud tone as the unconditioned stimulus (Hare, 1965a, 1965c, 1965d; Hare & Craigen, 1974; Hare et al., 1978; Hare & Quinn, 1971; Lykken, 1957) and a signal tone or count-down procedure with a revolving memory drum as the conditioned stimulus. The psychopaths in these studies uniformly failed to develop, or exhibited retarded development of, a conditioned GSR, defined as increased electrical skin conductance prior to the onset of the unconditioned stimulus. Hare and Craigen (1974), using inmate subjects, and Sutker (1970), using non-institutionalized subjects with a diagnosis of antisocial personality disorder, demonstrated that psychopaths also fail to develop anticipatory GSRs prior to delivery of shock to other humans.

The conclusion of these investigators is that psychopaths are deficient in their ability to classically

condition fear responses. Of relevance to this argument are findings that psychopaths will tolerate much higher levels of shock for incentives than will non-psychopaths (Hare & Thorvaldson, 1970) and will choose delayed over immediate electric shock much more often than non-psychopaths (Hare, 1966). These reports suggest that a more severe punisher than electric shock may be necessary before researchers can truly study the fear response of the psychopath.

Cardiovascular conditioning. In contrast to their findings regarding deficient electrodermal conditioning in psychopaths, Hare and Quinn (1971) found no differences between psychopaths and non-psychopaths in ability to condition cardiac and digital vasomotor responses to impending electric shock. Hare and Craigen (1974) found that psychopaths were as able as non-psychopaths to condition cardiac orienting responses to impending shock, and that both the acceleratory and deceleratory components of the cardiac responses were greater in the psychopaths.

Instrumental Conditioning

Verbal conditioning. In most studies of verbal conditioning in psychopaths, the experimenter presents a series of index cards containing a past-tense verb and a number of pronouns and instructs the subject to choose a pronoun and make a complete sentence. The subject then selectively receives verbal reinforcement or punishment depending upon which pronoun he chooses, and the dependent variable is change in the frequency of selection of the

critical pronoun. Conditioning is assumed to have occurred if the frequency of the selected pronoun increases or decreases in the experimental group when compared to the performance of a non-reinforced control group.

Using this paradigm, Johns and Quay (1962) found that military offenders scoring high on the psychopathic scale of a factorially-derived delinquency questionnaire (Peterson et al., 1961) showed less verbal conditioning than those scoring high on the neuroticism scale. These results were later replicated by Quay and Hunt (1965).

Alternatively, conflicting reports of no difference in verbal conditioning between psychopaths and non-psychopaths have been obtained by Gutierrez and Eisenman (1971), using psychopathic and neurotic delinquents, and by Bryan and Kapche (1967), using military prisoners. Both studies employed the Peterson et al. (1961) delinquency questionnaire. Interestingly, two studies found superior verbal conditioning in psychopaths: Doctor and Craine (1971), using MMPI Pd and Ma and Welsh Anxiety scores to define groups of recovered male narcotics addicts, and Bernard and Eisenman (1967), using the MMPI to select psychopathic female prisoners. As the experimenter in the latter study was male, the authors concluded that the prisoners were more responsive to reinforcement because they had been deprived of male company, which was not true of the control group of nurses.

Reward versus punishment. Painting (1961) compared the probability learning of college students with that of recovering drug addicts classified as psychopathic according to MMPI Pd score and Internalization Ratio. Subjects were required to predict which of two lights would be lit during a series of trials, and half were rewarded for correct predictions while the other half were punished for incorrect predictions. Reward and punishment were defined as accumulation or loss, respectively, of poker chips redeemable for cigarettes. Subjects were randomly assigned to three conditions of correct light sequence: (a) random, (b) a 75 percent probability that the correct response was opposite of the correct response on the immediately preceding trial, and (c) a 75 percent probability that the correct response was opposite of the correct response two trials earlier.

In the random sequence condition, psychopaths tended to repeat the response that was correct on the immediately preceding trial, and performed significantly more poorly than controls with punishment as the contingency. However, with the reward contingency, psychopaths' performance was superior in the second sequence where the best strategy was to choose the response that was incorrect on the immediately preceding trial. Under the third, most difficult sequence, psychopaths' performance deteriorated markedly, and their performance was significantly poorer than controls under the reward contingency. With the exception of the last, complex

sequence condition that required attention to temporally remote cues, psychopaths tended to perform better for reward than for punishment.

Moses, Ratliff, and Ratliff (1979) studied performance on the Wisconsin General Test Apparatus in delinquents classified as psychopathic or neurotic based on the Peterson et al. (1961) questionnaire. The psychopaths performed at a significantly higher level than neurotics for verbal and token reward, and their learning was greatest under a joint verbal reward and punishment contingency. They failed to learn across trials for a joint token reward and punishment contingency.

Passive avoidance. A classic study by Lykken (1957) employed Cleckley's criteria (from an earlier edition of the 1976 The Mask of Sanity) to define inmate groups of primary and neurotic psychopaths and non-psychopaths. The subjects learned to complete a maze comprising 20 choices among four levers. The choice of one lever on each trial resulted in administration of electric shock and the onset of a signal light indicating an incorrect choice. Choice of either of two other levers resulted in the onset of the signal light only, while the selection of the fourth lever resulted in onset of a different light indicating a correct choice and progression to the next choice point in the maze. Lykken found no difference among subject groups in overall performance in the manifest task of learning the correct sequence through the maze. Compared to the other two

subject groups, however, the primary psychopaths demonstrated a deficiency in the latent task which measured ability to avoid the shocked errors.

This finding was replicated by Schachter and Latane (1964) with prisoners selected on the basis of Cleckley's criteria (from an earlier edition of the 1976 The Mask of Sanity) and scores on an anxiety scale developed by Lykken (1957). Of interest, Schachter and Latane also demonstrated that after injections of adrenalin, psychopaths were no longer deficient in avoidance of the shocked lever. In a similar study, Chesno and Kilmann (1975) found that primary psychopaths learned to avoid shock more effectively under conditions of high background auditory stimulation (90 decibels of white noise), whereas their avoidance under lower auditory stimulation continued to be impaired. These last two studies suggest a possible link, not yet explicated, between avoidance learning in psychopaths and autonomic nervous system arousal. As noted previously, however, interpretation of these two studies is difficult because of problems with appropriate manipulation checks.

Schmauk (1970) also found that psychopaths' deficient passive avoidance could be attenuated, but, rather than arousal, he manipulated type of contingency. Using prisoners selected on the basis of MMPI Pd, Corrected Internalization Ratio, and Welsh and Taylor Anxiety scores, he compared the avoidance of psychopaths and non-psychopaths in the Lykken (1957) maze under conditions of physical

punishment (electric shock), social punishment (experimenter's saying "wrong"), and tangible punishment (loss of quarters). While psychopaths demonstrated avoidance deficits and low electrodermal responsiveness with physical and social punishment, their avoidance and electrodermal responsiveness with tangible punishment approximated those of the controls. Schmauk's findings suggest that psychopaths can learn avoidance responses when the punishment, in their perception, is truly noxious, and his research calls into question the internal validity of all studies purporting to examine the psychopath's reaction to punishment as such.

Several studies have suggested that the meaningfulness of a punisher for psychopaths may vary as a function of its certainty (or uncertainty) and its history of presentation, particularly if that history includes previous pairing of the punisher with a response that has sometimes led to reward. Siegel (1978) devised a probability learning game with 10 levels of probability of punishment. He used 10 decks of cards with varying proportions of "punishment" cards (number cards) and "reward" cards (face cards). The subject's task was to select a deck and turn its cards face up, one by one, until he wished to stop and move on to the next deck. Upturned face cards were rewarded with poker chips redeemable for money, while upturned number cards resulted in loss of chips.

Siegel (1978) used groups of psychopathic and non-psychopathic offenders, selected with Cleckley's (1976) criteria, and compared their performance to that of non-offenders. He hypothesized that primary psychopaths would demonstrate less suppression of behavior (defined as the inhibition of responding for any particular deck of cards) as the probability of punishment became more uncertain. Consistent with his prediction, primary psychopaths showed significantly less suppression than the other two groups in conditions of 40 to 70 percent punishment, while suppression among the groups was equivalent when probability of punishment was 10, 20, 30, and 100 percent. It is important to note Siegel's acknowledgment that the partial reinforcement effect could account for his findings; however, the traditional partial reinforcement paradigm involves reward and non-reward for the same response, while Siegel's experiment employed reward and punishment. Moreover, this explanation fails to indicate why psychopaths should differ from non-psychopaths in their response to partial reinforcement.

Newman (1979/1980) reported a series of experiments involving card tasks with delinquent males, classified as primary psychopaths and non-psychopaths based on MMPI Pd and Welsh Anxiety scores. One experiment employed a card task highly similar to Siegel's (1978) probability card game, and the results indicated that psychopaths exhibited passive avoidance deficits when the punished response had previously

led to reward on some occasions. He also demonstrated that psychopaths were much less likely to exhibit this perseveration of the previously rewarded response under conditions of concrete external feedback about accumulated reward and punishment (Newman, 1979/1980). Consistent results were obtained by Newman, Patterson, and Kosson (1987), who employed the same card task and found that concrete and cumulative feedback, coupled with forced delay in response time, eliminated psychopaths' response perseverative deficits.

In a related experiment that examined discrimination learning, Newman (1979/1980) presented subjects with a series of cards with printed stimuli and rewarded them for touching any of four appropriate stimuli and punished them for touching any of four inappropriate stimuli. Reward and punishment were defined as the accumulation or loss, respectively, of poker chips redeemable for cigarettes or candy bars. Newman reported that the psychopathic group, as compared to controls, exhibited an exaggerated tendency to make the rewarded response (defined as touching a stimulus card) and that this response perseveration interfered with passive avoidance. Consistent, but marginally significant, results were obtained with an identical discrimination task in an experiment by Widom and Newman (1985) using as subjects non-incarcerated psychopaths defined by the Research Diagnostic Criteria (Spitzer et al., 1975, cited in Widom & Newman, 1985).

The tendency of the psychopathic delinquents in Newman's (1979/1980) experiment to persevere in making the rewarded response was attenuated by a second set of contingencies whereby subjects were rewarded for avoidance responses and inappropriate responses did not result in penalty. Psychopaths performed as well as non-psychopaths in this condition, and this finding was replicated by Newman et al. (1985) with delinquents classified according to degree of psychopathy with MMPI Pd and Welsh Anxiety scores. These findings suggest that the response perseveration of psychopaths might be attenuated under conditions involving only reward. Research by Newman and Kosson (1986) further suggests that such attenuation may also occur under conditions involving only loss of reward: Using adult prisoners classified according to Hare's (1980) psychopathy research checklist and a computerized discrimination task with two-digit numbers as go/no-go stimuli, they found that psychopaths demonstrated passive avoidance deficits under competing reward and loss of reward contingencies but not under conditions involving loss of reward only.

The studies by Siegel (1978), Newman (1979/1980), Widom and Newman (1985), Newman et al. (1985), and Newman and Kosson (1986) suggest that, without salient corrective feedback, psychopaths tend to persevere in performance of a rewarded response under conditions where that response leads to punishment on some occasions. These results are highly consistent with Doren's (1987) theory of psychopathy

described earlier. To review briefly, the learning/environmental component of Doren's theory describes a childhood history of inconsistent discipline where the same behaviors are unpredictably rewarded on some occasions but punished on others. This unpredictable reward history is viewed as teaching psychopaths to persist in responding with a diminished concern for punishment.

An experiment by Ross and Doody (1973), conceptually similar to those of Siegel (1978), Newman (1979/1980), and Widom and Newman (1985), provides mixed support for Doren's (1987) theory even though it was reported prior to the publication of Doren's work. Much the same as Doren, Ross and Doody hypothesized that inconsistent discipline in childhood was the basis for psychopaths' behavioral persistence in the face of punishment. They examined the performance on a simple learning task of female adolescent offenders scoring high or low on the MMPI Pd scale. With continuous reinforcement, each subject learned to select one of five levers as the crucial response. Following pretraining, subjects were assigned to one of three reinforcement conditions: (a) continuous reinforcement of the previously crucial response, (b) partial reinforcement of the previously crucial response, and (c) partial reinforcement with intermittent punishment, where the previously crucial response was randomly reinforced on some occasions and punished on others. After 50 training trials, subjects then underwent intermittently punished extinction

and were tested for perseveration of the previously crucial response and for persistence of global responding (total number of responses until reaching a criterion of five trials of no response or 15 consecutive trials of incorrect responses).

Ross and Doody (1973) reported that psychopaths exhibited more global persistence after intermittent punishment/partial reinforcement training (partial helplessness conditioning, in Doren's terms) than after continuous reinforcement, but that learning schedule did not influence the psychopaths' frequency of choice of the previously crucial response. In a manner similar to psychopaths, the non-psychopaths exhibited greater global persistence after partial helplessness conditioning than after continuous reinforcement; however, unlike the psychopaths, they also demonstrated increased perseveration of the crucial response after partial helplessness conditioning.

Additional findings indicated that the psychopaths failed to show the partial reinforcement effect manifested by the non-psychopaths in greater global persistence and increased perseveration of the crucial response (Ross and Doody, 1973). Instead, the psychopaths' persistence and perseveration were approximately equal following partial and continuous reinforcement. The researchers predicted this would occur because of generalized persistence presumed to

result from the psychopaths' childhood history of unpredictable reinforcement and punishment.

Ross and Doody (1973) failed to find a main effect of psychopathy on global persistence and crucial response perseveration, which is at odds with other research (Newman, 1979/1980; Siegel, 1978) and may be due to differences in the structure of the researchers' learning tasks. Ross and Doody instead based their conclusions on the interaction produced by discrepant performance of psychopaths and controls in the continuous reinforcement condition, but neglected to clearly report whether the behavior of the subject groups was differentially affected by partial reinforcement versus partial helplessness training, with the exception that psychopaths' perseveration did not significantly differ between partial reinforcement and partial helplessness training schedules.

Ross and Doody's (1973) research is flawed in several respects. First, although the researchers drew conclusions about the behavior of psychopaths, their experiment employed only adolescent offenders. Further, these offenders were placed into subject groups on the basis of MMPI Pd scores, which, as Hare (1985a) has demonstrated, is a dubious method of subject classification in research on psychopathy.

Second, Ross and Doody (1973) stated that their experiment was a test of psychopaths' persistence through non-reward and punishment, and they confounded these contingencies in one, "intermittently punished" extinction

condition. A more accurate test of psychopaths' persistence under non-reward and punishment would involve separating these two types of extinction conditions.

Third, Ross and Doody (1973) employed as dependent variables the number of crucial responses during extinction and the number of total responses during extinction (including crucial responses). This contamination of the dependent variables makes it difficult to interpret significant findings for both, since these could be due to a significant effect for only the crucial response.

Fourth, Ross and Doody (1973) omitted important information about the effects on global persistence of partial reinforcement versus partial helplessness conditioning, as previously noted. Of relevance is that Deur and Parke (1968), using college students as subjects, obtained a marginally significant increase in resistance to continuous punishment with partial helplessness training as opposed to partial reinforcement.

Summary

It is difficult to compare results across learning studies with psychopaths, as investigators have used differing methods of subject selection. Inconsistencies in research findings may also result from a lack of careful attention to motivational issues, as was highlighted by Schmauk's (1970) findings, or the particular choice of intensity of variables such as punishment (Hare & Thorvaldson, 1970).

One fairly consistent finding is that psychopaths exhibit impaired classical conditioning of the GSR when shock or loud tone are used as unconditioned stimuli. The research does not support, however, a generalized conditionability deficit in this group, and this is particularly reflected in verbal instrumental conditioning studies. In fact, several instrumental conditioning studies have found superior performance of psychopaths under reward contingencies that were not too complex.

Although deficient passive avoidance is another fairly consistent finding with psychopaths, several investigators found this deficiency to be attenuated under conditions where arousal and motivation appear to be carefully controlled. Other research indicates that the passive avoidance deficit of the psychopath may be exacerbated when he is required to inhibit a response that sometimes leads to reward. Findings by Ross and Doody (1973) suggest that this deficit may be linked to a childhood history of inconsistent discipline, as Doren (1987) has hypothesized; however, the Ross and Doody project has many limitations and so does not provide an adequate test of the possible relationship between inconsistent reinforcement/punishment history and passive avoidance deficits in psychopaths. Clarification of this hypothesized relationship is sought in the present study, which is designed to be an empirical test of the environmental/learning component of Doren's (1987) theory of the etiology of psychopathy.

Statement of the Problem

Interpretation of the learning literature on psychopathy is difficult because of variability of subject selection techniques, inadequate attention to motivational issues, and inconsistencies among reported results. One fairly consistent finding, however, is that psychopaths are deficient in passive avoidance under normal conditions (Chesno & Kilmann, 1975; Lykken, 1957; Schachter & Latane, 1964). In the "real world" outside the psychological laboratory, the psychopath's passive avoidance deficit is reflected in his inability to inhibit the behaviors that society deems unacceptable and punishes.

Results of several studies suggest that psychopaths' passive avoidance deficit may be exacerbated when they are required to inhibit a response that has previously led to reward (Newman, 1979/1980; Newman et al., 1985; Siegel, 1978; Widom & Newman, 1985). This is in concert with Doren's (1987) theory, which states that inconsistent delivery of reward and punishment in childhood, or partial helplessness conditioning, results in an adult psychopath whose behavior is relatively unaffected by contingencies, especially punishment. The psychopath persists and perseverates in antisocial behaviors because the

contingencies for such behavior were mixed and unpredictable during childhood.

Although the theoretical underpinnings of Ross and Doody's (1973) research were not linked specifically with Doren (1987), some of their results are consistent with Doren's hypotheses. However, Ross and Doody's experiment cannot be viewed as an adequate test of the learning component of Doren's theory due to the methodological difficulties noted previously. The current research is designed to provide such a test.

Overview of the Current Research

The present study employs a methodology similar to that of Ross and Doody (1973), correcting for several noted difficulties, to investigate the persistence and perseveration of high psychopathy and low psychopathy subjects following different conditioning schedules. This study addresses two of Doren's (1987) arguments: (a) partial helplessness conditioning, an etiological factor in psychopathy, causes a behavioral tendency to persist in responding until goal attainment, with a diminished regard for consequences and, specifically, increased resistance to punishment, and (b) psychopaths tend to repeat a relatively small repertoire of behavioral responses (which Doren linked to impaired limbic system functioning). This study also attempts replication of Ross and Doody's (1973) findings that: (a) non-psychopaths demonstrate an acute partial helplessness effect in the laboratory, in that partial helplessness conditioning results in more persistence during extinction when compared to continuous reinforcement, and (b) psychopaths, unlike non-psychopaths, fail to demonstrate a partial reinforcement effect.

Subjects were males incarcerated at the Federal Correctional Institution in Butner, North Carolina. This is an administrative facility, housing inmates at all levels of

custody and security, but is most comparable to a medium security prison. Subjects were classified according to degree of psychopathy using Hare's (1985b) Psychopathy Checklist, and then were randomly assigned to one of three reinforcement conditions where they completed a computerized learning task with several phases. Continuous reinforcement of a single crucial response comprised the initial pretraining phase for all subjects. In the succeeding acquisition phase, one third of the subjects received additional continuous reinforcement for the crucial response. One third were partially reinforced for the crucial response, and one third received partial helplessness training, where the crucial response brought reinforcement on some occasions and punishment on others. Following acquisition, all subjects underwent extinction that comprised continuous punishment of the crucial response. Punished extinction continued until subjects terminated the computer task or reached a total of 250 extinction trials.

Reinforcement consisted of points earned in the computer task, exchangeable for food snack items. Punishment consisted of loss of points, and, by implication, food items. Based on Schmauk's (1970) findings, gain and loss of money were originally chosen to operationalize reinforcement and punishment, respectively. A different reinforcer was selected for the final project to remain in

compliance with the research policy statement of the Federal Prison System (1981).

The design of the current research was a 2 (high psychopathy vs. low psychopathy subject groups) x 3 (continuous vs. partial reinforcement vs. partial helplessness conditioning) factorial. The three dependent measures were: (a) global persistence of responding during punished extinction, or total number of responses, (b) crucial response perseveration (the persistence during punished extinction in choosing the crucial response of acquisition), or the ratio of number of crucial responses to the sum of all punished extinction responses, and (c) the variability of the alternate response choices during punished extinction, or the standard deviation.

Hypotheses

1. High psychopathy subjects were expected to show greater global persistence during punished extinction than low psychopathy subjects, and this was expected to be true across all learning conditions, producing a main effect for psychopathy level on global persistence. This conflicted with Ross and Doody's (1973) results but was perceived as consistent with Doren's (1987) proposition that psychopaths tend to persist until goal attainment regardless of consequences.

2. Based on Ross and Doody's (1973) findings, low psychopathy subjects were expected to demonstrate a partial helplessness effect, in that their global response

persistence was expected to be greater after partial helplessness conditioning than after continuous reinforcement. Likewise, the global persistence of low psychopathy subjects across learning schedules was expected to reflect a partial reinforcement effect. Greatest persistence was expected after partial helplessness conditioning, consistent with propositions of Doren's (1987) theory. In other words, low psychopathy subjects exposed to partial helplessness conditioning in the laboratory were expected to behave like psychopaths in the "real world," and to thus exhibit an increased tendency to act until goal attainment despite consequences.

3. Based on Doren's (1987) assertion that psychopaths persist in responding despite contingencies, high psychopathy subjects' global persistence was expected to be relatively uninfluenced by learning schedule. The aberrant learning history of these subjects was expected to override their experiences in the laboratory. Thus, an interaction was predicted between psychopathy level and learning schedule for persistence of global responding.

4. High psychopathy subjects were expected to demonstrate greater crucial response perseveration during punished extinction than low psychopathy subjects, and this was predicted to occur regardless of reinforcement condition. This predicted main effect of psychopathy level on crucial response perseveration followed from Doren's (1987) assertions that psychopaths exhibit increased

resistance to punishment and perseveration within a limited behavioral repertoire.

5. Low psychopathy subjects' perseveration during punished extinction was expected to increase across learning schedules, with little perseveration after continuous reinforcement, increased perseveration after partial reinforcement, and greatest perseveration following partial helplessness conditioning. The prediction of increased perseveration after partial helplessness conditioning when compared to continuous reinforcement was based on results by Ross and Doody (1973), and also on findings by Deur and Parke (1968) who used college student subjects. This prediction was perceived to be consistent with Doren's (1987) assertion that partial helplessness conditioning leads to increased resistance to punishment; and again, low psychopathy subjects exposed to partial helplessness conditioning were expected to behave like psychopaths who, outside the laboratory, exhibit increased resistance to punishment. The prediction of increased perseveration in low psychopathy subjects after partial reinforcement when compared to continuous reinforcement training was consistent with evidence from Ross and Doody, and also from Vogel-Sprott and Thurston (1968) who used college subjects, but was inconsistent with findings of Deur and Parke (1968) and Vogel-Sprott (1966). The expectation that partial helplessness training would increase perseveration when compared with partial reinforcement was consistent with

marginally significant results obtained by Deur and Parke.

6. In contrast, high psychopathy subjects' perseveration of the crucial response was expected to be relatively uninfluenced by learning schedule, consistent with the findings of Ross and Doody (1973) and propositions from Doren's (1987) theory. The prior learning history of the high psychopathy subjects was again expected to exert a greater influence on their performance than would laboratory conditioning. Thus an interaction between psychopathy level and learning schedule was predicted in addition to the main effect.

7. High psychopathy subjects were expected to be less variable than low psychopathy subjects in their alternate response choices regardless of learning schedule, leading to a main effect of psychopathy level on alternate response variability. This hypothesis was viewed as consistent with Doren's (1987) contention that psychopaths repeat a limited repertoire of behaviors.

Method

Subjects

Referral and Screening

Referrals for potential subjects were obtained through staff in the General Population living units of the institution, including psychologists, case managers, and correctional counselors. General characteristics of psychopathic and non-psychopathic offenders were explained during a meeting between individual staff members and the author. Each staff person was given a brief written outline of general selection criteria to be employed when identifying potential subjects. A list of referrals was then obtained from each staff member consulted, and the total number of referrals was 424.

All referrals were screened by the author, using several exclusion criteria. A potential subject was excluded for medical reasons if his records indicated that he had problems in areas of obesity, diabetes, significant hearing or vision loss, paralysis or absence of limbs, seizure disorder, or history of head injury that had resulted in concussion or loss of consciousness. The presence of obesity or diabetes was deemed undesirable because food snack items were given to each subject at the conclusion of the learning task. Referrals with significant

hearing or vision loss and paralyzed or absent limbs were eliminated because their medical problems could have interfered with normal completion of experimental procedures. Additionally, history of seizure disorder or head injury was used to exclude some referrals because of the difficulty in discriminating behavioral sequelae of these medical conditions versus that of psychopathic personality disturbance.

Educational achievement test scores were used to eliminate referrals with potentially borderline and lower levels of intelligence, since limited intelligence could have affected performance in the learning task independently of behavioral tendencies. Achievement test scores were examined rather than intelligence test scores, because the former were available for all inmates in the prison population, whereas the latter were not. Available Stanford Achievement Test (SAT, The Psychological Corporation, 1982) information included scores on subtests of Reading Comprehension, Vocabulary, Mathematical Comprehension, Mathematical Applications, Concepts of Number, Language, Spelling, and Listening Comprehension. During the course of the research project, the prison's Education Department changed its educational screening instrument to the Adult Basic Learning Examination (ABLE, Karlsen, Madden, & Gardner, 1967). ABLE subtest scores were thus examined for each referral admitted to the prison after this change. Five of six ABLE subtest scores were recorded for

these referrals, as validity information for the ABLE indicated correlations ranging from .68 to .76 between five specific ABLE and SAT subtests (Karlsen & Gardner, 1986). These subtests were Reading Comprehension, Vocabulary, Number Operations, Problem Solving, and Spelling.

Referrals were eliminated if any subtest score was below the sixth grade level, or if fewer than five subtest scores were available from records. The most recent educational test scores were examined for each referral.

In addition to screening against the above educational and medical criteria, referrals were also eliminated if their release date was within one month, or if their age was greater than 40 (although one subject did attain his forty-first birthday before he concluded all phases of the project). This age criterion was employed in recognition of research that suggests psychopaths may undergo behavioral changes after age 40 (Hare, McPherson, & Forth, 1988). Referrals were also eliminated if their race was other than white or black, given that no evidence could be found supporting the applicability of the psychopathy research checklist (Hare, 1985b) with races other than these. Referrals were also eliminated if they had obtained psychiatric treatment in the prison's Mental Health Division within the previous year, had prior clinical contact with the author, or were transferred or released between the time of referral and completion of the screening process.

Of the 424 original referrals, 289 were eliminated during the screening process. All 135 remaining referrals were invited to participate in the research. Forty-six inmates declined the invitation. Of the 89 who agreed to participate, 12 were transferred or released before they completed all phases of the project, eight later voluntarily withdrew, two repeatedly failed to appear for research appointments, and one was eliminated by the author due to excessive hostility and intimidating behavior during the interview. A complete data set was thus obtained for 66 subjects, although six of these were later eliminated because of failure to reach acquisition in the learning task, as will be discussed in a later section.

All subjects were rated according to degree of psychopathy with a research checklist developed specifically by Robert Hare (1985b) for the assessment of psychopathy in criminal populations. Following is a description of the checklist and general scoring procedures; prior research involving reliability, validity, and factor analysis; and the use of the checklist in this study.

Psychopathy Checklist

Description and scoring procedures. The 20-item research checklist developed by Hare (1985b) to classify inmate subjects according to degree of psychopathy is based on Cleckley's (1976) profile of the psychopath and represents a revision of an earlier 22-item checklist, demonstrated through research to be a reliable and valid

measure of psychopathy in male prison populations (Hare, 1980, 1983, 1985a; Hare & Frazelle, 1980; Schroeder, Schroeder, & Hare, 1983).

The Psychopathy Checklist (PCL, Hare, 1985b) items are: (a) glibness/superficial charm, (b) grandiose sense of self-worth, (c) need for stimulation/proneness to boredom, (d) pathological lying, (e) conning/manipulativeness, (f) lack of remorse or guilt, (g) shallow affect, (h) callousness/lack of empathy, (i) parasitic lifestyle, (j) poor behavioral controls, (k) promiscuous sexual behavior, (l) early behavior problems, (m) lack of realistic long-term goals, (n) impulsivity, (o) irresponsibility, (p) failure to accept responsibility for own actions, (q) many short-term marital relationships, (r) juvenile delinquency, (s) revocation of conditional release, and (t) criminal versatility. Two items, "drug or alcohol abuse not direct cause of antisocial behavior" and "previous diagnosis as psychopath," were deleted from the original version of the checklist due to scoring difficulties and failure to provide useful information, respectively (Hare, 1985b).

A handbook (Hare, 1985b) and subsequent modifications and clarifications (R. D. Hare, personal communications, July, 1987, & November, 1988) are available to guide the scoring of each item. PCL ratings are based on information from inmates' institutional files and individual semi-structured interviews. Each PCL item is scored on a 3-point scale (0, 1, 2) according to the extent to which it

is descriptive of the inmate. A score of 0 means the item does not apply to the offender, whereas a score of 2 indicates the item is generally consistent with his behavior. A score of 1 is reserved for situations in which the item applies to the inmate but not to a great extent, or when there is uncertainty about its applicability. If there is insufficient information available about an inmate to score certain items, up to five such items can be eliminated and the total PCL score is prorated. Total PCL scores range from 0 to 40, with higher scores representing greater degrees of psychopathy.

Prior research: Reliability, validity, and factor analysis. The PCL (Hare, 1985b) originated in an attempt by Hare (1980) to operationalize the decision strategies employed by himself and his assistants when making global assessments of psychopathy, based on Cleckley's (1976 and earlier versions of The Mask of Sanity) criteria, in order to assign subjects to groups in research (e.g., Hare & Craigen, 1974; Hare & Quinn, 1971). These global ratings have been shown to be significantly correlated (Hare, 1985a) with diagnoses made by clinicians using the DSM-III (American Psychiatric Association, 1980).

During the initial stage of checklist construction (Hare, 1980), two experienced investigators independently rated 143 inmates with a list of Cleckley's (1976) criteria. These ratings were subjected to factor analysis, resulting in extraction of five factors that accounted for 64 percent

of the total variance. Hare and his assistants then listed the behaviors, traits, and other indicants they considered when making global ratings of psychopathy, and items were selected from this list on the basis of ability to discriminate between inmates with low and high global ratings of psychopathy. This list of items was compiled as the research checklist and used to rate the same 143 inmates. Factor analysis of the checklist ratings (Hare, 1980) revealed a factor structure highly similar to the one obtained in the factor analysis of the ratings based on Cleckley's (1976) criteria.

Hare has reported checklist interrater reliabilities of: .93 with two experienced investigators rating 143 inmates (Hare, 1980); .90 with two experienced investigators rating 159 inmates (Hare, 1983); .91 for two investigators rating 146 inmates (Hare & McPherson, 1984a); .93 for two investigators rating 72 inmates (Schroeder et al., 1983); .92 for two investigators rating 71 inmates (Schroeder et al., 1983); and .90 for two investigators rating 229 inmates (Hare, 1985a). In addition to reporting interrater consistency between members of two pairs of experienced investigators in Schroeder et al. (1983), this article also describes three studies using as raters graduate and undergraduate students with little correctional or psychological assessment experience. The interrater reliabilities for these studies were .84, .88, and .91. In addition, alpha coefficients of internal consistency have

been reported between .82 and .92 (Hare, 1980; Schroeder et al., 1983).

Generalizability coefficients of reliability for the PCL were reported by Schroeder et al. (1983): .85 for a 1977 study with 72 inmates, .86 for a 1978 study with 71 inmates, .90 for a 1979 study with 47 inmates, .86 for a 1980 study with 44 inmates, and .89 for a 1981 study with 58 inmates.

In assessing checklist validity, checklist ratings have been compared with global ratings of psychopathy made by independent investigators (Hare, 1980, 1985a; Schroeder et al., 1983) and with diagnoses from the DSM-III (American Psychiatric Association, 1980) made by independent clinicians (Hare, 1983, 1985a; Schroeder et al., 1983). The correlation between checklist ratings and global ratings of psychopathy have been reported between .80 (Hare, 1985b) and .83 (Hare, 1980; Schroeder et al., 1983). Correlations between checklist ratings and DSM-III diagnoses have ranged from .67 (Hare, 1985a) to .83 (Hare, 1983). Validity of the checklist has also been substantiated in studies demonstrating that, when compared with inmates receiving low PCL scores, inmates with high PCL scores have more convictions for violent crimes (Hare & McPherson, 1984b) and are more likely to violate the stipulations of conditional release (Hart, Kropp, & Hare, in press).

Early factor analysis of the checklist (Hare, 1980) resulted in five factors that accounted for 51 percent of

the total variance in the ratings. These factors were labelled as: (a) impulsive, unstable lifestyle; (b) egocentricity, callousness, and lack of empathy; (c) superficial relationships; (d) early appearance of chronic antisocial behavior; and (e) impulsive and inadequately motivated criminal acts (Hare, 1980). The second factor was found to be most predictive of which inmates received high or low total ratings of psychopathy. This five-factor structure was essentially replicated in a subsequent study (Hare, 1982b).

More recent factor analysis of the PCL (Hare, 1985b) was reported by Harpur, Hakstian, and Hare (1988). This analysis included data combined from samples of minimum, medium, and maximum security prisons from five provinces of Canada, one city in England, and state facilities in Wisconsin and Missouri. Total number of subjects was 1,119. A two-factor solution was replicated in all samples, with the first factor describing core personality characteristics of "selfish, callous, and remorseless use of others" and the second factor representative of behaviors consistent with "chronically unstable and antisocial lifestyle" (Harpur et al., 1988, p. 745).

Use in this study. Ratings of the 60 subjects in the present study with the PCL (Hare, 1985b) were made by the author and one of two additional judges, all of whom were prison employees. The two judges were another doctoral candidate in clinical psychology, who rated 38 subjects, and

a vocational rehabilitation specialist with graduate and undergraduate psychology background, who rated 22 subjects. The ratings were based on detailed reviews of institutional files and on information obtained from semi-structured interviews (Appendix D) lasting between 30 minutes and one hour.

Each subject was interviewed by the author, and these interviews were audiotaped for review by the second rater. The author and second judge independently inspected the institutional files, which contained conviction listings from the Federal Bureau of Investigation; copies of parole board decisions and related justifications; past records of incarcerations or mental health treatment; institutional adjustment records, including work and educational evaluations, disciplinary reports, case management progress reviews, and participation in drug and correctional counseling groups; and pre-sentencing investigative reports that described the current offense, prior legal record, childhood adjustment if remarkable, and history of educational, occupational, military, and emotional functioning.

The author and second judge then independently completed the PCL for each subject, combining information from the interview and institutional file. These independent ratings were used in calculating interrater reliability and generalizability coefficients. The ratings were averaged across the two judges to determine the final

PCL score to be assigned to each subject for classification purposes.

Training of raters was accomplished via the following method: Early in the study, the doctoral candidate judge and the author consulted after assigning independent PCL (Hare, 1985b) scores to the initial set of subjects, and reviewed the rating process for each of the 20 PCL items. In no case were the independent ratings altered after these reviews; rather, the consultations served solely as training for subsequent independent ratings. This process was repeated later in the study when the vocational rehabilitation specialist joined the research team.

Based on previous research (Hare, 1985a; Hare, 1985b; Hare & McPherson, 1984a), checklist cutoff scores were originally established at 30 to delineate the high psychopathy group and 22 to delineate the low psychopathy group. However, independent ratings of a number of initial referrals for the high psychopathy group indicated that the majority of PCL (Hare, 1985b) scores for these subjects actually fell between the established cutoff scores. Therefore, the groups were restructured so that all subjects with averaged PCL scores of 22 and below were designated as low psychopathy subjects, and those with averaged PCL scores greater than 22 were designated as high psychopathy subjects.

Apparatus and Learning Task

To fully understand the early development of the apparatus, learning task, and procedure, the reader is referred to Appendices J-M, which summarize the results of four pilot studies.

The apparatus consisted of a Radio Shack TRS-80 color computer and television monitor. Only eight keys on the computer keyboard were visible; the remaining keys were covered with white cardboard. The four exposed keys at the top of the keyboard were used by subjects to make responses on each trial of the learning task. These keys were covered by small cardboard squares, white with black borders. Each had a thick black line in the center that descended vertically from the top horizontal border toward the bottom horizontal border. The keys were clearly distinguished from each other by the length of this vertical line. The far left key displayed a very short vertical line, and the length of the line gradually increased across keys until the fourth, far left key, which contained a vertical line that connected both the top and bottom horizontal borders. Two other exposed keys were the "F" key, which subjects used to make the computer task move forward to each successive trial, and the slash/question mark key, which they used to halt the task. The "Y" and "N" keys were also visible; they were used by subjects to indicate whether they wished additional practice trials after an initial set.

The computer program used may be obtained in written form from the author. A summary description follows:

The onset of each trial was signalled by information printed on the computer screen, which also pictured small squares identical to the four black-and-white keys. Above these squares the screen depicted a row of five zeroes spaced approximately one and one half inches apart. At the onset of the first trial, the zeroes at each of the five positions were replaced by a randomly generated sequence of numbers, with each number in the sequence presented for a duration of .1 second. This randomly generated sequence was presented for three seconds and was then replaced by the original zeroes. At this point the subject chose one of the four black-and-white keys, and the zeroes were immediately replaced by one stationary number at each of the five pictured positions.

Subjects won or lost points in the task according to the redundancy or non-redundancy of the five stationary numbers that appeared after their selection of a black-and-white key. The computer was programmed so that only one of the four black-and-white keys resulted in a "winning" combination of stationary numbers. Points were accumulated in accordance with the learning schedule to which each subject was assigned. A running point total was displayed on the screen at the end of each trial, just after the subject made his key selection, in addition to one of three messages: "WIN" if the key selection increased the

subject's point total, "SAME" if the key selection had no effect on the point total, and "LOSE" if the key selection decreased the point total.

For the purposes of this task, reinforcement was defined as the addition of points, and punishment the loss of points.

Intertrial interval was 3.3 seconds throughout the task. The total duration of each trial varied, depending upon individual response times (latency), and the subject had to press a key on each trial until he terminated the task by selecting the slash/question mark key.

Procedure

Each subject was seen by the author for three sessions during the course of the research project, initially for recruitment, then for the semi-structured interview, and finally for completion of the learning task.

Recruitment occurred in groups of between one and five potential subjects. During recruitment sessions, subjects were allowed to ask questions about the research project and, if they agreed to participate, signed informed consent forms (Appendix F).

Subjects were interviewed by the author in individual sessions. These semi-structured interviews (Appendix D) were audiotaped.

Each subject completed the learning task individually in a subsequent session. After he entered the research room, the experimenter explained that he would complete

several different tasks, including a computer "game," written questionnaire, and brief interview. It was explained that he would win points in the computer task that he could exchange for one or more food items, and that he would be able to eat the food items after completing the computer task. On two trays in the room were displayed snack food items, with signs describing the point totals necessary to win each type of item.

The subject was then seated at a table in front of the TRS-80 color computer and television monitor. The experimenter sat beside the subject and stated that he would first engage in a key-pressing computer game in which he could accumulate points redeemable for food items. It was explained that on each trial in the game, the computer would reset and assign different combinations of five numbers to each of four black-and-white keys. The subject was told that he could win points on a trial by selecting the key that had been assigned the winning number combination, but that his point total would decrease or remain unchanged if he selected keys with other number combinations. He was informed that the screen would display the assigned number combination as soon as he made his key selection on each trial. A winning combination was defined as a five-number sequence containing at least three identical numbers. A neutral combination, or one that would not affect his point total, was defined as one containing only two identical

numbers. A losing combination was defined as a five-number sequence containing all non-identical numbers.

The subject was told that he would begin the game with 50 points, and that it was up to him to find a strategy to achieve the most points in the game. It was also explained that he would win a bonus number of points at the conclusion of the computer game if his final score was greater than the average score of the people who had already played the game. The subject was informed that he could terminate participation in the game at any time by pressing the slash/question mark key, and that subsequently he would redeem his points for food items. (See Appendix E for the actual instructions given to each subject.)

After the task was described, the computer game began with five sample trials to allow the subject to practice selection of each of the four black-and-white keys and the slash/question mark key to exit the task. To ensure the salience of the exit key, a low tone sounded when it was pressed. The subject was invited to ask questions and to participate in further sample trials if he deemed them necessary.

The three-phase learning task then began, and included pretraining, acquisition, and extinction. A running point total was displayed on the computer screen throughout all phases of the task.

Pretraining

The first two key selections by the subject were not reinforced and were met with the printed message, "SAME," on the computer screen and no change in the point total. The subject's third response was arbitrarily designated as the crucial response and reinforced; it and subsequent crucial responses were followed by a high tone, the message, "WIN," and an increase of 50 in the point total. Pretraining continued until each subject executed a total of five crucial responses. All alternate, or non-crucial, responses were followed by the message "SAME," with no change in the point total. At the conclusion of pretraining, the experimenter indicated that the subject appeared to understand the procedure and had already won 300 points. The experimenter further indicated that she intended to read at another desk in the room while the subject completed the computer task, and invited him to ask any remaining questions to clarify the procedure. After entertaining questions, the experimenter then moved to another desk, and the subject completed the task alone.

Acquisition

Each subject entered the acquisition (training) phase at this point, although the computer screen did not indicate that he had progressed to a different phase of the learning task. The acquisition phase continued until each subject executed a total of 25 crucial responses. Alternate responses were neither rewarded nor penalized, and, as in

the pretraining phase, were met with the printed message "SAME" and no change in point total.

For subjects in the continuous reinforcement condition, all 25 crucial responses were reinforced with a high tone, the printed message, "WIN," on the computer screen, and an increase of 50 in the point total. Subjects in the partial reward condition were reinforced for 75 percent of the 25 crucial responses (a total of 19 reinforcements), which comprised a variable ratio schedule. For these subjects, the remaining 25 percent of the crucial responses (a total of six responses) were not reinforced and were met with the printed message "SAME" and no change in point total. Subjects in the partial helplessness condition were reinforced for 75 percent of crucial responses and punished for the remaining 25 percent. Punished crucial responses were followed by the printed message, "LOSE," on the computer screen and a decrease of 50 in the point total. The following schedule governed delivery of reinforcement and non-reinforcement in the partial reward condition, and also the delivery of reinforcement and punishment in the partial helplessness condition: -++++,+-+--,--+++,+----,+-+-. The location of non-reinforcement/punishment within each block of five trials was determined by entry into a table of random numbers.

Punished Extinction

Following acquisition, subjects in all learning conditions were exposed to continuously punished extinction,

in which crucial responses were punished and alternate responses resulted in non-reward. Thus, crucial responses were followed by the message, "LOSE," on the computer screen and a decrease of 50 in the point total, whereas alternate responses were met with the message, "SAME," and no change in point total. There was no signal on the computer screen that task contingencies changed when subjects progressed from acquisition to extinction. All reinforcement was discontinued in the punished extinction phase, which lasted until subjects terminated the experiment, or executed a total of 250 responses.

At the conclusion of the punished extinction phase, subjects were given oral feedback about how their performance in the computer task compared with that of the pilot subjects. Their performance was described as "lower than average," "average," "higher than average," or "much higher than average." They were awarded a bonus number of 300 points if their final score surpassed the average score of subjects in the pilot studies. Subjects were then allowed to exchange the points they earned in the computer task for food snack items. Participants whose final scores were very low were awarded the 300 points they earned during the pretraining phase.

Post-experiment Questionnaire and Interview

Subjects completed a post-experiment questionnaire (Appendix G) to assess individual perceptions of the experiment, response sets, the effectiveness of the

reinforcement manipulations, and several cognitive beliefs consistent with Doren's (1987) theory. The questionnaire had a 7-point Likert-type format that ranged from strongly disagree (1) to strongly agree (7), with 4 representing no opinion.

The post-experiment interview (Appendix H) included questions about the subject's decision to exit the task, as well as questions about extraneous factors that might have affected his performance in the task. The interview also included questions about discipline administered during the subject's childhood, in search of information relevant to propositions of Doren's (1987) theory.

Ethical Considerations

Precautions were taken to ensure the ethical treatment of these inmate subjects who, due to institutionalization, suffered from diminished autonomy. The following procedures were followed to protect their rights:

1. Oral recruitment messages stressed that the inmates' participation was purely voluntary and that they were free to withdraw from the experiment at any time. It was further explained that their decision about participation would not affect parole board decisions regarding their sentences.

2. Informed consent forms were passed out and read aloud to the inmates when they were recruited. This form (Appendix F) was written in language intended to be fully understandable to inmates of average intelligence, and it

contained a statement, emphasized orally by the experimenter, that decisions about participation would not influence parole outcome or release date.

3. At the recruitment sessions, it was explained that inmate anonymity would be protected with the following procedure: A list of the subjects' names, with paired code numbers, would be used throughout the study. Data obtained from examination of inmates' files would be paired only with the code numbers, and names would not be recorded on data sheets from the interview and learning task phases of the experiment. The master list of inmate names and code numbers would be kept separate from actual data, in order to decrease the possibility that data could be linked with specific participants in the study.

Results

Data Analyses

Although complete data sets were obtained for 66 subjects, six were eliminated from consideration because of failure to reach acquisition during the learning task. Data analyses included all 60 cases where possible; however, subjects were excluded from some analyses when certain data were unavailable for them. These latter instances are mentioned below, and unless otherwise noted, all subjects were included in the analyses. Where analysis of variance (ANOVA) was employed, the Brown-Forsyth ANOVA was selected as the most appropriate test (Brown & Forsyth, 1974b; Dixon, 1985) when nonhomogeneity of variance among groups was detected by Levene's test for equality of variances (Brown & Forsyth, 1974a; Dixon, 1985; Levene, 1960). Levene's test comprises a one-way analysis of variance of the absolute deviations of all cases from their cell means, and the value of the resulting F ratio is reported in all instances below where nonhomogeneity of variance among groups is noted. For chi square analyses, the likelihood-ratio chi square was employed due to its slightly greater power when compared to the Pearson chi square test for analyses involving moderately large samples (Hays, 1963).

Raw data are displayed in Appendix N, which also includes information about how each datum was coded for analysis.

Psychopathy Checklist

The mean PCL (Hare, 1985b) score obtained by subjects was 21.7, with a standard deviation of 8.9. The range of scores varied from 3.16 to 37.78. Table 1 (Appendix A) presents the frequency distribution of the scores, which closely approximates a normal distribution.

Scores on the PCL (Hare, 1985b) were subjected to a 2 x 3 (psychopathy level by reinforcement condition) analysis of variance. PCL scores did not vary according to reinforcement condition but did, of course, differ between subjects groups, $F(1,54)=123.4$, $p<.0001$. The high psychopathy group held a mean PCL score of 29.0 ($SD=4.6$); the low psychopathy group, 14.4, ($SD=5.6$).

Several indices of reliability were computed for the PCL (Hare, 1985b). For all indices, the author was considered to be the first rater, and the other two judges' ratings were combined to form the second rater for the analyses. Reliability of the PCL was evaluated in terms of generalizability theory (Cronbach, Gleser, Nanda, & Rajaratnam, 1972, as cited in Crocker & Algina, 1986; Jackson & Paunonen, 1980; Mitchell, 1979; Schroeder et al., 1983) and classical test theory (Crocker & Algina, 1986).

Generalizability analysis provides a single index of reliability, a generalizability coefficient, which is an

intraclass correlation coefficient that ranges in value from 0 to 1 and can be calculated from the mean square terms in an analysis of variance table (Crocker & Algina, 1986; Haggard, 1958). The generalizability analysis identifies several sources of systematic error rather than grouping them all together as measurement error (Jackson & Paunonen, 1980; Mitchell, 1979). In the present analysis, a 2 x 60 ANOVA table was generated (see Table 2, Appendix A), identifying raters and subjects as sources of lawful variation, with a residual error component. Mean square terms of 63.45 for raters, 158.69 for subjects, and 16.89 for residual error were entered into an intraclass correlation formula (Crocker & Algina, 1986; Haggard, 1958). A generalizability coefficient of .81 was obtained, indicating the extent to which the sample of measurements in the current research generalizes to the universe of measurements that includes all possible raters using Hare's (1985b) PCL. This generalizability coefficient is higher than the values Mitchell (1979) described for adequate measurement dependability; however, it is slightly lower than than the values reported by Schroeder et al. (1983).

Use of the PCL (Hare, 1985b) in this study was also evaluated by classical test theory statistics. The interrater reliability coefficient, using the Pearson r formula, was .81. Alpha coefficients of internal consistency were .93 for the first rater, and .88 for the second rater.

An item analysis was conducted for the checklist by subjecting each of the 20 PCL item scores to a one-way analysis of variance, with the subject groups comprising the independent variable with two levels. These analyses were conducted separately for each rater, and the alpha level was set at .01. The correlation ratio, or eta, was computed to determine the extent to which each PCL item correlated with overall assignment to psychopathy groups. The correlation ratio (equal to the Pearson r given the one degree of freedom in these analyses) was squared to determine the proportion of all the variance on each PCL item that was due to differences between the subject groups.

Table 3 (Appendix A) depicts the results of these analyses, and includes for each item the mean, standard deviation, number of cases included, and the values of F , p , eta, and eta squared. For the first rater, all but three items were found to successfully discriminate the two subject groups, with eta squared values ranging from .13 to .45. The two items best discriminating the subject groups for this rater were "conning/manipulative" (eta squared=.45) and "lack of remorse or guilt" (eta squared=.43). Three items did not discriminate between the subject groups, with nonsignificant probability values and eta squared valued of .10. These items were "promiscuous sexual behavior," "early behavior problems," and "many short-term marital relationships."

Results for the second rater indicated that all but four items significantly discriminated the two subject groups, with eta squared values ranging from .11 to .42. The two best discriminating items were "pathological lying" (eta squared=.42) and "revocation of conditional release" (eta squared=.36). Four items did not significantly discriminate between the subjects groups for the second rater, and they were "poor behavioral controls," "early behavior problems," "failure to accept responsibility for own actions," and "many short-term marital relationships."

Subject Demographic and Criminal Characteristics

Metric demographic data were subjected to analyses of variance. Categorical data were entered into chi square contingency tables to detect whether certain demographic information was related to either psychopathy level or reinforcement condition. Because chance alone could produce an apparently statistically significant difference in at least one analysis at the .05 alpha level, the probability value was set at .01 to detect truly significant differences.

The mean age of all subjects was 30.9 years (SD=5.3), with no significant difference between the high psychopathy and the low psychopathy groups nor among the continuous reinforcement (CR), partial reinforcement (PR), and partial helplessness (PH) groups. There were no group differences in subjects' height (M=70.5 inches, SD=3.0, one case

excluded due to missing data) or weight (\underline{M} =174.1 pounds, \underline{SD} =38.8, two cases excluded due to missing data).

There was a significant difference between groups for age at first arrest, with high psychopathy subjects experiencing their first arrest at an earlier age (\underline{M} =18.9, \underline{SD} =2.8) than low psychopathy subjects (\underline{M} =23.4, \underline{SD} =5.8), $\underline{F}(1,38)=14.2$, $\underline{p}=.0006$, with Levene's analysis recognizing nonhomogeneity of variance between groups, $\underline{F}(1,51)=9.61$, $\underline{p}=.0032$, and three cases excluded due to missing data. The mean legal fine levied against subjects in connection with their current offenses was \$2,702 (\underline{SD} =6,900), with no significant differences detected between psychopathy levels and reinforcement conditions.

A significant interaction effect was detected for psychopathy and reinforcement condition on subjects' length of sentence, $\underline{F}(2,24)=3.63$, $\underline{p}=.042$, with Levene's analysis recognizing nonhomogeneity of variance among groups, $\underline{F}(2,54)=6.4$, $\underline{p}=.0032$. Examination of a graph of the means indicated that for high psychopathy subjects, length of sentence was greatest for the PH condition (\underline{M} =24.3 years, \underline{SD} =22.4), followed by the PR condition (\underline{M} =10.4, \underline{SD} =5.1) and the CR condition (\underline{M} =8.9, \underline{SD} =5.4); for low psychopathy groups, however, length of sentence was greatest in the CR condition (\underline{M} =23.5 years, \underline{SD} =27.3), followed by the PR condition (\underline{M} =16.5, \underline{SD} =14.2) and the PH condition (\underline{M} =12.2, \underline{SD} =5.6). This interaction effect is due to a random

assignment error, and is not believed to have affected the experimental results described below.

Mean years of formal education for all subjects was 11.3 ($SD=2.3$). High psychopathy subjects obtained fewer years of formal education ($M=10.8$, $SD=1.9$) than did low psychopathy subjects ($M=11.8$, $SD=2.4$), but the group differences only approached statistical significance, $F(1,53)=3.27$, $p=.0762$, with one case excluded. Average grade level obtained for educational testing scores with the SAT and ABLE did not vary between psychopathy groups or across reinforcement conditions ($M=11.1$, $SD=1.3$). The same was true for the following specific subtest areas: Vocabulary ($M=11.6$, $SD=1.8$, one case excluded), Mathematical Comprehension (corresponding to ABLE subtest Number Operations, $M=10.8$, $SD=2.0$), Mathematical Concepts ($M=10.8$, $SD=2.0$, seven cases excluded), Language ($M=10.6$, $SD=2.0$, six cases excluded), Spelling (11.2 , $SD=2.1$), and Listening Comprehension ($M=10.9$, $SD=2.2$, nine cases excluded). Nearly statistically significant differences between subject groups were detected in two subtest areas: Low psychopathy subjects obtained a higher grade level score ($M=12.5$, $SD=0.7$) in Reading Comprehension than did high psychopathy subjects ($M=11.8$, $SD=1.7$), $F(1,32)=4.08$, $p=.0518$, with Levene's analysis recognizing nonhomogeneity of variance between groups, $F(1,54)=26.13$, $p<.0001$. Similarly, low psychopathy subjects obtained a higher grade level score ($M=11.8$, $SD=1.5$) in Mathematical Applications (corresponding

to ABLE subtest Problem Solving) than did high psychopathy subjects ($M=10.6$, $SD=2.1$), $F(1,44)=6.26$, $p=.0162$, with Levene's analysis recognizing nonhomogeneity of variance between groups, $F(1,54)=7.2$, $p=.0096$. The correlation between Reading Comprehension and Mathematical Applications/Problem Solving subtests was significant for this prison sample, $r=.6132$, 58 df.

Subjects fell into two racial categories. Forty-one subjects were white and 19 were black. Chi square values indicated that race was unrelated to psychopathy level and reinforcement condition. Likewise, veteran discharge status (two cases excluded), marital status (one case excluded), and number of dependents (one case excluded) were unrelated to psychopathy level and reinforcement condition, according to chi square analyses.

Subjects' offenses were divided into 16 types. The 15 categories employed in the scoring criteria for Hare's PCL (1985b) were combined with a sixteenth category to accommodate subjects who had multiple charges that fell into more than one of Hare's 15 categories. The 16 offense types were: (a) theft, (b) robbery/extortion, (c) drug offenses, (d) assault, (e) murder, (f) possession of weapons, (g) sex offenses, (h) criminal negligence, (i) fraud, (j) escape, (k) kidnapping, (l) arson, (m) obstruction of justice, (n) crimes against the state, (o) minor charges, and (p) multiple charges. Offense type was unrelated to reinforcement condition but was related to psychopathy level

(likelihood-ratio chi square=20.4, 8 df, p=.0083).

Examination of the chi square contingency table revealed the following: More high psychopathy subjects (n=11) than low psychopathy subjects (n=3) had multiple charges falling into more than one category. Additionally, the categories of robbery/extortion (11 low psychopathy, 7 high psychopathy subjects) and drug offenses (11 low psychopathy, 4 high psychopathy subjects) contained more subjects than any of the other categories. Other offense types were equally divided between those having a greater number of high psychopathy or low psychopathy subjects, and in none of those categories did either subject type exceed the other by more than n=3.

The courts of jurisdiction in which subjects were convicted were grouped according to the 12 Federal Circuits, with a thirteenth category added for subjects having current convictions in more than one circuit. The greatest number of subjects (18 low psychopathy, 13 high psychopathy subjects) had convictions in the Fourth Circuit, including the states of North and South Carolina, Virginia, West Virginia, and Maryland. The second largest number of subjects (5 low psychopathy, 6 high psychopathy subjects) had convictions in the Eleventh Circuit, which includes the states of Alabama, Florida, and Georgia. Chi square statistics indicated that psychopathy level and reinforcement condition were unrelated to court of jurisdiction as grouped by the Federal Circuits.

Subjects' legal pleas in their current commitments were divided into two groups, not guilty and guilty/other. Chi square analyses indicated that type of plea was unrelated to psychopathy level and reinforcement condition, with eight cases excluded.

Number of prior arrests and convictions for subjects were grouped into the following categories: zero, one, two through 10, and greater than 10. Neither of these was found to be significantly related to reinforcement condition. Number of prior arrests was significantly related to psychopathy level (likelihood-ratio chi square=28.6, 3 df, p<.0001; test for linear trend value=14.1, 1 df, p=.0002), with two cases excluded. Low psychopathy subjects outnumbered high psychopathy subjects in the categories of zero, one, and two through 10 prior arrests, but high psychopathy subjects (n=13) outnumbered low psychopathy subjects (n=0) in the category of greater than 10 prior arrests. Number of prior convictions was also significantly related to psychopathy level (likelihood-ratio chi square=13.9, 3 df, p=.003; test for linear trend value=9.3, 1 df, p=.0022), with five cases excluded. Low psychopathy subjects outnumbered high psychopathy subjects in the categories of zero and one prior conviction, whereas more high psychopathy than low psychopathy subjects fell into the higher value categories with two or more prior convictions.

Number of prior commitments to correctional facilities was unrelated to reinforcement condition but was

significantly related to psychopathy level (likelihood-ratio chi square=22.9, 2 df, p<.0001), with three cases excluded. More low psychopathy (n=23) than high psychopathy (n=6) subjects had no prior commitments. Equal numbers of low psychopathy and high psychopathy subjects (n=5) had one prior commitment. Fewer low psychopathy (n=2) than high psychopathy (n=16) subjects had greater than 1 prior commitment.

Security level of subjects (the amount of institutional structural restraint deemed necessary for secure housing) was unrelated to reinforcement condition but was nearly significantly related to psychopathy level (likelihood ratio chi square=7.7, 3 df, p=.0516; test for linear trend value=4.4, 1 df, p=.0351). Compared to high psychopathy subjects, more or equal numbers of low psychopathy subjects were found at the lower security levels of one, two, and three. In contrast, more high psychopathy (n=10) than low psychopathy (n=2) subjects were rated security level four. Custody classification (the degree of staff supervision required for individual inmates) included community, out, and in levels for this sample, and was unrelated to psychopathy level and reinforcement condition.

Reinforcement Manipulation

Data from the three dependent variables of crucial response perseveration, global response persistence, and alternate response variability were subjected to 2 x 3 analyses of variance. There was a significant main effect

for reinforcement condition on crucial response perseveration, or the ratio of crucial responses to total punished extinction responses, $F(2,54)=6.04$, $p=.0043$ (see ANOVA summary table in Table 4, Appendix B). The differences between the overall means were in the direction predicted for the low psychopathy subjects, in that the mean ratio of crucial to total punished extinction responses was greatest in the PH condition (.327, $SD=.128$), followed by the PR condition (.204, $SD=.13$) and the CR condition (.178, $SD=.17$).

To test the prediction that low psychopathy subjects' perseveration would increase across learning schedules, planned comparisons in the form of protected t tests were conducted for the mean ratios between CR and PH conditions, CR and PR, and PR and PH. A partial helplessness effect for low psychopathy subjects was demonstrated by the significant difference between their CR and PH means, $t(54)=-2.82$, $p=.007$. The mean ratio was significantly greater for the PH group (.356, $SD=.142$) than for the CR group (.173, $SD=.168$). A partial helplessness effect was further demonstrated in the low psychopathy subjects by the significant difference between their PR and PH means, $t(54)=-2.22$, $p=.03$. The mean ratio was significantly greater for the PH group (.356, $SD=.14$) than for the PR group (.212, $SD=.13$). Contrary to prediction, however, the low psychopathy subjects did not demonstrate a partial reinforcement effect, as no significant difference was detected in the planned

comparison between the CR mean (.173) and the PR mean (.212), although the difference between these means was in the predicted direction.

Consistent with the prediction that high psychopathy subjects' perseveration should be less influenced by reinforcement condition than low psychopathy subjects', no statistically significant differences were discovered in comparisons between high psychopathy subjects' CR and PH means, PR and PH means, or CR and PR means. Of interest, however, is that the mean ratios did increase across learning schedules, similar to the increase observed in the low psychopathy subjects. The mean was .182 (SD=.174) for the high psychopathy CR group, .195 (SD=.13) for the high psychopathy PR group, and .297 (SD=.115) for the high psychopathy PH group. Additionally, the difference between the high psychopathy subjects' CR and PH means approached statistical significance, $t(54)=-1.78$, $p=.08$.

It should be noted that analysis of variance of an arcsin transformation of the ratio perseveration data produced the same results as described above, indicating that the effects were not due to a rectangular distribution.

Contrary to other predictions, there was no main effect for psychopathy level on crucial response perseveration, nor was there a significant interaction effect. Also unsupported were the predictions of a main effect for psychopathy level on global response persistence, an interaction between psychopathy level and learning schedule

for global response persistence, and a main effect of psychopathy level on alternate response variability (see ANOVA summary tables in Tables 5 and 6, Appendix B).

Examination of a correlation matrix of the three dependent variables revealed that the correlation coefficients were nonsignificant when compared against critical Pearson r values for 58 degrees of freedom at the .05 alpha level. The three dependent variables intercorrelated as follows: global response persistence and crucial response perseveration, .0147; global response persistence and alternate response variability, .1175; and crucial response perseveration and alternate response variability, -.1352.

Linear regression analyses were conducted with PCL (Hare, 1985b) scores as the predictor variable and three criterion variables: global persistence, crucial response perseveration, and alternate response variability. Separate analyses were conducted for data within each of the three reinforcement conditions, in addition to analyses that combined data from all conditions. The resulting regression coefficients and corresponding probability values are presented in Table 7, Appendix B. None of these regression coefficients was found to be statistically reliable.

Ad Hoc Analyses

A number of ad hoc experimental variables were examined. The number of crucial responses during punished extinction and the total number of trials and minutes in the

learning task did not vary between subject groups or across reinforcement conditions (see ANOVA summary tables in Tables 8, 9, and 10, Appendix C).

The total number of pretraining trials did not vary between subject groups but the differences among reinforcement conditions approached statistical significance, $F(2,32)=3.05$, $p=.06$, with Levene's analysis recognizing nonhomogeneity of variance among groups, $F(2,54)=3.85$, $p=.0274$ (see ANOVA summary table in Table 11, Appendix C). The number of pretraining trials was greatest for the CR condition ($M=15.3$, $SD=7.5$), followed by the PR ($M=11.6$, $SD=4$) and the PH ($M=11.6$, $SD=4.33$) conditions. The differences between these means proved to be nonsignificant when Scheffe's test was employed.

Number of training trials in the learning task did not vary between subject groups; however, a significant main effect emerged for reinforcement condition, $F(2,54)=5.6$, $p=.0062$ (see ANOVA summary table in Table 12, Appendix C). The number of training trials was greatest in the PH condition ($M=50.9$, $SD=16.8$), followed by the PR condition ($M=41.3$, $SD=12.3$) and the CR condition ($M=34.9$, $SD=16.1$). Examination of these differences with Scheffe's test (t' critical=2.52, 54 df) indicated that the number of training trials in the PH condition differed significantly from the CR condition, $t(54)=4.71$, $p<.05$, and the PR condition, $t(54)=2.83$, $p<.05$, whereas the difference between the means of the CR and PR conditions was nonsignificant. The greater

number of training trials in the PH condition was not unexpected given the complexity of the contingencies in this learning schedule.

There was also a significant interaction effect for number of training trials, $F(2,36)=3.6$, $p=.0376$, with Levene's analysis recognizing nonhomogeneity of variance among groups, $F(2,54)=5.6$, $p=.006$. Examination of a graph of the means and application of Scheffe's test (t' critical=3.46, 54 df) to nine comparisons between means revealed that the interaction effect was produced by one significant difference between the high psychopathy subjects' CR mean (28.7, SD=5.5) and their PH mean (54.6, SD=18.4), $t(54)=-3.85$, $p<.05$.

Average latency per trial (time required to respond) did not vary between subject groups but the differences among reinforcement conditions reached significance, $F(2,54)=3.85$, $p=.0274$ (see ANOVA summary table in Table 13, Appendix C). Average duration of latency was greatest in the PR condition (M=1.115, SD=.428), followed by the CR condition (M=.816, SD=.381) and the PH condition (M=.781, SD=.445). Use of Scheffe's test (t' critical=2.52, 54 df) indicated that the PR mean significantly differed from the CR mean, $t(54)=3.32$, $p<.05$, and the PH mean, $t(54)=3.71$, $p<.05$, but that the means between the CR and PH conditions did not significantly differ.

The oral feedback to subjects at the conclusion of the learning task, comparing their performance to that of the

pilot subjects, did not differ according to psychopathy level; however, a significant main effect was detected for reinforcement condition, $F(2,54)=3.74$, $p=.0302$ (see ANOVA summary table in Table 14, Appendix C). The four categories of oral feedback were assigned the following numbers for the purposes of this analysis: lower than average=1, average=2, higher than average=3, and much higher than average=4.

Feedback to subjects was most favorable in the CR condition ($M=2.2$, $SD=1.1$), followed by the PR condition ($M=1.5$, $SD=0.8$) and the PH condition ($M=1.4$, $SD=1.0$). Use of Scheffe's test (t' critical=2.52, 54 df) indicated that the CR mean significantly differed from the PR mean, $t(54)=3.23$, $p<.05$, and the PH mean, $t(54)=3.46$, $p<.05$, but that the difference between the PR and PH means was nonsignificant.

The final score obtained by subjects at the conclusion of punished extinction did not vary between psychopathy groups but did significantly differ among reinforcement conditions, $F(2,38)=15.5$, $p<.0001$, with Levene's analysis recognizing nonhomogeneity of variance among groups, $F(2,54)=4.3$, $p=.0185$ (see ANOVA summary table in Table 15, Appendix C). The final score on punished extinction was greatest in the CR condition ($M=1232.5$, $SD=553.2$), followed by the PR condition ($M=855$, $SD=306.6$) and the PH condition ($M=480$, $SD=384.4$). Scheffe tests (t' critical=2.52, 54 df) indicated that the CR mean was significantly greater than the PR mean, $t(54)=3.95$, $p<.05$, and that the PR mean was significantly greater than the PH mean, $t(54)=3.92$, $p<.05$.

The direction of these differences was consistent with the reward structure of each of the reinforcement conditions, in that for 25 acquisition trials, CR subjects received a steady increase in points, PR subjects received an intermittent increase in points, and PH subjects received an intermittent increase coupled with intermittent decrease in points.

A correlation matrix was constructed that included the ad hoc experimental variables for which significant differences were detected by analysis of variance (see Table 16, Table C). Two significant correlations emerged: final score on punished extinction was positively correlated with oral feedback to subjects at conclusion of the task, $r = .7962$, 58 df, $p < .001$, but negatively correlated with total number of training trials, $r = -.3871$, 58 df, $p < .01$. This negative correlation is consistent with the significantly greater number of training trials found for the PH condition, the same condition that had the lowest "highest" score possible for subjects to attain.

Post-Experiment Questionnaire

The post-experiment questionnaire (Appendix G) included nine questions to assess subjects' attitudes toward and reactions to the learning task; four questions to evaluate the effectiveness of the experimental manipulations; and 15 questions to assess subjects' cognitive beliefs, consistent with Doren's (1987) theory, about the computer game and games in general. A Likert-type format allowed subjects to

choose among numbers one through seven, with 1=strongly disagree and 7=strongly agree.

Each of the 28 questionnaire items was subjected to a 2 (psychopathy level) x 3 (reinforcement condition) analysis of variance. Because at least one of these analyses was expected to reveal an apparently statistically significant difference due to chance alone at an alpha level of .05, the probability value was set at .01 to identify truly significant differences.

Only nonsignificant differences between subject groups and among reinforcement conditions were detected for the nine questions designed to assess subjects' attitudes toward and reactions to the learning task, although group differences approached statistical significance for one question.

Subjects reported relative agreement with the following statements: "I liked the computer game" ($\underline{M}=4.8$, $\underline{SD}=1.7$); "I would play another computer game if I could" ($\underline{M}=5.6$, $\underline{SD}=1.6$); "I would play another computer game even if I could not win food items" ($\underline{M}=5.8$, $\underline{SD}=1.7$); and "I was able to pay close attention all throughout the game" ($\underline{M}=5.6$, $\underline{SD}=1.8$). Relative disagreement was reported to the following: "I was frustrated while playing the game" ($\underline{M}=3.0$, $\underline{SD}=2.1$); "I was bored by the game" ($\underline{M}=3.5$, $\underline{SD}=2.1$); "The game was difficult" ($\underline{M}=2.6$, $\underline{SD}=1.7$); and "The instructions for the game were hard to understand" ($\underline{M}=2.4$, $\underline{SD}=1.9$).

Group differences for reinforcement condition were of borderline significance for the item, "The game could have been improved," $F(2,54)=3.23$, $p=.0474$. Whereas the means for all reinforcement conditions indicated some agreement with this item, subjects in the PR condition reported stronger agreement ($M=5.3$, $SD=1.8$) than did those in the CR ($M=4.2$, $SD=1.5$) and PH ($M=4.1$, $SD=1.9$) conditions.

No statistically significant group differences were detected on the four items designed as manipulation checks. Subjects reported relative agreement with three of these items: "I tried to beat the average score of the people who already played the game" ($M=4.5$, $SD=2.2$); "I believed that I would be able to exchange my points for food items" ($M=5.8$, $SD=1.6$); and "I wanted to win points on the computer screen" ($M=6.4$, $SD=1.1$). Responses to the statement, "I wanted to win food items," fell into the neutral range ($M=3.9$, $SD=1.9$).

Statistically significant group differences were not detected for the large majority of the 15 items assessing subjects' cognitive beliefs about the computer game and games in general. Relative agreement was reported on the following items that referred specifically to the learning task: "I was challenged by the game" ($M=5.2$, $SD=2.0$); "It was hard to predict the outcome before the game was over" ($M=5.0$, $SD=2.2$); "If I played the game again, I would get a higher score" ($M=5.8$, $SD=1.6$); and "The researcher helped me do well in the computer game" ($M=4.4$, $SD=1.7$). The average

of subjects' responses to "I controlled the outcome of the game" was neutral ($\underline{M}=4.0$, $\underline{SD}=2.2$).

Subjects reported very slight disagreement with the statement, "Most people would do better at this computer game than I did" ($\underline{M}=3.8$, $\underline{SD}=1.5$). An interaction effect of borderline significance was obtained for the item, "I reached the highest score possible in the game," $\underline{F}(2,42)=3.45$, $\underline{p}=.041$, with Levene's analysis recognizing nonhomogeneity of variance among groups, $\underline{F}(2,54)=4.07$, $\underline{p}=.0226$. Examination of a graph of the interaction indicated that the effect was likely caused by a relatively large difference between the high psychopathy and low psychopathy means in the PH condition. Although the means for all groups reflected disagreement with this item, the low psychopathy subjects in the PH condition reported stronger disagreement ($\underline{M}=1.4$, $\underline{SD}=1.0$) than did the high psychopathy subjects ($\underline{M}=3.5$, $\underline{SD}=2.1$) in the same condition. An interaction effect of borderline significance was also obtained for the item, "If I had stayed longer in the game, I would have gotten a higher score," $\underline{F}(2,54)=3.23$, $\underline{p}=.0475$. Whereas the means of all subject groups reflected disagreement with this item, the high psychopathy subjects reported stronger disagreement ($\underline{M}=1.3$, $\underline{SD}=0.5$) than did the low psychopathy subjects ($\underline{M}=2.6$, $\underline{SD}=1.6$) in the CR condition, and the same pattern was detected in the PH condition ($\underline{M}=2.6$, $\underline{SD}=1.4$ for high psychopathy; $\underline{M}=3.9$, $\underline{SD}=2.1$ for low psychopathy). The pattern was reversed for the

partial reinforcement condition, as low psychopathy subjects more strongly disagreed that they would have obtained a higher score by staying longer ($M=1.9$, $SD=1.6$) than did high psychopathy subjects ($M=2.9$, $SD=2.2$).

For questions relating to cognitive beliefs about games in general, subjects reported relative agreement with the items: "I usually win at games I play" ($M=5.1$, $SD=1.4$); "I do not mind losing at games" ($M=4.7$, $SD=2.1$); and "The chances are good that I can do well at anything I want to" ($M=6.4$, $SD=1.1$). A significant main effect was detected for the statement, "Even if I lose at one game, I will likely win at the next one I play," $F(1,54)=6.55$, $p=.0133$, in that low psychopathy subjects reported stronger agreement ($M=5.3$, $SD=1.3$) than did high psychopathy subjects ($M=4.3$, $SD=1.6$). Subjects reported relative disagreement with the following items: "If I lose at a game, it is usually because I do not try very hard" ($M=3.0$, $SD=2.0$); "If I lose at a game, it is usually because the game is boring" ($M=3.0$, $SD=2.0$); and "If I lose at a game, it is usually because I do not have enough skill" ($M=3.8$, $SD=2.3$).

Post-Experiment Interview

The semi-structured interview (Appendix D) that followed the post-experiment questionnaire contained several questions about variables outside the laboratory setting that could have affected subjects' responses in the learning task. The bulk of the questions, however, pertained to subjects' recollection of their childhoods, with a

particular focus on the type and consistency of discipline administered. Several questions pertained to characteristics of the parents that could have indirectly affected the discipline subjects received.

Most of the 17 interview questions were open-ended. For the purposes of coding subjects' responses for statistical analysis, responses to most questions were dichotomized, whereas responses to remaining questions fell into either three or four categories. All interview data were subjected to chi square analyses, with separate analyses for subject group and reinforcement condition for each question, for a total of 34 analyses. Given that between one and two statistically significant findings were expected just by chance with an alpha level of .05, the probability level was set at .01 to detect true significant differences.

Subjects' responses about whether they heard prior information about the experiment were unrelated to subject group and reinforcement condition. The same was true for whether they had eaten their last meal either within or outside the hour just before their participation in the learning task. Subjects' categorization of their most recent meal as either "light," "average," or "heavy" was nearly significantly related to subject group (likelihood-ratio chi square=6.076, 2 df, p=.0479), and to reinforcement condition (likelihood-ratio chi square=10.831, 4 df, p=.0285), with one case excluded due to missing data.

More low psychopathy subjects reported that their most recent meal was average (18 low psychopathy, 12 high psychopathy subjects) or heavy (8 low psychopathy, 5 high psychopathy subjects), whereas more high psychopathy subjects reported light meals (4 low psychopathy, 12 high psychopathy subjects). Examination of a graph of the frequency counts for the reinforcement conditions indicated that subjects in the CR condition reported fewer average meals ($\underline{n}=5$) than did subjects in the PR ($\underline{n}=11$) and PH ($\underline{n}=14$) conditions, and also that CR subjects reported more heavy meals ($\underline{n}=8$) than did PR ($\underline{n}=2$) and PH ($\underline{n}=3$) subjects.

Responses reflecting subjects' recollection of their childhoods were all unrelated to reinforcement condition, and only two were related to subject group with borderline statistical significance. Nonsignificant relationships were found for questions relating to which parent was the primary disciplinarian, absence of parents from the home, type of discipline used, severity of physical punishment if applicable, parental delay in use of discipline, subjects' ability to avoid punishment and perception of the amount of freedom allowed them by parents, and parents' use of alcohol and other substances.

Of borderline significance was the relationship between psychopathy level and subjects' recollections of whether their parents always punished them or sometimes let them get by with breaking rules (likelihood-ratio chi square=4.997, 1 df, p=.0254), with five cases excluded due to missing data.

Many fewer low psychopathy subjects reported that their parents always punished them (n=5) than only sometimes punished them (n=22), whereas high psychopathy subjects' responses were more nearly equally divided between the two categories of always (n=13) versus sometimes (n=15) punished.

Nine subjects reported that their parents physically abused them, and 51 denied this. Responses to this question were unrelated to subject's group and reinforcement condition. Eighteen subjects said their parents verbally abused them, and 39 denied this, with three cases excluded. Responses to this question were unrelated to reinforcement condition but were nearly significantly related to psychopathy level (likelihood-ratio chi square=5.761, 1 df, p=.0164). Many more low psychopathy subjects denied that their parents verbally abused them (n=24) than affirmed this (n=5), whereas high psychopathy subjects' responses were more nearly equally divided between the two categories of denying verbal abuse (n=15) versus reporting it (n=13).

Interpretation of Results

Findings from the PCL (Hare, 1985b) suggest that it was a useful measure for classifying subjects according to degree of psychopathy in this study. Total PCL scores were reliable for this sample, as indicated by a generalizability coefficient, interrater reliability coefficient, and alpha coefficients ranging from .81 to .93. The mean and standard deviation of the PCL scores are similar to those described by Harpur et al. (1988), who reported psychometric characteristics for six studies involving use of the PCL in prison populations in Canada, England, and the United States.

Item analysis for the PCL (Hare, 1985b) in this study indicated that the majority of individual items successfully discriminated between the two subject groups. "Early behavior problems" and "many short-term marital relationships" were two items that failed to discriminate for both judges. This is likely due to a relative lack of extensive information in the institutional files concerning childhood behavioral adjustment and marital history. All other items that failed to discriminate at the .01 alpha level had probability values of borderline significance, and all items except "early behavior problems" and "many short-term marital relationships" successfully discriminated subject groups for at least one judge.

It should be noted that the PCL (Hare, 1985b) cutoff score of 22, used to delineate the high psychopathic and low

psychopathic groups, closely approximated the mean PCL score of 21.7. Further, the cutoff score is located close to the center of the nearly normal distribution of PCL scores. Some question thus exists as to whether the so-designated groups actually represent two different subject "types"; in actuality, the groups reflect persons who are more and less psychopathic along a dimension of psychopathy. Support for the validity of the cutoff score in distinguishing levels of psychopathy lies in the analyses of criminal and demographic characteristics of subjects. Compared to low psychopathy subjects, the high psychopathy subjects were first arrested at an earlier age and were more likely to have criminal records reflecting greater than 10 prior arrests, two or more prior criminal convictions, and more than one prior criminal commitment. They were more likely to have multiple current convictions. Borderline significant differences also reflected the following: High psychopathy subjects outnumbered low psychopathy subjects at institutional security level four, the highest security level for subjects in this sample. High psychopathy subjects obtained fewer years of formal education and, consistent with this, achieved lower scores on SAT/ABLE subtests of Reading Comprehension and Mathematical Applications/Problem Solving.

Data from the experimental learning task provide some evidence consistent with Doren's (1987) theory, although only two of the study's hypotheses received partial support, whereas five were not substantiated. Increased resistance

to punishment, thought by Doren to result from partial helplessness conditioning in childhood, was reflected in the performance of low psychopathy subjects in perseveration of the crucial response during punished extinction. The direction of the differences between the low psychopathy means for the three reinforcement conditions was consistent with the predictions of Hypothesis 5, although significant differences were only obtained for two of the three comparisons. The absence of a significant partial reinforcement effect, although not predicted, is consistent with results by Deur and Parke (1968) and Vogel-Sprott (1966). That low psychopathy subjects failed to demonstrate the increased resistance to punishment after partial reinforcement training that they did after partial helplessness training seems to suggest that such resistance is uniquely linked to the intermittent punishment and reward sequence within partial helplessness conditioning, and not due solely to the inherent partial reward schedule. Low psychopathy subjects' demonstration of a partial helplessness effect for perseveration of the crucial response indicates that reproduction of this conditioning process in the laboratory causes low psychopathy subjects to mimic psychopaths' characteristic passive avoidance deficits.

The crucial response perseveration of the high psychopathy subjects was not significantly affected by the three learning schedules, consistent with Ross and Doody's

(1973) research, and providing support for Doren's (1987) proposition that psychopaths' behavior is relatively unaffected by most contingencies. It appears from the results that, as predicted, the prior learning history of high psychopathy subjects had a stronger influence over their performance in the learning task than did the various conditioning schedules recreated in the laboratory. Thus, Hypothesis 6 was partially supported, even though a statistically significant interaction effect was not detected for the dependent variable of crucial response perseveration. It is recognized that even though high psychopathy subjects' perseveration did not significantly differ across learning schedules, the differences between the means were in the direction observed for the low psychopathy subjects, and the difference between their CR and PH means approached statistical significance. Results from a larger sample might clarify whether the partial helplessness effect, albeit weaker than in low psychopathy subjects, can in fact be demonstrated in high psychopathy subjects with laboratory manipulation.

Two propositions from Doren's (1987) theory were not supported by the data in this research project. These were his arguments that psychopaths persist in responding until goal attainment and that they persevere within a limited behavioral repertoire. Related Hypotheses 1, 2, 3, 4, and 7 were not supported, as reflected by an absence of

significant differences between subject groups for all dependent variables.

Results for the post-experiment questionnaire indicated that subjects generally reacted positively to the learning task. Responses to questions designed as manipulation checks suggested that subjects did not perceive food items as reinforcing, but were more strongly motivated by winning points on the computer screen and by the challenge of surpassing the average scores of the pilot subjects.

Of interest are marginally significant differences in the PH condition between low psychopathy and high psychopathy subjects' perceptions of their final scores on punished extinction. In response to the item, "I reached the highest score possible in the game," the high psychopathy mean response fell near the neutral range of the Likert-type scale, while the low psychopathy mean reflected stronger disagreement with this item. This difference could be due to the high psychopathy subjects' strong focus on short-term reward (as hypothesized by Doren, 1987) and a concomitant overestimate of the influence of reward on their final score. In response to "If I had stayed longer in the game, I would have gotten a higher score," high psychopathy subjects more strongly disagreed than did low psychopathy subjects in the partial helplessness condition. This seems to contradict a basic tenet of Doren's theory, that psychopaths persist in responding through punishment because they believe reinforcement will be eventually forthcoming.

This same contradiction initially appears evident in the main effect reflecting high psychopathy subjects' significantly weaker agreement, when compared with low psychopathy subjects, with the item, "Even if I lose at one game, I will likely win at the next one I play." Responses to these latter two items may be more linked to psychopaths' perception (again hypothesized by Doren) that outcomes of their behavior are unpredictable at specific times and not directly linked to their actions. Both of these items reflected beliefs about behavioral outcomes in specific instances, continuation of the computer task and the very "next" game in the subject's future after losing one, respectively.

Subjects' responses to the post-experiment interview, assuming them to be valid, generally offered little support for Doren's (1987) assertions about inconsistent discipline in the childhood of psychopaths, in that nonsignificant group differences were obtained for most of the items. Of interest, however, is that more high psychopathy than low psychopathy subjects reported that their parents always punished them rather than sometimes let them get away with breaking rules. Although this result seems to contradict Doren's theory, it may in fact reflect the assumed perception of psychopathic individuals that other people are often sources of punishment. This same hypothesized perception may have been the basis for more high psychopathy than low psychopathy subjects reporting that they were

verbally abused by their parents. Differences on the verbal abuse question, however, could also have reflected true differences in parenting between the two subject groups. It is important to note that these interview responses concerning subjects' childhoods comprised recall data, and a major limitation of such data is that they may reflect inadvertent distortion relative to the true previous state of affairs. Deliberate misrepresentation also cannot be ruled out, given that these subjects were selected from a criminal population.

Discussion and Conclusions

Results of this research project provide limited support for the behavioral and cognitive sequelae of partial helplessness conditioning as hypothesized by Doren (1987). Probably the most significant finding was that low psychopathy subjects exhibited increased resistance to continuous punishment after partial helplessness conditioning, as evidenced by perseveration of the crucial response, and that this increased resistance to punishment was not due solely to the partial reward schedule inherent in partial helplessness conditioning. In addition, perseveration of the crucial response in high psychopathy subjects was not clearly influenced by laboratory conditioning, suggesting that the prior learning history of this group was more powerful than the contingencies provided in the learning task. This is consistent with Doren's assertion that psychopaths' behavior is relatively unaffected by contingencies unless they involve short-term, stimulating, positive reinforcers. It is debatable whether the two reinforcers employed in this study, accumulation of points in the learning task and snack food items, were adequately motivating for subjects, particularly those in the high psychopathy group.

The absence of significant differences between the high psychopathy and low psychopathy groups in performance during the learning task limits integration of these findings with much of the research on psychopathy reviewed in the

introductory section of this document. It is noted, however, that the low psychopathy subjects exposed to partial helplessness conditioning exhibited passive avoidance deficits linked to perseveration of the crucial response, similar to the performance of psychopaths in studies by Siegel (1978), Newman (1979/1980), Widom and Newman (1985), and Newman and Kosson (1986). The present results are also similar to those of Ross and Doody (1973), who reported that intermittent punishment and reward conditioning caused increased perseveration of the crucial response in non-psychopaths, but that perseveration in psychopaths was uninfluenced by learning schedule. And finally, the perseveration pattern of the low psychopathy subjects in this study parallels the findings with college students by Deur and Parke (1968), who reported increased resistance to continuous punishment after reward/punishment training when compared with both continuous reinforcement and partial reinforcement, but no increased resistance as a result of partial reinforcement training when compared to continuous reinforcement.

One of the limitations of Doren's (1987) theory is that he failed to explain the behavioral sequelae of partial helplessness conditioning in the childhood of persons not affected by low cortical arousal. Extrapolation of current findings to the world outside the laboratory suggests that non-psychopathic adults with a childhood history of inconsistent and unpredictable discipline may exhibit

increased resistance to punishment, reflected by perseveration of previously rewarded responses, even when faced with a subsequent state of affairs involving consistently punishing contingencies. Thus partial helplessness conditioning may be an etiological factor for the development of juvenile delinquency and adult criminality in persons without all the character traits of primary psychopaths.

If partial helplessness conditioning does in fact contribute to the development of juvenile and adult criminality, as well as psychopathy, this has implications for the assessment and treatment of children exhibiting behavior problems and referred for professional intervention. In addition to psychological testing, interviewing, and specialized behavioral observation, assessment might include examination of problem children's reactions to punishment in an adequately normed learning task similar to the one employed in this research. Should resistance to or disregard for punishment prove to be a factor in such children's difficulties, then treatment efforts could stress consistent management of contingencies of children's behavior by older significant others, including immediate family members, relatives, teachers, and baby-sitters. Such "contingency management" would ideally involve adequate assessment, intervention, and follow-up (Rimm & Masters, 1979). Treatment efforts should also focus on restructuring any aberrant cognitive beliefs, such as the

ones described by Doren (1987) and consistent with findings in this study. These might include perceptions that general outcomes of behavior cannot be predicted at specific times, the view that other people are often sources of capricious punishment, and overemphasis on reward with little attention to negative contingencies.

The current research may also be relevant to correctional management practices for adult offenders. One implication of these findings is that consistent disciplinary contingencies are far preferable to inconsistent ones, and that deviations from consistency may actually increase management problems in prisons by diminishing the effectiveness of punishing contingencies. It is questionable whether adverse contingencies can substantially influence the actions of primary psychopaths, but inconsistent punishment within a prison setting could only exacerbate their resistance to negative contingencies. The less psychopathic individuals in prison populations might be most adversely affected by inconsistent contingencies for behavior. If such inconsistency comprised a partial helplessness schedule, this could result in increased resistance to punishment over time, consistent with the short-term behavioral effects observed in low psychopathy subjects exposed to partial helplessness conditioning in this study.

Despite its above mentioned implications for correctional management practices and treatment of problem

children, this study is not without its limitations. The sample of subjects was generated by staff referrals and thus its members may not be representative of the prison population from which it was drawn. Given that many of the high psychopathy subjects actually had PCL (Hare, 1985b) scores falling into the middle range of possible scores, their performance in the learning task might not be replicated with subjects having uniformly higher PCL scores. The lack of totally controlled laboratory conditions, including the presence of extraneous noise and occasional brief interruptions, may have influenced the results in unknown ways, as may have discussions outside the laboratory between individual inmates concerning the learning task. Findings suggest that subjects were not adequately motivated by the reinforcer of snack food items, and thus it appears that attempts to remain in compliance with federal research policy may have precluded effective operationalization of reinforcement and punishment within the learning task. Influence of experimenter bias on the results cannot be ruled out, given that the experimenter was not blind either to subject group or reinforcement condition. Effort was made to reduce the effects of bias by having subjects complete the learning task at one desk, while the experimenter read at another, somewhat removed, location in the same room. Additionally, the gender of the experimenter may also have influenced subjects' behavior in undetermined

ways, and there is no reason to assume such influence was uniform across subjects.

The limitations of the present study underscore the need for further research in the area of partial helplessness conditioning and its role in the etiology of psychopathy and, possibly, in the development of criminal behavior in the absence of psychopathy. The present research could be extended to discover whether normal and behaviorally disordered children differ in their responses to varying reinforcement schedules, including partial helplessness conditioning. Should other investigators confirm present findings that partial helplessness conditioning results in increased resistance to punishment through response perseveration, further research could determine the endurance and reversibility of this effect. Additional clarification of Doren's (1987) assertions is also desirable, given that the comprehensiveness of his theory lends it great potential to guide years of research in the area of psychopathy.

Appendices

Appendix A

Tables for Psychopathy Checklist Results

Table 1

Frequency Distribution of Psychopathy
Checklist (Hare, 1985b) Scores

Ranges of PCL scores	Number of Subjects
0 - 5	1
5.1-10	6
10.1-15	9
15.1-20	8
20.1-25	14
25.1-30	10
30.1-35	10
35.1-40	2

Table 2

Analysis of Variance Summary Table for
Generalizability Analysis

Analysis of Variance

Source	Sum of Squares	df	Mean Square	F Value	Tail Probability
Grand Mean	56516.3299	1	56516.3299	356.14	0.0000
Subjects	9362.8512	59	158.6924		
Raters	63.4526	1	63.4526	3.76	0.0574
Error	996.7431	59	16.8940		

Table 3

Results of Item Analysis for Hare's (1985b)
Psychopathy Checklist

Item	First Rater				<u>p</u>	e*	es**
	<u>M</u>	<u>SD</u>	<u>n</u>	<u>F</u>			
Glibness/Superficial Charm	1.2	0.8	58	10.5	.002	.4	.16
Grandiose Sense of Self-Worth	1.1	0.9	60	30.3	.000	.6	.34
Need for Stimulation/ Proneness to Boredom	1.5	0.6	60	36.1	.000	.6	.38
Pathological Lying	1.2	0.7	59	18.2	.000	.5	.24
Conning/ Manipulative	1.1	0.8	56	43.3	.000	.7	.45
Lack of Remorse or Guilt	1.4	0.8	59	44.4	.000	.7	.43
Shallow Affect	1.3	0.7	56	31.0	.000	.6	.36
Callous/Lack of Empathy	1.1	0.8	57	29.6	.000	.6	.35
Parasitic Lifestyle	0.9	0.6	56	12.8	.001	.4	.19
Poor Behavioral Controls	0.9	0.8	58	8.1	.006	.4	.13
Promiscuous Sexual Behavior	0.9	0.8	55	5.9	.019	.3	.10
Early Behavior Problems	0.2	0.5	28	2.1	.175	.3	.10
Lack of Realistic Long-Term Plans	1.3	0.7	60	11.4	.001	.4	.16

Item	First Rater						
	<u>M</u>	<u>SD</u>	<u>n</u>	<u>F</u>	<u>p</u>	e*	es**
Impulsivity	1.1	0.8	56	34.5	.000	.6	.39
Irresponsibility	1.2	0.7	46	30.3	.000	.6	.41
Failure to Accept Responsibility for Own Actions	1.2	0.8	60	9.7	.003	.4	.14
Many Short-Term Marital Relationships	0.5	0.8	55	6.3	.015	.3	.10
Juvenile Delinquency	0.4	0.7	54	11.9	.002	.5	.21
Revocation of Conditional Release	1.6	0.7	38	7.6	.013	.5	.22
Criminal Versatility	0.8	0.8	60	22.5	.000	.5	.28

Item	Second Rater						
	<u>M</u>	<u>SD</u>	<u>n</u>	<u>F</u>	<u>p</u>	e*	es**
Glibness/Superficial Charm	1.1	0.9	60	7.5	.008	.3	.11
Grandiose Sense of Self Worth	1.0	0.9	60	14.5	.000	.4	.20
Need for Stimulation/Proneness to Boredom	1.6	0.6	60	11.6	.001	.4	.17
Pathological Lying	0.9	0.9	58	41.1	.000	.7	.42
Conning/Manipulative	0.9	0.9	60	25.3	.000	.6	.30
Lack of Remorse or Guilt	1.5	0.7	60	13.3	.001	.4	.19

Item	Second Rater						e*	es**
	<u>M</u>	<u>SD</u>	<u>n</u>	<u>F</u>	<u>p</u>			
Shallow Affect	1.2	0.9	60	21.5	.000	.5	.27	
Callous/Lack of Empathy	1.2	0.8	59	31.1	.000	.6	.35	
Parasitic Lifestyle	0.8	0.7	60	11.6	.001	.4	.17	
Poor Behavioral Controls	1.1	0.8	55	3.8	.056	.3	.07	
Promiscuous Sexual Behavior	1.3	0.9	58	9.6	.003	.4	.14	
Early Behavior Problems	0.8	1.0	39	2.8	.101	.3	.07	
Lack of Realistic Long-Term Plans	1.4	0.8	58	13.5	.001	.4	.19	
Impulsivity	1.2	0.8	60	9.2	.004	.4	.14	
Irresponsibility	1.2	0.9	57	12.9	.001	.4	.19	
Failure to Accept Responsibility for Own Actions	1.4	0.8	60	3.4	.071	.2	.06	
Many Short-Term Marital Relationships	0.8	0.9	48	2.4	.132	.2	.05	
Juvenile Delinquency	0.7	0.8	46	8.8	.005	.4	.17	
Revocation of Conditional Release	1.3	0.9	44	21.2	.000	.6	.36	
Criminal Versatility	0.8	0.8	60	25.4	.000	.6	.30	

Note. All values are rounded upward.

* "e" = eta. ** "es" = eta squared. All eta squared values are computed from original (before rounding) eta values.

Appendix B

Tables for Results for the Three Dependent Variables

Table 4

Analysis of Variance Summary Table for Dependent Variable of
Crucial Response Perseveration

Analysis of Variance

Source	Sum of Squares	df	Mean Square	F Value	Tail Probability
Psychopathy	0.0075	1	0.0075	0.36	0.5523
Reinforcement	0.2526	2	0.1263	6.04	0.0043
Interaction	0.0116	2	0.0058	0.28	0.7584
Error	1.1293	54	0.0209		

Levene's Test for Equality of Variances

Psychopathy	1,54	0.12	0.7275
Reinforcement	2,54	0.47	0.6286
Interaction	2,54	0.16	0.8491

Mean 0.236
Standard Deviation 0.154

Table 5

Analysis of Variance Summary Table for Dependent Variable of
Global Response Persistence

Analysis of Variance

Source	Sum of Squares	df	Mean Square	F Value	Tail Probability
Psychopathy	2740.2254	1	2470.2254	0.36	0.5496
Reinforcement	10504.9088	2	5252.4544	0.77	0.4676
Interaction	14529.2421	2	7264.6211	1.07	0.3514
Error	367880.3000	54	6812.5981		

Levene's Test for Equality of Variances

Psychopathy	1,54	1.51	0.2248
Reinforcement	2,54	2.29	0.1114
Interaction	2,54	2.71	0.0754

Mean 93.250

Standard Deviation 81.862

Table 6

Analysis of Variance Summary Table for Dependent Variable of
Alternate Response Variability

Analysis of Variance

Source	Sum of Squares	df	Mean Square	F Value	Tail Probability
Psychopathy	0.1770	1	0.1770	0.79	0.3784
Reinforcement	0.1630	2	0.0815	0.36	0.6972
Interaction	0.7078	2	0.3539	1.58	0.2160
Error	12.1191	54	0.2244		

Levene's Test for Equality of Variances

Psychopathy	1,54	0.21	0.6502
Reinforcement	2,54	0.03	0.9658
Interaction	2,54	0.06	0.9433

Mean 2.098
Standard Deviation 0.472

Table 7

Regression Coefficients with Three Criterion Variables and
Psychopathy Checklist (Hare, 1985b) Scores as the
Predictor Variable

Reinforcement Condition	Criterion Variables		
	Global Persistence	Crucial Response Perseveration	Alternate Response Variability
Continuous Reinforcement (<u>n</u> =20)			
<u>b</u>	.7343	.0018	-.0099
<u>p</u>	.7424	.6690	.4044
Partial Reinforcement (<u>n</u> =20)			
<u>b</u>	-1.0025	-.0026	-.0013
<u>p</u>	.5686	.4192	.9052
Partial Helplessness (<u>n</u> =20)			
<u>b</u>	.2417	-.0003	.0161
<u>p</u>	.9248	.9468	.2806
All Conditions Combined (<u>N</u> =60)			
<u>b</u>	.0196	.0003	-.0001
<u>p</u>	.9871	.8965	.9935

Appendix C

Tables for Results for the
Ad Hoc Experimental Variables

Table 8

Analysis of Variance Summary Table for Ad Hoc Experimental
Variable of Number of Crucial Responses During
Punished Extinction

Analysis of Variance

<u>Source</u>	<u>Sum of Squares</u>	<u>df</u>	<u>Mean Square</u>	<u>F Value</u>	<u>Tail Probability</u>
Psychopathy	28.0059	1	28.0059	0.03	0.8710
Reinforcement	3579.0892	2	1789.5446	1.70	0.1920
Interaction	1115.2225	2	557.6113	0.53	0.5915
Error	56783.3000	54	1051.5426		

Brown-Forsyth Analysis of Variance

Psychopathy	1,33	0.03	0.8713
Reinforcement	2,33	1.70	0.1980
Interaction	2,33	0.53	0.5934

Levene's Test for Equality of Variances

Psychopathy	1,54	0.01	0.9424
Reinforcement	2,54	7.68	0.0012
Interaction	2,54	1.22	0.3028

Mean 22.150
Standard Deviation 32.287

Table 9

Analysis of Variance Summary Table for Ad Hoc Experimental
Variable of Total Number of Trials in Learning Task

Analysis of Variance

Source	Sum of Squares	df	Mean Square	F Value	Tail Probability
Psychopathy	3665.7661	1	3665.7661	0.47	0.4954
Reinforcement	12556.6494	2	6278.3247	0.81	0.4516
Interaction	15212.9827	2	7606.4914	0.98	0.3828
Error	420226.7000	54	7781.9759		

Levene's Test for Equality of Variances

Psychopathy	1,54	0.29	0.5900
Reinforcement	2,54	1.68	0.1969
Interaction	2,54	1.03	0.3653

Mean 148.450
Standard Deviation 87.495

Table 10

Analysis of Variance Summary Table for Ad Hoc Experimental
Variable of Number of Minutes in Learning Task

Analysis of Variance

Source	Sum of Squares	df	Mean Square	F Value	Tail Probability
Psychopathy	17.0656	1	17.0656	0.27	0.6087
Reinforcement	4.4323	2	2.2162	0.03	0.9662
Interaction	67.2323	2	33.6162	0.52	0.5960
Error	3474.6000	54	64.3444		

Levene's Test for Equality of Variances

Psychopathy	1,54	2.11	0.1525
Reinforcement	2,54	1.61	0.2098
Interaction	2,54	0.92	0.4066

Mean 12.333
Standard Deviation 7.771

Table 11

Analysis of Variance Summary Table for Ad Hoc Experimental
Variable of Number of Pretraining Trials

Analysis of Variance

Source	Sum of Squares	df	Mean Square	F Value	Tail Probability
Psychopathy	6.0160	1	6.0160	0.20	0.6579
Reinforcement	185.0326	2	92.5163	3.05	0.0557
Interaction	73.2326	2	36.6163	1.21	0.3071
Error	1638.7000	54	30.3463		

Brown-Forsyth Analysis of Variance

Psychopathy	1,32	0.20	0.6591
Reinforcement	2,32	3.05	0.0614
Interaction	2,32	1.21	0.3125

Levene's Test for Equality of Variances

Psychopathy	1,54	3.30	0.0750
Reinforcement	2,54	3.85	0.0274
Interaction	2,54	0.07	0.9332

Mean 12.817
Standard Deviation 5.679

Table 12

Analysis of Variance Summary Table for Ad Hoc Experimental
Variable of Number of Training Trials

Analysis of Variance

Source	Sum of Squares	df	Mean Square	F Value	Tail Probability
Psychopathy	70.4124	1	70.4124	0.31	0.5826
Reinforcement	2579.2291	2	1289.6145	5.60	0.0062
Interaction	1657.4291	2	828.7145	3.60	0.0341
Error	56783.3000	54	1051.5426		

Brown-Forsyth Analysis of Variance

Psychopathy	1,36	0.31	0.5837
Reinforcement	2,36	5.60	0.0076
Interaction	2,36	3.60	0.0376

Levene's Test for Equality of Variances

Psychopathy	1,54	0.04	0.8380
Reinforcement	2,54	1.49	0.2342
Interaction	2,54	5.63	0.0060

Mean 42.383
Standard Deviation 16.845

Table 13

Analysis of Variance Summary Table for Ad Hoc Experimental
Variable of Average Latency Per Trial in Seconds

Analysis of Variance

Source	Sum of Squares	df	Mean Square	F Value	Tail Probability
Psychopathy	0.3954	1	0.3954	2.25	0.1394
Reinforcement	1.3528	2	0.6764	3.85	0.0274
Interaction	0.4634	2	0.2317	1.32	0.2759
Error	9.4875	54	0.1757		

Levene's Test for Equality of Variances

Psychopathy	1,54	2.80	0.1003
Reinforcement	2,54	0.62	0.5434
Interaction	2,54	0.77	0.4702

Mean 0.904
Standard Deviation 0.445

Table 14

Analysis of Variance Summary Table for Ad Hoc Experimental
Variable of Oral Feedback to Subjects at Conclusion of
Learning Task

Analysis of Variance

<u>Source</u>	<u>Sum of Squares</u>	<u>df</u>	<u>Mean Square</u>	<u>F Value</u>	<u>Tail Probability</u>
Psychopathy	0.0666	1	0.0666	0.07	0.7911
Reinforcement	7.0333	2	3.5167	3.74	0.0302
Interaction	1.4333	2	0.7167	0.76	0.4718
Error	50.8000	54	0.9407		

Levene's Test for Equality of Variances

Psychopathy	1,54	0.09	0.7702
Reinforcement	2,54	2.46	0.0946
Interaction	2,54	2.72	0.0747

Mean 1.667
Standard Deviation 1.003

Table 15

Analysis of Variance Summary Table for Ad Hoc Experimental
Variable of Final Score on Punished Extinction

Analysis of Variance

Source	Sum of Squares	df	Mean Square	F Value	Tail Probability
Psychopathy	1035.2588	1	1035.26	0.01	0.9403
Reinforcement	5662576.9255	2	2831288.46	15.50	0.0000
Interaction	326076.9255	2	163038.46	0.89	0.4154
Error	9860750.0000	54	182606.48		

Brown-Forsyth Analysis of Variance

Psychopathy	1,38	0.01	0.9402
Reinforcement	2,38	15.50	0.0000
Interaction	2,38	0.89	0.4179

Levene's Test for Equality of Variances

Psychopathy	1,54	2.38	0.1287
Reinforcement	2,54	4.30	0.0185
Interaction	2,54	1.71	0.1902

Mean 855.833
Standard Deviation 518.316

Table 16

Intercorrelations Between Selected
Ad Hoc Experimental Variables

Variable	2	3	4	5
1. Number of pre-training trials	.2693	-.1184	.0873	.2189
2. Number of training trials	---	-.1998	-.1759	-.3871
3. Average latency per trial		---	-.1463	-.0419
4. Feedback at end of task			---	.7962
5. Final score on extinction				---

Appendix D

Semi-structured Interview

What is your age?
Current offense?
How long is your sentence?
When did it start?

Item 12: Early behavior problems

Prior to age 12, did you have any major behavior problems at home or at school?
Were you ever removed from your home and placed in a juvenile detention center or training school?
Were you ever seen by a counselor or a doctor for any behavior problems when you were growing up?
Were you ever diagnosed as hyperactive?

Item 18: Juvenile delinquency

Prior to age 17, were you ever in trouble with the law?
Did you ever go to juvenile court?
If so, what was the disposition of the charges?
How old were you at the time of your first arrest?
What was the charge?
Did that first arrest involve auto theft?

Item 3: Need for stimulation/proneness to boredom

As a child, did you like going to school?
Did you find it boring?
How far did you go in school and job training?
What types of jobs have you held in your lifetime?
Approximately how many different positions have you held?
What is the longest you have stayed at one job?
Were you working at the time of the current offense?
Out of your last two years on the streets, how much of that time were you working full time?
Would you say you have "itchy feet," and that you feel a need to travel and be always on the go?
Are you able to work at something for a long time, or do you tend to jump from one thing to another?

Item 13: Lack of realistic long-term plans

What kind of job would you like to pursue when you get back on the streets?
On the street, do you tend to plan your time or live more day by day?
Do you think much about the future?
Do you have goals for the future?
If so, what are they?

Item 14: Impulsivity

Do you tend to plan things or do them more spur of the moment?

Have you quit jobs in the past without another job to go to?
Have your criminal offenses been premeditated or spontaneous?

Tell me something about the circumstances surrounding the current offense.

What prior convictions do you have on your record?

What prior charges do you have on your record that were later dropped or not prosecuted for whatever reason?

Item 16: Failure to accept responsibility for own actions

Have other members of your family been in trouble with the law?

In general, what factors do you feel have been responsible for your own involvement in criminal behavior?

What factors would help keep you out of trouble in the future?

Item 6: Lack of remorse or guilt

Was there a victim of your present offense?

What are your feelings toward the victim?

Do you feel any remorse for what you did?

If so, have you ever done anything to show this, such as make apology or restitution?

What about your family--how do they react to what has happened?

How do you feel about their reaction?

Do you feel that your sentence is a fair one?

Item 19: Revocation of conditional release

Have you ever been on probation or parole before?

How many times?

Did you honor them?

Have you ever been charged with failure to appear?

Breach of your own recognizance?

Jumping bail?

Item 10: Poor behavioral controls

Do you tend to take offense easily, or get very upset over minor things?

Do you take things too personally a lot?

How often in a week would you say you get angry?

Have a temper outburst?

Since age 16, have you ever been so angry that you have blown up at someone and hurt them?

If so, describe this.

Have other people ever told you that you have a short fuse?

Item 9: Parasitic lifestyle

When you are on the street, how do you support yourself primarily?

Does anyone else assist you in terms of giving you a place to live, food, or money?

Have you ever been on welfare?

Unemployment?

If so, for how long?

Item 17: Many short-term marital relationships

When you were last on the street, did you live alone or with someone?

Male or female?

Have you ever been married?

If so, for how long?

Were you ever married to anyone else?

Have you ever lived with someone to whom you were not married?

How many times, and for how long each time?

Item 15: Irresponsibility

Do you have any children?

What are their names and ages?

How much contact do you have with them?

Do you provide any financial support for them?

To the best of your knowledge, have you fathered other children?

If so, describe any contact with and financial support of them.

Do you financially support anyone else?

Item 11: Promiscuous sexual behavior

Apart from marriages, have you had affairs with other women?

Approximately how many?

Have you ever maintained more than one sexual relationship at a time?

Have you ever been involved in any unusual sexual practices, such as bisexuality, male prostitution, incest, or child molestation?

Item 4: Pathological Lying

Have you ever been convicted of fraud, forgery, false pretense, impersonation, or perjury?

If so, how many times?

Have you ever used an alias?

Would you find it easy or difficult to tell a lie if it was in your best interest to do so?

Item 5: Conning/Manipulative

Have other people ever described you as a hustler or manipulator?

Item 7: Shallow Affect

Do you tend to care much about what other people think or feel about what you are doing?

When you act, do you tend to think of yourself or others?

In deciding what to do, do you regularly consider the consequences of your actions in terms of how they affect others?

Do you sometimes put on a show of feelings because other people expect it, even though you do not feel that way?

In relationships with others, do you reveal a great deal of yourself, or are you quite guarded?

How often do you feel the following emotions in a typical week? Please answer according to the following scale:

never, rarely, sometimes, often, very often.

Angry? Sad? Happy? Bored? Lonely? Confident? Anxious?

Guilty?

Item 8: Callous/lack of empathy

Are you patient and tolerant with other people?

Do your expectations of others create problems for you?

What do you think of people in general?

Item 2: Grandiose sense of self-worth

What are your feelings toward the future--are things likely to work out well for you?

Are you concerned that your criminal history will prevent you from accomplishing your goals?

Appendix E

Script of Instructions

I'd like to welcome you to the last part of the research study. While you are here, you will take part in several different tasks. You will first play a computer game, and then you will complete a written research questionnaire, and then I will ask you a few questions at the end. In the computer game you will win points that you can exchange for one or more of the food items you see here. You may eat the food items you win after the game.

You will exchange the points that you win like money for these food items. For example, just by playing the game you win a minimum of 300 points automatically, no matter what your final score. You could spend your 300 points on one of these 300-point items or six of these 50-point items. The more points you win, the more and better food items you get.

Please have a seat here. There are many different trial-and-error games programmed into the computer, and you have been randomly assigned to play one of those games. You will start with 50 points, and on each trial in the game you may press one of these four black-and-white keys to earn more points. Each time you choose a key, one of three things can happen: (a) you may win points, or (b) you may lose points, or (c) your point total may stay the same. As soon as you choose a key on each trial, the computer screen will tell you right away if you win, lose, or stay the same, and it will tell you your total points.

This is how the game works. See these five zeroes along the top of the screen? On each trial in the game, the computer will reset these numbers and will secretly assign different combinations of five numbers to each of the four keys. Only one key per trial will be assigned a number combination that will win points for you. The other keys will either cause you to lose points or they will not affect your point total at all. Your job, on each trial in the game, is to find the key that has the winning number combination.

The computer will take about three seconds on each trial to reset the number combinations, and during that time the five numbers pictured here will be flashing. As soon as the number combinations have been set, these zeroes will reappear. At that time, you should choose the key that you think has the winning combination. As soon as you make your choice, the computer screen will show you the number combination that you picked; it will tell you if your point total has increased, decreased, or stayed the same; and it will show you your total points.

If the number combination that appears at the top of the screen has three identical numbers, then you will win points on that trial. If only two of the five numbers are identical, then your point total will stay the same. If all of the five numbers are different, then you will lose points. As I said before, as soon as you choose a key, the computer screen will show you the number combination that

you picked, it will tell you if you win, lose, or stay the same, and it will show your total points.

Please choose only one key per trial, and use your first finger when making your choice. Take as long as you like to choose your key on each trial; this is not a test of reaction time. It will be up to you to discover the strategy of which key to pick on each trial to win the most points in the game. If you can beat the average score of the people who have already played this game, then you will win a bonus number of 300 points at the end. I will give you feedback after the game about whether your final score is average, lower than average, higher, or much higher than the average.

You may play the game for as long as you like, and you may quit at any time. You will stop the game by pressing the slash key, unless you reach the maximum number of points, in which case the game will automatically end. Let's go through five practice trials to make sure you understand how the game works. Press the "F" key to make the game go forward.

Now that the zeroes have reappeared, you know that the computer has assigned number combinations to each of the four keys. Were this the actual game, it would now be up to you to find the key with the winning number combination. But since these are only sample trials, I'd like you to practice the keys in order from left to right. Practice the choice of the far left key on this first sample trial.

This is an example of a winning number combination, because three of the five numbers are identical. If only two of the numbers were alike, the screen would say "SAME" and your point total would still be 50. If all five numbers were different, the screen would say "LOSE" and you would have lost points on that trial. Press the "F" key to make the game go forward.

Now practice the choice of the next key.

This again is an example of a winning number combination, because three of the five numbers are alike. You will always use the "F" key to make the game go forward to the next trial, so press it now.

Now practice the next key.

Here again is an example of a winning combination. Press the "F" key again.

Now practice the far right key.

Another example of a winning combination. Press the "F" key again.

On this last sample trial, I'd like for you to practice the slash key.

You will press the slash key whenever you are ready to end the game, and the game will continue until you press that key, unless you reach the maximum number of points possible, in which case the game will automatically end. After you press the slash key, you will exchange your points for food items, and then you may eat those items while you

fill out the research questionnaire and participate in the short interview.

What questions do you have?

Do you need more sample trials?

If there are no more questions, then you may play the game for as long as you like, and you may take as much time as you need to choose your key on each trial. The game will begin as soon as you press the "F" key. Good luck.

(After pretraining:) It looks like you are catching on, because you have already won 300 points. No matter what happens to your score during the rest of the game, you will be credited with at least 300 points at the end.

I'm going to go move over here to this chair and read and let you finish the game on your own. What other questions do you have?

It is important that you ask all questions now, because once you go forward to the next trial, neither of us should talk until you press the slash key to stop the game.

Again, good luck.

Appendix F
Informed Consent Form

INFORMED CONSENT STATEMENT

The study titled "Computer Games" will be conducted by Tucker Johnson, Psychology Intern with the Federal Correctional Institution at Butner, North Carolina. The objectives of this study are to examine different inmate personality styles and to discover whether personality styles influence how inmates play different computer games.

The study involves two procedures:

1) The researcher will conduct an interview with each participant about his past and present life, and all information obtained in this interview will be held in the strictest confidence. The information obtained in the interview will be combined with material from the central file to find out about the inmate's personality style.

2) Each inmate will then be randomly assigned to play one of several games on a computer, with a chance to win snacks/food items based on his final score in the game. No previous computer experience is required to be able to play, and all inmates who participate in this procedure will win at least a small amount of food regardless of his score in the game. This procedure is included to determine if the inmate's personality style has influenced the way he plays the computer game.

The results of the study will be provided to the Bureau of Prisons to assist in ongoing development and refinement of correctional procedures. In addition, the results may be published in book form and/or in professional journals. In neither instance will names be linked with individual performance in the study.

No known risks or discomforts are involved in this project. All information provided during the interview will be kept confidential, unless it is revealed that an escape from the institution is planned or that an inmate is currently in danger.

A benefit of this study is that it is expected to advance current knowledge about corrections. In addition, each inmate who participates in both procedures will directly benefit by winning food items for his personal consumption.

Your participation is completely voluntary and you may refuse participation at any time without penalty or prejudice. All research information will be handled in the strictest confidence and your participation will not be individually identifiable in any reports. Your participation will not affect your release date or parole eligibility. You may ask the researcher questions about the above information.

The Federal Bureau of Prisons is authorized to conduct research on the correctional environment by Title 18, U.S. Codes 4001(b) and 4042(2).

Appendix G

Post-Experiment Questionnaire

Post-game Questionnaire

Please indicate whether you agree or disagree with the following statements according to the following scale:

- | | |
|-----------------------|--------------------|
| 1 = STRONGLY DISAGREE | 5 = SLIGHTLY AGREE |
| 2 = SOMEWHAT DISAGREE | 6 = SOMEWHAT AGREE |
| 3 = SLIGHTLY DISAGREE | 7 = STRONGLY AGREE |
| 4 = NO OPINION | |

Circle the number that best represents your opinion about each statement:

1. I liked the computer game.

1	2	3	4	5	6	7
-----	-----	-----	-----	-----	-----	-----
1	2	3	4	5	6	7
STRONGLY	SOMEWHAT	SLIGHTLY	NO OPINION	SLIGHTLY	SOMEWHAT	STRONGLY
DISAGREE	DISAGREE	DISAGREE		AGREE	AGREE	AGREE

2. I would play another computer game if I could.

1	2	3	4	5	6	7
-----	-----	-----	-----	-----	-----	-----
1			4			7
STRONGLY			NO OPINION			STRONGLY
DISAGREE						AGREE

3. I would play another computer game even if I could not win food items.

1	2	3	4	5	6	7
-----	-----	-----	-----	-----	-----	-----
1			4		6	7
STRONGLY			NO OPINION			STRONGLY
DISAGREE						AGREE

4. I was frustrated while playing the game.

1	2	3	4	5	6	7
-----	-----	-----	-----	-----	-----	-----
1			4			7
STRONGLY			NO OPINION			STRONGLY
DISAGREE						AGREE

5. I was able to pay close attention all throughout the game.

1	2	3	4	5	6	7
-----	-----	-----	-----	-----	-----	-----
1			4			7
STRONGLY			NO OPINION			STRONGLY
DISAGREE						AGREE

6. I was bored by the game.

1	2	3	4	5	6	7
-----	-----	-----	-----	-----	-----	-----
1			4			7
STRONGLY			NO OPINION			STRONGLY
DISAGREE						AGREE

7. The game could have been improved.

1	2	3	4	5	6	7
-----	-----	-----	-----	-----	-----	-----
1			4			7
STRONGLY			NO OPINION			STRONGLY
DISAGREE						AGREE

8. The game was difficult.

1	2	3	4	5	6	7
-----	-----	-----	-----	-----	-----	-----
1			4			7
STRONGLY			NO OPINION			STRONGLY
DISAGREE						AGREE

9. The instructions for the game were hard to understand.

1	2	3	4	5	6	7
STRONGLY DISAGREE	SOMEWHAT DISAGREE	SLIGHTLY DISAGREE	NO OPINION	SLIGHTLY AGREE	SOMEWHAT AGREE	STRONGLY AGREE

10. I tried to beat the average score of the people who already played the game.

1	2	3	4	5	6	7
STRONGLY DISAGREE			NO OPINION			STRONGLY AGREE

11. I believed that I would be able to exchange my points for food items.

1	2	3	4	5	6	7
STRONGLY DISAGREE			NO OPINION			STRONGLY AGREE

12. I wanted to win food items.

1	2	3	4	5	6	7
STRONGLY DISAGREE			NO OPINION			STRONGLY AGREE

13. I wanted to win points on the computer screen.

1	2	3	4	5	6	7
STRONGLY DISAGREE			NO OPINION			STRONGLY AGREE

14. I reached the highest score possible in the game.

1	2	3	4	5	6	7
STRONGLY DISAGREE			NO OPINION			STRONGLY AGREE

15. I was challenged by the game.

1	2	3	4	5	6	7
STRONGLY DISAGREE			NO OPINION			STRONGLY AGREE

16. It was hard to predict the outcome before the game was over.

1	2	3	4	5	6	7
STRONGLY DISAGREE			NO OPINION			STRONGLY AGREE

17. I controlled the outcome of the game.

1	2	3	4	5	6	7
STRONGLY DISAGREE			NO OPINION			STRONGLY AGREE

18. If I played the game again, I would get a higher score.

1	2	3	4	5	6	7
STRONGLY DISAGREE			NO OPINION			STRONGLY AGREE

19. If I had stayed longer in the game, I would have gotten a higher score.

1	2	3	4	5	6	7
1	2	3	4	5	6	7
STRONGLY DISAGREE	SOMEWHAT DISAGREE	SLIGHTLY DISAGREE	NO OPINION	SLIGHTLY AGREE	SOMEWHAT AGREE	STRONGLY AGREE

20. The researcher helped me do well in the computer game.

1	2	3	4	5	6	7
1			4			7
STRONGLY DISAGREE			NO OPINION			STRONGLY AGREE

21. Most people would do better at this computer game than I did.

1	2	3	4	5	6	7
1			4			7
STRONGLY DISAGREE			NO OPINION			STRONGLY AGREE

22. I usually win at games I play.

1	2	3	4	5	6	7
1			4			7
STRONGLY DISAGREE			NO OPINION			STRONGLY AGREE

23. I do not mind losing at games.

1	2	3	4	5	6	7
1			4			7
STRONGLY DISAGREE			NO OPINION			STRONGLY AGREE

24. If I lose at a game, it is usually because I do not try very hard.

1	2	3	4	5	6	7
1			4			7
STRONGLY DISAGREE			NO OPINION			STRONGLY AGREE

25. If I lose at a game, it is usually because the game is boring.

1	2	3	4	5	6	7
1			4			7
STRONGLY DISAGREE			NO OPINION			STRONGLY AGREE

26. If I lose at a game, it is usually because I do not have enough skill.

1	2	3	4	5	6	7
1			4			7
STRONGLY DISAGREE			NO OPINION			STRONGLY AGREE

27. Even if I lose at one game, I will likely win at the next one I play.

1	2	3	4	5	6	7
1			4			7
STRONGLY DISAGREE			NO OPINION			STRONGLY AGREE

28. The chances are good that I can do well at anything I want to.

1	2	3	4	5	6	7
1			4			7
STRONGLY DISAGREE			NO OPINION			STRONGLY AGREE

Appendix H

Post-Experiment Interview

1. What did you hear about the game before you came today, other than what I told you?
2. At what time did you eat your last meal?
3. Would you say it was a heavy meal, light meal, or average meal?

Now I would like to ask you several questions about your childhood.

4. In your household growing up, which parent was the primary disciplinarian?
5. Was either parent absent a lot from the home?
6. How did your parents discipline you?
7. Which method of discipline did they use most often?
8. Did they ever hit you?
9. Did they ever hit you with anything other than their hands? What did they use?
10. How long after your parents found out you had done something wrong would they discipline you?

11. If you broke a rule, did your parents always punish you or did they sometimes let you get by with it?

12. Were you able to often get away with breaking the rules and not get caught?

13. Did your parents allow you a lot of freedom to do as you wished growing up?

14. Was either of your parents a heavy drinker? Did either abuse drugs?

15. Would you say that either or both of your parents physically abused you? Verbally abused you?

Appendix I
Approval Forms

THE UNIVERSITY OF ALABAMA

Institutional Review Board for the
Protection of Human Subjects
Dr. Ron Rogers, Chairperson, 348-5083

Notification of IRB Action

Principal Investigator(s): Tucker Johnson

Title of Research Proposal: "Partial helplessness ~~training~~ conditioning as a
possible etiological factor in psychopathy"

Date: November 21, 1986

IRB Action:

- This proposal complies with University and federal regulations for the protection of human subjects (45 CFR 46). Approval is effective for a period of one year from the date of this notification.
- Revisions requested:

UNITED STATES GOVERNMENT

memorandum

Federal Bureau of Prisons
Washington, DC 20534DATE:
REPLY TO
ATTN OF:

May 11 1967

Wade B. Houk, Assistant Director for Administration

SUBJECT: Research proposal of Tucker Johnson

TO: Gary McCune
Southeast Regional Director

This is in response to a request by Tucker Johnson, psychology intern, to conduct a study at FCI Butner on partial helplessness training as a possible etiological factor in psychopathy.

We concur with your recommendation of approval of the pilot phase. The proposal for the full study will be evaluated when the results of the pilot phase become available.

Ms. Johnson is authorized to proceed with the pilot phase within the ability and resources of the institution to accommodate her. Any questions which arise may be addressed to Pete Nacci at FTS 724-3228.

cc: Warden Samples, Butner
Bernadette Pelissier, Butner
Tucker Johnson, Butner ✓

COPY
UNITED STATES GOVERNMENT
memorandum

DATE: October 28, 1989
REPLY TO: Gerry G. Gaes, Director
ATTN OF: Office of Research and Evaluation
SUBJECT: Tucker Johnson's Research Project
TO: Gary McCune, Regional Director
SERO

Federal Bureau of Prisons
Washington, DC 20534

We have reviewed the proposed revisions to Ms. Johnson's research project entitled Partial Helplessness Training as a Possible Etiological Factor in Psychopathy. The revisions seem reasonable, and Ms. Johnson is authorized to complete the project. She should submit quarterly progress reports to the Institution Research Committee, and should plan to finish the project no later than October 1989.

cc: Warden, FCI, Butner
Chief of Research, FCI, Butner
Tucker Johnson

Appendix J

Pilot Study 1

Purpose

The primary purpose of this pilot study was to identify potential difficulties in the procedure and learning apparatus. In addition, the study was designed to assess whether male college students, classified according to MMPI Pd score into high psychopathy and low psychopathy groups, would perform differently in the learning task.

Method

Subjects. Undergraduate males who volunteered for the experiment received three bonus points to be added to their final grade in introductory psychology. They were recruited using a variant of the procedure described by Widom (1978) for studying non-institutionalized psychopaths. The following is the recruiting message that was used, and it represents a slightly modified version of the advertisement that Widom ran in a Boston counter-culture newspaper to attract non-incarcerated psychopaths:

I am looking for two types of males. One type I'm looking for could be described as an impulsive, carefree, and adventurous person who leads an exciting life and always looks out for number one. If you have most of these traits, and are charming and good at handling people, then please sign up for this study. The second type I'm looking for is males who are careful, cautious, and tend to worry a great deal. If you are very organized about most things and not impulsive but instead tend to plan ahead, than you are also a type I'm looking for.

The subjects were classed into high psychopathy and low psychopathy groups according to a median split (T score = 62) of the K-corrected MMPI Pd scale scores of 46 subjects who originally signed up for the experiment.

Design. The pilot study employed a 2 x 3 x 2 factorial design, with two levels of psychopathy (high vs. low), three learning schedules (continuous reinforcement vs. partial reinforcement vs. partial helplessness), and two extinction schedules (simple extinction vs. continuous punishment). Subjects from each group were randomly assigned to the six experimental conditions. Thirty-five of the original 46 subjects participated in the learning task in the second phase.

Dependent variables. The dependent variables were: (a) total number of responses during extinction, or global persistence; (b) the ratio of the number of crucial responses during extinction to the number of total extinction responses, or crucial response perseveration; and (c) the standard deviation of the alternate response choices during extinction, or the variability of alternate responses.

Procedure. Subjects initially completed the MMPI in groups of approximately 8 to 15. They were assigned a code number to use on the MMPI protocol, and were informed that their names would be kept separate from personality data.

Subjects completed the second phase, the pre-programmed computer learning task, individually. When each subject arrived, it was explained that he would play a key pressing game for points and poker chips which he would redeem for money at the end of the experiment. The experimenter indicated that she would award a bonus amount of money to

the subject at the end of the experiment if he surpassed the average score of a group of undergraduates who played the game the previous semester. This mild dissimulation was included to heighten interest in the task.

Subjects completed informed consent forms and practiced each of the computer keys ("1," "2," "3," "4," and "5") to be used in the task, and were told that they could withdraw from the experiment at any time by pressing the "S" key. They were allowed to ask questions both before and after completing the task.

The learning task was composed of an acquisition phase and an extinction phase for all subjects. The acquisition phase comprised 25 trials of the crucial response, arbitrarily defined as the third response the subject made after the game began. Subjects in the continuous reinforcement condition were rewarded with 50 points and a poker chip each time they made the crucial response. Subjects in the partial reinforcement condition were rewarded for 75 percent of the crucial responses; the remaining 25 percent resulted in non-reward. Subjects in the partial helplessness condition were rewarded for 75 percent of the crucial responses; 25 percent of the crucial responses were punished by loss of points and a token. The sequence of reinforcement/non-reinforcement for the partial reinforcement condition was determined randomly. The sequence of reinforcement/punishment for the partial helplessness condition was identical to the sequence of

reinforcement/nonreinforcement used in the partial reinforcement condition.

Following completion of the task, subjects were given money (either \$1.75, \$2.00, or \$2.25, depending on the experimental condition to which they were assigned) and a slip of paper listing the times and place for debriefing sessions. They were reminded of the two subject types described in the recruitment, and were asked which type was more descriptive of them. Subjects who came to the debriefing sessions were interviewed about their perceptions of the experiment.

Results and Discussion

Extinction data from 32 subjects were subjected to a 2 x 3 x 2 factorial multivariate analysis of variance (MANOVA, Barker & Barker, 1984). Three subjects were eliminated from the analysis because of failure to reach acquisition.

There was a significant main effect for extinction condition, Wilks's Lambda (3,19)=.505, $F(1,21)=6.22$, $p=.004$. Following the Hummel and Sligo (1971) approach, univariate analyses were examined within this main effect. There was a significant difference between the two extinction groups for global persistence during extinction, $t(21)=2.42$, $p=.023$. The mean number of total extinction responses was significantly greater for the simple extinction group (88.11) than for the continuous punishment group (55.58). The difference between extinction groups was also significant for crucial response perseveration, $t(21)=2.56$,

$p=.017$. The ratio of crucial responses to total extinction responses was significantly greater in the simple extinction group ($M=.327$) than in the continuous punishment group ($M=.187$). There was no significant difference between groups for the third dependent variable.

No other main effects or interactions in the MANOVA were significant.

The point biserial correlation between subjects' Pd score and self-assignment to either the "adventurous" or "cautious" group was $-.105$, suggesting that the differentiation of groups based on MMPI Pd score was not particularly useful in this experiment.

Because 50 percent of the subjects went to the maximum number of total extinction trials (100), this maximum was raised to 250 for the second pilot. In addition, to increase the salience of the subject's option to end the game at any time, it was decided to add a sample trial to allow him to practice the key he would use to exit the game. In addition, a low tone was added, activated only when this key was selected. The exit key was changed from "S" to the zero key, based on reasoning that a subject would be less likely to hit the zero key accidentally since it was on the opposite side of the keyboard from the keys to be used in playing the game. It was also decided that the experimenter would not award chips to the subjects during the second pilot, to reduce possible experimenter bias.

Interviews with subjects who came to the debriefing sessions indicated that the money manipulation was ineffective, with many subjects suspecting deception. Thus it was decided to place money in sight of the subjects in the second pilot.

All three subjects who failed to reach acquisition were in the partial helplessness condition and ended the task after executing five crucial responses. The reward sequence for the first five crucial responses was R, P, R, P, R, apparently somewhat predictable. Thus it was decided to generate another random sequence for delivery of reinforcement and punishment in the partial helplessness condition, and to add to the task a pretraining phase of five continuously reinforced responses for all subjects.

Ethical considerations. Because of the possibility that some subjects' MMPI profiles might indicate psychopathology, it was decided, in conjunction with the Institutional Review Board for Human Rights, to mail a followup letter to subjects with a Pd score more than three standard deviations above the adolescent norm (T score of 90). No subjects met this requirement.

Appendix K

Pilot Study 2

Purpose

The primary purpose of the second pilot project was to further refine the procedure and learning apparatus. The dependent variables were those used in the first pilot. It was decided not to classify subjects according to MMPI Pd scale score, as this procedure was not useful in the first study; with this exception, the independent variables were the same across the two studies.

Based on the results of the first pilot, a main effect for extinction schedule was predicted for two dependent variables, specifically, subjects in the simple extinction condition would show more global persistence and crucial response perseveration than would subjects in the continuously punished extinction condition. It was also predicted that subjects in the partial reinforcement/extinction condition would exhibit more global persistence and perseveration of the crucial response than would those in the continuous reinforcement/extinction condition.

Method

Subjects. Undergraduate males who volunteered for the experiment received one bonus point added to their final grade in introductory psychology.

Design. The second pilot study employed 3 x 2 factorial design, with three learning schedules and two extinction schedules. Fifty-two subjects were randomly assigned to the six experimental conditions.

Procedure. Subjects completed the pre-programmed computer learning task individually. When each subject arrived, it was explained that he would play a key pressing game for points redeemable for money at the end of the experiment. Fifty dollars in quarters were stacked next to the computer. The experimenter indicated that she would award a bonus amount of money to the subject if he could surpass the average score of a group of undergraduates who had played the game the previous semester.

Subjects completed informed consent forms and were told that they could withdraw from the experiment at any time by pressing the zero key. In six sample trials, subjects practiced each of the five computer keys to be used in the task and also the zero key. They were allowed to ask questions both before and after completing the task.

The learning task was identical to that used in Pilot Study 1 except for the following changes: (a) the number of maximum extinction trials was increased from 100 to 250, (b) a pretraining phase of five continuously reinforced crucial responses was added prior to the acquisition phase for all subjects, (c) another random, and less predictable, sequence was generated for delivery of reward/non-reward and reward/punishment in the partial reinforcement and partial helplessness conditions, respectively, (d) instead of awarding chips to the subjects, the experimenter retired to the back of the room while each subject played the game, and (e) an additional sample trial was added to allow the

subject to practice the key used to exit the game. This key was changed from "S" to the zero key, and a low tone sounded each time the subject pressed this key.

Following completion of the task, subjects were given money in accordance with their point total at the end of the task. The highest amount won was \$2.25 and the lowest \$.50. They were also given a slip of paper listing the times and place for debriefing sessions. Subjects then filled out a post-experiment questionnaire anonymously. One-half were also briefly interviewed to establish manipulation checks and examine response sets.

Results and Discussion

Extinction data from 47 subjects were subjected to a 3 x 2 factorial MANOVA (Barker & Barker, 1984). Data from five subjects were eliminated: One subject failed to follow instructions while the other four did not reach acquisition. Two of these subjects had been in partial reinforcement groups and three in continuous reinforcement.

The generalized Bartlett Test of homogeneity of the MANOVA dispersion matrices was significant, $df=30$, $p=.008$, and the Box Test approached significance, $df=30$, 3707, $p=.07$. This indicated a lack of homogeneity of dispersion matrices, resulting in a conservative MANOVA test. The partial helplessness/punishment condition was characterized by an extreme outlier matrix.

None of the main effects or interactions reached significance. Thus the prediction that subjects would be

differentially affected by the two extinction conditions was not supported. In view of the pilot nature of the study, a one-tailed t -test was computed to test the a priori hypothesis that subjects in the partial reinforcement group would show greater global persistence during simple extinction than would those in continuous reinforcement. The difference between groups was marginally significant, $t(13)=1.38$, $p<.10$.

A 3 x 2 analysis of variance (ANOVA) was computed to determine if there were significant differences between groups in number of trials to acquisition. There was a significant effect of reinforcement condition on this variable, $F(2,41)=10.76$, $p<.001$. Protected t tests between individual cells revealed that the only significant difference was between the continuous reinforcement group ($M=30.65$) and the partial helplessness group ($M=46.19$). This difference is not unexpected in view of the complex nature of the reward sequence in the partial helplessness condition.

The marginally significant difference in global persistence between the continuous reinforcement/extinction group and the partial reinforcement/extinction group indicates that the learning task is sensitive enough to find differences between learning schedule conditions. However, other potentially significant main effects or interactions appear to have been obscured by large within-cell error terms. Data from the post-experiment questionnaire and

interviews indicated several reasons for this large intracell variability.

Many subjects continued to believe they were deceived about the money. Also, many subjects said they persisted in the game because they thought the trial number on the computer screen was somehow predictive of later winnings, e.g., one subject said he noticed he began to lose points at trial 80 but assumed he would begin winning points again at trial 160. In addition, many said they stayed in the game to search for a correct sequence, or pattern, of numbers. One-third of the subjects said they thought the game was boring.

On the basis of input from subjects, it was decided to remove the trial number from the computer screen.

Appendix L

Pilot Study 3

Purpose

The primary purpose of the third pilot project was to further refine the procedure and learning apparatus. The dependent variables were those used in the prior pilots. The independent variables were those employed in the second pilot.

Based on the results of the first pilot, a main effect for extinction schedule was predicted for two dependent variables; compared to subjects in the continuously punished extinction condition, subjects undergoing simple extinction were expected to show more global persistence and crucial response perseveration. It was also predicted that subjects in the partial reinforcement/extinction condition would exhibit more global persistence than those in the continuous reinforcement/extinction condition. Based on the results of the second pilot, it was expected that subjects in the partial helplessness condition would demonstrate a greater number of trials to acquisition than would those in the continuous reinforcement condition.

Method

Subjects. Undergraduate males who volunteered for the experiment received one bonus point added to their final grade in introductory psychology.

Design. The third pilot study employed a 3 x 2 factorial design, with three learning schedules and two extinction schedules. Thirty-seven subjects were randomly assigned to the six experimental conditions.

Procedure. Subjects completed the pre-programmed learning task individually. When each subject arrived, it was explained that he would play a key pressing game for points redeemable for money at the end of the experiment. Fifty dollars in quarters were stacked next to the computer. The experimenter indicated that she would award a bonus amount of money to the subject if he could surpass the average score of a group of undergraduates who had played the game the previous semester.

Subjects were told that they could withdraw from the task at any time by pressing the zero key. Subjects completed six sample trials in which they practiced each of the five computer keys to be used in the task and also the zero key. They completed informed consent forms and were allowed to ask questions both before and after participation in the task.

The learning task was identical to that used in Pilot Study 2, with one exception: the trial number was removed from the computer screen.

Following completion of the task, subjects were given monetary reinforcement, the amount depending directly upon their point total at the end of the task. Rewards ranged from \$.50 to \$2.25. They were also given information noting the times and place for debriefing sessions, and they then completed the post-experiment questionnaire anonymously.

Results and Discussion

Extinction data from 30 subjects were entered into a 3 x 2 factorial MANOVA (Barker & Barker, 1984). Data from seven subjects were eliminated: four subjects failed to reach acquisition, two hit the break key and stated that their exit from the task was accidental, and the data for one subject was lost due to experimenter error. Three of these subjects were in continuous reinforcement groups, one was in partial reinforcement, and three were in partial helplessness.

There was a significant main effect for extinction condition, Wilks's Lambda (3,22)=.679, $F(1,24)=3.47$, $p=.033$. Following the Hummel and Sligo (1971) approach, univariate analyses were examined within this main effect. There was a significant difference between the two extinction groups for global persistence during extinction, $t(24)=2.61$, $p=.015$. The mean number of total extinction responses was significantly greater for the simple extinction group (73.87) than for the continuous punishment group (26.07). The difference between extinction groups was also significant for crucial response perseveration, $t(24)=2.19$, $p=.036$. The ratio of crucial responses to total extinction responses was significantly greater in the simple extinction group ($M=.327$) than in the continuous punishment group ($M=.243$). No significant difference was detected between groups for the third dependent variable.

Neither the interaction nor the other main effect was significant, according to the results of the MANOVA. However, a 3 x 2 analysis of variance produced a significant main effect for reinforcement condition on crucial response perseveration, $F(2,24)=3.59$, $p=.042$. Protected t tests between individual cells revealed only one significant difference: the mean ratio of crucial responses to total extinction responses was significantly greater in the partial helplessness condition (.343) than in the continuous reinforcement condition (.218), $t(24)=2.66$, $p<.02$.

A 3 x 2 analysis of variance was computed in an attempt to replicate the finding of Pilot Study 2 that a greater number of trials to acquisition was found in the partial helplessness group when compared to the continuous reinforcement group. Results were nonsignificant.

As in Pilot Study 2, a one-tailed t -test was computed to test the a priori hypothesis that subjects in the partial reinforcement group would show greater global persistence during simple extinction than would those in continuous reinforcement. The difference between groups was marginally significant, $t(8)=1.69$, $p<.10$.

Examination of responses to the post-experiment questionnaire by subjects who completed the learning task revealed the following: Placing money on the table next to the computer enhanced the believability of the money manipulation for subjects in this third pilot. Twenty-three subjects indicated that they believed they would win money

at the end of the task, and seven said they did not. (It is noted that this pilot project was conducted relatively early in the Spring, 1986, semester, before the undergraduates would have acquired much experience with or knowledge about deception in psychology experiments.) Twenty-three subjects stated that they attempted to surpass the average score of students who already played the game, indicating the effectiveness of this mild deception across the majority of subjects. Fourteen of 30 subjects indicated that the computer task or some part of it was boring. Responses of 10 subjects indicated that they were searching for a correct sequence, or pattern, of numbers, rather than focusing on just one key for reinforcement. Of the seven subjects whose data were eliminated, five believed the money manipulation, three indicated that the mild deception influenced their behavior, three judged the computer task as boring, and three searched for a winning sequence of numbers.

Based on the feedback from subjects in the third and prior pilots, the learning task was altered in the following ways: To reduce monotony, the computer keys to be used for the task were changed from numbered to colored. In addition, flashing numbers were presented on the screen for approximately three seconds during each trial, and subjects were instructed that while the numbers flashed, the computer assigned either a winning or losing number combination to each of the colored keys. To perhaps reduce the possibility of subjects searching for a sequence of numbers, the key

choices were reduced from five to four. The exit key was changed from the 0 key, which was relatively close to the break key, to the slash/question mark key at the bottom of the keyboard. To increase the believability of the money manipulation, the procedure was altered so that the subjects would be given a small amount of money at the conclusion of the pretraining trials.

Appendix M

Pilot Study 4

Purpose

The primary purpose of the fourth pilot project was to further refine the learning task and procedure. In addition, the study was designed to assess whether male college students, assigned to high psychopathy and low psychopathy groups according to their scores on the Socialization (So) scale from the California Psychological Inventory (Gough, 1957), would perform differently in the computer task. This scale has been used by a number of researchers to discriminate levels of psychopathy among subjects (Gough, 1965; Hare et al, 1978; Jaffee & Polansky, 1962; Peterson et al., 1959; Widom, 1974; Widom & Newman, 1985).

The independent and dependent variables for the present pilot study were those used in the first pilot. Based on the results of the first and third pilot, a main effect of extinction schedule was predicted for the dependent variables of global persistence and crucial response perseveration. Based on the results of the third pilot, subjects in the partial helplessness condition were expected to demonstrate greater crucial response perseveration than those in the continuous reinforcement condition.

Method

Subjects. Undergraduate males who volunteered for the experiment received one and one half bonus points to be added to their final grade in introductory psychology. All subjects completed the So scale (Gough, 1957), which

includes 54 items designed to measure "social maturity, integrity, and rectitude" (Gough, 1960). The items are scored true or false, with total scores having a possible range of 0 to 54. Higher scores reflect greater socialization, while lower scores reflect increasing amounts of psychopathy.

Sixty-two subjects completed the So scale. The range of scores was 21 to 45. The mean So scale score for this sample was 34.69, with a standard deviation of 5.73. These figures are similar to those reported by Gough (1960), who administered the So scale to 1,745 college males and obtained a mean of 37.41 and standard deviation of 5.28.

Subjects were assigned to psychopathy groups according to the relationship of their individual So score to the mean obtained for this sample. Twenty-eight subjects who obtained the mean score (rounded to the nearest integer) of 35 or below were classified as high psychopathy subjects. Twenty-three subjects obtained scores 36 and above and were classified as low psychopathy subjects.

Design. The present pilot project employed a 2 x 3 x 2 factorial design, with two levels of psychopathy (high vs. low), three reinforcement conditions (continuous reinforcement vs. partial reinforcement vs. partial helplessness), and two extinction schedules (simple extinction vs. continuous punishment). Fifty-one of the original 62 subjects participated in the learning task in the second phase.

Procedure. Subjects completed the So scale prior to participating in the computer task. Thirty-three of the subjects completed the So scale at the conclusion of a psychology class, and then were scheduled to complete the learning task at a later date. Twenty-nine completed both the So scale and the computer task during a single appointment with the researcher.

The learning task employed in the present pilot included the pretraining, training, and extinction phases common to the tasks in the second and third pilots. The structure of the task, however, was altered somewhat, as explained in the description of the third pilot.

The apparatus consisted of a Radio Shack color computer and television monitor. Only eight keys on the computer keyboard were visible; the remaining keys were covered with cardboard. Colored construction paper was taped over the tops of four of the exposed keys at the top of the keyboard, which were red, green, blue, and yellow, respectively. Subjects used the four colored keys to make responses on each trial of the learning task. Two other exposed keys were the "F" key, which subjects used to move forward to each successive trial, and the slash/question mark key, which they used to exit the task. The "Y" and "N" keys were also visible, and were used by subjects to indicate whether they wished additional practice trials after an initial set.

The onset of each trial was signalled by information printed on the computer screen, which also pictured small

colored squares corresponding to the primary keys used in the task. Above these squares the screen depicted a row of five zeroes spaced approximately one and one half inches apart. At onset of the first trial, the zeroes at each of the five positions were replaced by a randomly generated sequence of numbers, with each number in the sequence presented for a duration of .3 second. The randomly generated sequence was presented for three seconds and was then replaced by the original zeroes. At that point, the subject chose one of the four colored keys, and the zeroes were replaced by one stationary number at each of the five pictured positions.

Subjects won or lost points in the task according to the redundancy or non-redundancy of the five stationary numbers that appeared after their selection of a colored key. The computer was programmed so that only one of the four keys resulted in a "winning" combination of stationary numbers, and, for each trial, points were accumulated in accordance with the reinforcement condition to which the subject was assigned. Each time the subject made a crucial response during pretraining and acquisition, a tone sounded and "WIN" was displayed on the screen. Crucial responses during extinction were followed by "SAME" or "LOSE" messages and no tone, depending upon the specific extinction condition. All non-crucial responses met a "SAME" message. A running point total was displayed on the screen at the end of each trial.

Intertrial interval was three seconds throughout the task. The length of each trial varied, depending upon individual response times.

When each subject began the learning task, it was explained that he would play a key pressing game for points redeemable for money at the end of the experiment. Fifty dollars in quarters were stacked next to the computer. The experimenter indicated that she would award a bonus amount of money to the subject if he could surpass the average score of a group of undergraduates who had played the game the previous semester.

Each subject completed an informed consent form and was told that he could withdraw from the task at any time by pressing the slash/question mark key. He then practiced the four colored keys and the slash/question mark key in five sample trials. Pretraining followed, in which the crucial response was reinforced five consecutive times. Each subject was then given \$.50 for the points he had earned during pretraining, and was told that amount was his to keep regardless of his score at the conclusion of the task. The experimenter then retired to the back of the room and read while the subject completed the task.

Following exit from the task, subjects were given additional monetary reinforcement, depending upon their final score in the task. The additional monetary awards ranged from 0, for subjects whose score were exceptionally low, to \$2.50. All subjects were allowed to keep the

original \$.50, and were given information noting the times and place for debriefing sessions. Subjects then completed the post-experiment questionnaire.

Results and Discussion

Extinction data from 51 subjects were subjected to a 2 x 3 x 2 factorial MANOVA (SAS Institute, Inc., 1985). Three of the original subjects were eliminated because they did not appear for research appointments to complete the learning task. Eight additional subjects were eliminated: five failed to reach acquisition, one failed to follow instructions, one chose to leave during the practice trials of the task, and one correctly guessed at the conclusion of the task that he had undergone partial reinforcement training. Of these eight, three were in continuous reinforcement groups, one was in partial reinforcement, and four were in partial helplessness. Of the 11 total subjects eliminated, eight were classified as high psychopathy subjects according to So scale score, and three were low psychopathy subjects.

There was a significant main effect for extinction condition, Wilks's Lambda=.665, $F(3,37)=6.22$, $p=.0016$. Following the Hummel and Sligo (1971) approach, univariate analyses were examined within this main effect. There was a significant difference between the two extinction groups for crucial response perseveration, $t(39)=4.35$, $p=.0001$. The ratio of crucial responses to total extinction responses was significantly greater in the simple extinction group

($M=.375$) than in the continuous punishment group ($M=.219$). There was no significant difference between extinction groups for the other two dependent variables.

No other main effects or interactions in the MANOVA were significant. However, a $2 \times 3 \times 2$ analysis of variance, with global persistence during extinction as the dependent variable, produced a significant interaction effect for psychopathy level by reinforcement condition, $F(2,39)=3.71$, $p=.0334$. Protected t tests between individual means revealed that the interaction effect was produced by significant differences between the low psychopathy/continuous reinforcement group and all other groups. The mean for the low psychopathy/continuous reinforcement group (141.63) was greater than the means for all other cells, indicating that the subjects in this group demonstrated greater global persistence during extinction than did subjects in all other groups. The differences among means of other cells were nonsignificant. It should be noted that the MANOVA for this interaction approached statistical significance, Wilks's Lambda=.751, $F(6,74)=1.9$, $p=.0926$.

Examination of a correlation matrix revealed nonsignificant correlation coefficients between the three dependent variables.

A $2 \times 3 \times 2$ analysis of variance was computed to determine if there were significant differences between groups in number of trials to acquisition. There was a

ABSTRACT OF DISSERTATION

The University of Alabama Graduate School

Degree Doctor of Philosophy Major Subject Psychology

Name of Candidate Tucker Dunlap Johnson

Title of Dissertation Partial Helplessness Conditioning
as a Possible Etiological Factor in Psychopathy

Dennis Doren's (1987) theory proposes that inconsistent discipline during childhood is one of the factors necessary for the development of psychopathic personality disturbance. Inconsistent discipline is presumed to comprise a peculiar learning process labelled partial helplessness conditioning, in which the same behaviors by the child are unpredictably reinforced on some occasions and punished on others. The behavioral sequelae are thought to be an increased tendency to persist in responding until goal attainment and a diminished concern for negative consequences. The present study was designed to test these and other assumptions of Doren's theory.

Sixty male prisoners were assigned to groups using Hare's (1985) Psychopathy Checklist. All completed a computerized learning task with pretraining, acquisition, and punished extinction phases, involving point accumulation and food incentives as reward. Equal thirds were randomly assigned to continuous reinforcement, partial reinforcement, and partial helplessness training, during which a single crucial response was reinforced according to the parameters of the specific learning condition. The following dependent

significant main effect for reinforcement condition on this variable, $F(2,39)=15.42$, $p=.0001$. Protected t tests between individual cells, with an alpha level of .05, revealed that the partial helplessness mean (48.0) was significantly greater than the partial reinforcement mean (36.67), which was significantly greater than the continuous reinforcement mean (28.44). These differences are not unexpected in view of the increasingly complex nature of the reward sequences across reinforcement groups.

Subjects' responses on the post-experiment questionnaire indicated that the alterations in the learning task and procedure from the third to fourth pilot study generally decreased monotony and increased believability of the money manipulation.

Appendix N

Raw Data for the Dissertation Research

Coding for Raw Data:
Psychopathy Checklist (PCL, Hare, 1985b) Item Scores

Column	Data
1	Psychopathy level 1=Low psychopathy, 2=High psychopathy
2	Reinforcement condition 1=Continuous reinforcement, 2=Partial reinforcement, 3=Partial helplessness
Scores for First Judge	
3	Glibness, Superficial Charm
4	Grandiose Sense of Self-Worth
5	Need for Stimulation/Proneness to Boredom
6	Pathological Lying
7	Conning/Manipulative
8	Lack of Remorse or Guilt
9	Shallow Affect
10	Callous/Lack of Empathy
11	Parasitic Lifestyle
12	Poor Behavioral Controls
13	Promiscuous Sexual Behavior
14	Early Behavior Problems
15	Lack of Realistic Long-Term Plans
16	Impulsivity
17	Irresponsibility
18	Failure to Accept Responsibility for Own Actions
19	Many Short-Term Marital Relationships
20	Juvenile Delinquency
21	Revocation of Conditional Release
22	Criminal Versatility
23	Total PCL score
Scores for Second Judge	
24	Glibness/Superficial Charm
25	Grandiose Sense of Self-Worth
26	Need for Stimulation/Proneness to Boredom
27	Pathological Lying
28	Conning/Manipulative
29	Lack of Remorse or Guilt
30	Shallow Affect
31	Callous/Lack of Empathy
32	Parasitic Lifestyle
33	Poor Behavioral Controls
34	Promiscuous Sexual Behavior
35	Early Behavior Problems
36	Lack of Realistic Long-Term Plans
37	Impulsivity
38	Irresponsibility
39	Failure to Accept Responsibility for Own Actions
40	Many Short-Term Marital Relationships
41	Juvenile Delinquency
42	Revocation of Conditional Release
43	Criminal Versatility
44	Total PCL score

45 Subject's research number

Note. * indicates missing data.
 Raw data follows coding information.

1 1 1 0 2 1 1 2 2 2 1 2 1 0 1 2 * 0 * 0 0 0 20.00 2 0 2 0 1 0 1 0 1 2 2 0 1 1 *
0 0 2 * 0 16.67 012
1 1 1 0 0 0 0 0 1 1 1 1 0 * 0 0 0 0 0 0 2 0 7.37 2 0 2 0 0 2 0 0 1 1 0 0 0 0 0
2 0 0 2 0 12.00 036
1 1 0 0 1 0 0 0 0 0 0 0 0 * 0 0 1 0 0 1 * 1 4.44 0 0 1 0 0 0 0 0 0 2 1 0 0 0 1
1 0 1 0 1 8.00 038
1 1 1 0 1 2 1 0 1 1 * 2 0 0 0 1 * 1 * 0 * 0 13.75 0 0 1 0 0 0 0 2 0 2 0 0 0 1 *
0 * 0 * 0 7.06 041
1 1 2 1 2 1 0 2 2 1 1 1 0 0 1 2 1 2 1 0 1 2 23.00 2 0 2 0 0 2 0 0 1 0 0 0 1 2 2
1 2 0 1 1 17.00 046
1 1 1 2 0 0 0 0 0 0 0 0 * 0 0 0 0 0 0 * 0 4.44 1 1 2 0 0 1 0 1 1 0 0 0 0 0 0
0 0 0 0 7.00 075
1 1 1 0 1 0 0 0 1 1 1 2 1 * 1 0 * 1 * 0 * 0 12.50 0 2 1 1 0 2 2 0 1 2 0 2 1 0 0
2 * 0 0 0 16.84 060
1 1 1 1 1 1 0 2 * 0 0 * 1 0 1 * * 2 0 0 * 0 13.33 0 2 1 0 0 2 0 0 0 0 2 0 2 2 0
2 * 1 * 0 15.56 079
1 1 1 2 1 2 1 1 * * 0 1 2 * 1 0 1 1 2 * * 1 22.67 0 1 1 1 0 1 1 1 0 2 2 * 0 1 2
1 2 * 0 1 18.89 077
1 1 1 1 1 1 0 1 1 0 1 0 2 * 1 0 * 2 0 0 * 0 14.12 0 0 0 2 0 2 0 1 0 * 2 * 1 0 1
2 0 0 0 0 12.22 097
1 2 1 0 1 0 1 1 0 1 0 1 1 * 0 0 1 1 0 0 0 0 9.47 2 1 1 0 0 2 0 2 0 2 0 2 0 0 2
2 0 0 0 1 17.00 015
1 2 0 0 1 1 1 1 1 2 2 2 1 * 0 1 1 0 * 1 1 1 18.89 0 0 1 0 1 1 2 2 0 2 2 2 0 2 2
1 * 2 * 1 23.33 021
1 2 0 0 0 1 0 0 0 0 1 0 0 0 1 0 0 0 0 0 * 0 3.16 1 0 0 0 0 0 1 0 0 0 0 0 0 0 0
1 0 0 * 0 3.16 011
1 2 0 0 0 1 0 1 0 0 1 0 0 * 1 0 1 1 0 0 * 0 6.67 0 0 0 0 0 1 0 1 1 0 0 0 0 0 0
1 1 0 * 0 5.26 031
1 2 1 0 2 2 1 1 1 1 1 0 1 0 2 1 * 1 0 0 * 0 16.67 0 0 2 1 0 1 2 1 1 1 2 * 2 2 0
1 0 0 * 0 17.78 049
1 2 0 0 1 0 0 2 0 1 1 1 0 * 2 0 0 0 0 0 * 0 8.89 0 2 2 0 0 2 1 0 1 1 0 2 2 1 0
0 0 1 0 0 15.00 056
1 2 1 0 1 0 0 2 1 0 0 0 0 0 2 0 * 1 0 0 * 0 8.89 0 0 1 0 0 1 0 0 0 0 0 * 2 0 0
1 0 * 0 0 5.56 081
1 2 0 1 1 1 1 0 1 2 0 1 1 0 1 1 * 0 0 0 * 1 13.33 0 1 2 0 2 2 2 1 1 1 2 * 1 2 2
2 1 * 0 1 25.56 092
1 2 1 2 1 1 * 1 0 0 0 0 1 0 0 1 1 1 2 0 2 0 14.74 0 1 2 0 1 2 2 1 0 * 2 * 1 2 2
2 2 * 2 1 27.06 083
1 2 0 0 1 1 0 2 1 0 1 0 2 0 1 1 1 1 0 0 2 1 15.00 0 0 2 0 1 2 0 0 0 0 2 0 0 2 0
2 1 0 1 1 14.00 090
1 3 1 1 2 1 1 1 1 1 1 1 1 0 2 1 2 0 0 0 2 1 20.00 1 2 1 1 0 0 0 0 0 1 1 1 2 1 1
0 0 0 2 1 15.00 001
1 3 2 2 2 1 2 2 2 1 1 1 2 0 2 2 0 2 0 0 0 1 25.00 2 0 1 0 0 1 0 0 0 1 2 0 1 1 0
0 0 0 1 1 11.00 027
1 3 2 0 1 0 1 0 1 0 0 0 1 * 1 0 0 0 0 0 0 0 7.37 2 0 2 * 2 1 2 1 1 2 2 0 1 2 0
2 2 0 * 0 24.44 069
1 3 1 1 1 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 * 0 4.21 2 2 1 0 0 0 0 0 0 0 0 2 1 1 0
0 0 0 * 0 9.47 044
1 3 1 0 1 1 0 0 1 0 0 0 0 0 1 1 0 1 0 0 1 0 8.00 2 0 1 1 0 2 0 1 0 0 0 0 2 1 0
2 0 0 * 0 12.63 066
1 3 1 1 2 1 1 0 1 1 0 1 1 0 2 1 * 1 1 0 1 0 16.84 0 0 2 1 0 0 1 1 0 0 1 * 2 1 1
1 1 * 1 1 15.56 071
1 3 0 0 1 * 0 1 * 0 1 0 0 1 1 1 * 1 0 0 * 0 8.75 0 1 2 0 1 2 1 1 2 0 2 1 2 1 1
2 1 * 0 0 21.05 080
1 3 1 0 2 2 * 2 2 0 1 0 1 * 1 * * 2 1 0 2 1 22.50 0 0 2 0 0 1 1 1 2 0 1 * 2 1 2
2 1 * 2 0 20.00 076
1 3 2 1 1 1 1 1 * * 2 0 0 0 2 0 1 2 0 0 * 0 16.47 2 0 2 1 1 2 1 1 2 * 1 * 2 0 2
2 1 * * 0 25.00 022
1 3 2 2 0 2 2 2 1 1 1 0 0 * 0 0 1 2 0 0 2 0 18.95 2 2 0 2 2 2 2 2 0 * 0 * 2 0 2
2 0 0 2 0 24.44 107

2 1 2 2 2 2 2 2 2 2 2 0 2 0 2 2 2 2 2 1 2 2 2 35.00 1 2 2 2 2 2 2 2 2 0 2 0 2 2 1
 2 * 2 2 2 33.68 028
 2 1 2 2 1 2 2 2 2 2 0 2 1 0 1 0 2 2 0 0 0 0 23.00 1 2 1 2 2 2 2 2 0 0 2 0 * 0 1
 2 0 0 * 1 22.22 035
 2 1 2 1 2 2 2 2 2 1 1 0 0 * 2 2 2 1 0 1 2 1 27.37 2 2 2 2 2 1 1 0 1 0 1 2 2 1 2
 1 * 1 2 1 27.37 059
 2 1 1 1 2 2 2 2 2 2 2 2 * * 1 1 2 2 * 1 * 1 32.50 0 0 2 1 0 1 2 2 1 2 2 2 1 2 *
 1 * 2 * 1 25.88 042
 2 1 2 2 2 1 2 2 2 2 1 1 2 * 2 2 1 1 0 0 2 0 28.42 2 2 2 2 2 2 2 2 1 1 2 0 2 2 2
 2 * 0 2 1 32.63 052
 2 1 2 2 2 2 2 2 2 1 1 1 0 * 2 2 2 2 0 1 2 2 31.58 2 2 2 2 2 2 2 2 1 1 1 * 2 2 2
 2 0 1 2 2 33.68 058
 2 1 2 2 2 2 2 2 2 1 1 2 2 1 2 2 2 2 * * 2 36.67 2 2 2 2 2 2 2 2 2 2 * 2 2 2
 2 1 * 2 2 38.89 067
 2 1 * 0 1 2 2 2 2 2 * 2 0 * 1 2 1 1 0 * 2 2 27.50 0 0 1 1 2 2 2 2 2 1 0 * 1 2 2
 2 0 * 2 2 26.67 086
 2 1 0 1 2 1 1 2 1 1 1 0 2 * 1 1 2 1 2 1 2 1 24.21 0 2 2 2 1 2 2 * 2 1 2 1 0 0 2
 2 2 1 2 1 28.42 084
 2 1 1 2 2 1 1 2 2 * 2 1 2 * 1 1 * 1 0 * * 0 25.33 0 1 2 1 1 1 2 2 2 * 2 * 1 2 0
 0 0 1 * 1 22.35 093
 2 2 1 1 2 2 2 2 1 1 1 1 0 * 2 2 2 0 0 0 2 1 24.21 2 2 2 2 2 2 2 2 1 * 2 2 2 2
 0 * 1 2 0 33.33 032
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 2 0 0 2 0 25.26 037
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 1 2 0 1 2 22.00 043
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 0 1 0 2 0 20.00 061
 2 2 2 2 2 2 2 2 1 1 1 2 2 * 2 2 2 1 0 0 2 2 31.58 2 2 2 1 2 2 0 2 0 2 2 0 2 1 2
 2 0 0 2 2 28.00 065
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 2 0 0 2 0 30.00 062
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 2 1 2 2 2 33.00 070
 2 2 * 2 2 2 2 2 2 * 1 * * 1 2 1 2 1 2 2 2 35.00 2 1 2 2 2 2 2 2 1 1 0 * 1 2 2
 2 2 2 2 2 33.68 094
 2 2 2 2 2 1 * 2 2 1 * 1 * 2 2 2 1 1 0 0 2 1 28.24 2 2 2 1 0 2 2 2 1 2 1 2 2 2 2
 2 2 * 2 1 33.68 100
 2 2 2 1 2 * * 1 1 1 2 0 * 2 * 1 2 2 2 2 2 31.25 2 2 2 2 2 2 2 2 1 2 1 * 2 1 2
 2 2 2 2 2 36.84 091
 2 3 1 2 2 1 0 2 2 1 2 1 1 1 2 2 1 2 0 0 * 0 24.21 2 1 2 0 0 1 1 0 1 1 2 2 2 1 1
 2 * 1 * 0 22.22 024
 2 3 2 2 2 1 1 2 1 2 1 2 1 0 2 2 2 2 0 1 * 1 28.42 2 2 2 2 2 1 2 2 1 2 2 0 2 2 2
 0 0 2 * 1 30.53 039
 2 3 2 0 2 2 2 1 2 1 1 1 0 2 1 2 2 0 0 * 1 24.21 2 1 2 2 2 2 2 2 0 0 2 0 2 0 2
 2 0 0 1 24.00 040
 2 3 2 2 2 2 1 2 1 2 1 1 1 0 2 2 2 2 1 2 2 1 31.00 2 2 2 2 0 2 2 2 1 2 2 2 1 2 2
 2 2 2 2 1 35.00 055
 2 3 2 2 2 2 2 2 2 1 2 2 * 2 2 2 1 2 2 2 2 37.89 2 2 2 2 2 2 1 2 1 2 1 * * 2 1
 2 2 2 2 2 35.56 047
 2 3 2 2 2 1 2 2 2 2 1 1 2 * 1 2 1 1 1 * 2 2 32.22 2 2 2 1 2 2 2 1 2 2 2 * 2 2 2
 1 * 2 2 2 36.67 064
 2 3 0 0 2 1 0 2 1 2 1 2 2 * 0 2 * 0 0 0 2 1 20.00 2 1 1 1 0 2 2 2 1 2 2 2 2 1
 2 * 0 2 0 28.42 063
 2 3 0 1 2 1 2 2 2 2 2 * 1 0 2 0 * 1 2 0 2 1 25.56 1 1 1 1 1 2 2 2 2 2 1 * 2 1 2
 2 0 * 2 1 28.89 073
 2 3 0 1 2 2 2 2 2 2 2 1 1 * 2 1 2 2 2 0 2 2 31.58 0 0 2 1 2 2 2 2 2 1 1 * 2 1 2
 2 2 * 2 1 30.00 085
 2 3 2 2 2 2 2 2 2 1 1 2 * 1 * 2 2 2 * 2 2 36.47 2 2 2 0 1 2 1 1 0 1 2 * 1 0 0
 2 2 * 0 2 23.33 088

Coding for Raw Data:
Demographic and Criminal Characteristics

Column	Data
1	Psychopathy level 1=Low psychopathy, 2= High psychopathy
2	Reinforcement condition 1=Continuous reinforcement, 2=Partial reinforcement, 3=Partial helplessness
3	Total Psychopathy Checklist score, averaged across both judges
4	Age of subject in years
5	Race of subject 1=White, 2=Black
6	Offense type 1=Theft, 2=Robbery/extortion, 3=Drug offenses, 4=Assault, 5=Murder, 6=Possession of weapons, 7=Sex offenses, 8=Criminal negligence, 9=Fraud, 10=Escape, 11=Kidnapping, 12=Arson, 13=Obstruction of justice, 14=Crimes against the state, 15=Minor charges, 16=Multiple Charges
7	Length of sentence in years
8	Amount of legal fine levied to subject in total dollars
9	Court of Jurisdiction by Federal Circuit 1=1st Circuit: Maine, Massachusetts, New Hampshire, Rhode Island, Puerto Rico; 2=2nd Circuit: Connecticut, New York, Vermont; 3=3rd Circuit: Delaware, New Jersey, Pennsylvania, Virgin Islands; 4=4th Circuit: North Carolina, South Carolina, Virginia, West Virginia, Maryland; 5=5th Circuit: Louisiana, Mississippi, Texas; 6=6th Circuit: Kentucky, Michigan, Ohio, Tennessee; 7=7th Circuit: Illinois, Indiana, Wisconsin; 8=8th Circuit: Arkansas, Iowa, Minnesota, Missouri, Nebraska, North Dakota, South Dakota; 9=9th Circuit: Alaska, Arizona, California, Guam, Hawaii, Idaho, Montana, Nevada, Northern Mariana Islands, Oregon, Washington; 10=10th Circuit: Colorado, Kansas, New Mexico, Oklahoma, Utah, Wyoming; 11=11th Circuit: Alabama, Florida, Georgia; 12=12th Circuit: District of Columbia; 13=Courts of jurisdiction from more than one circuit
10	Number of prior arrests
11	Number of prior convictions
12	Number of prior commitments
13	Age at first arrest

- 14 Veteran discharge status
1=Nonveteran, 2=Honorable, 3=Other than
honorable, 4=General, 5=Dishonorable, 6=Not
discharged
- 15 Marital status
1=Single, 2=Married, 3=Common law married,
4=Separated, 5=Divorced
- 16 Number of dependents
- 17 Legal plea for current offense
1=Not guilty, 2=Guilty or other
- 18 Height
- 19 Weight
- 20 Custody classification
1=Community, 2=Out, 3=In
- 21 Security level, values 1-4, with higher values
indicating greater security
- 22 Last educational grade completed
- 23 Subject's research number

Note. * indicates missing data.
Raw data follows coding information.

1	1	18.34	29	2	16	99	*	12	0	0	0	18	1	1	*	1	65	110	3	3	9	012
1	1	9.69	40	2	2	15	*	4	2	2	2	25	2	4	*	*	73	180	3	4	13	036
1	1	6.22	28	1	2	20	13933	4	6	5	0	16	1	2	1	*	71	145	2	1	12	038
1	1	10.41	25	2	5	30	*	5	1	1	0	19	6	1	0	1	64	125	3	4	12	041
1	1	20.00	30	1	3	10	5100	4	10	5	0	22	1	1	0	2	69	145	3	1	11	046
1	1	5.72	38	1	3	8	0	11	0	0	0	34	1	2	3	2	73	235	1	1	16	075
1	1	14.67	27	2	2	10	0	11	1	1	1	20	5	1	0	2	67	155	3	3	12	060
1	1	14.45	23	1	3	18	150	11	4	2	0	18	1	1	0	1	65	150	3	2	8	079
1	1	20.78	37	2	3	9	0	4	10	*	0	20	2	4	3	2	75	180	1	1	12	077
1	1	13.17	27	2	3	16	50	11	0	0	0	26	1	1	0	2	76	291	3	2	16	097
1	2	13.24	41	1	4	5	0	4	4	4	0	24	3	2	*	*	69	213	2	1	8	015
1	2	21.11	23	2	2	15	2717	4	4	2	0	14	1	1	0	2	69	147	3	3	11	021
1	2	3.16	37	1	16	35	150	13	0	0	0	36	2	2	2	*	72	170	3	3	12	011
1	2	5.97	38	1	3	45	0	4	1	1	0	31	1	4	3	2	73	195	3	3	14	031
1	2	17.23	29	1	2	25	250	4	0	0	0	25	1	1	1	2	70	160	3	3	9	049
1	2	11.95	24	2	2	4	1845	6	0	0	0	23	2	1	1	2	*	*	3	2	8	056
1	2	7.23	31	1	3	5	50	12	2	1	0	18	1	3	0	2	70	160	3	1	13	081
1	2	19.45	30	2	9	5	10101	4	4	4	1	27	1	2	1	2	74	185	3	1	9	092
1	2	20.90	24	1	2	15	100	4	1	1	1	21	1	1	0	2	70	155	3	3	12	083
1	2	14.50	32	1	3	11	50	4	8	8	1	23	1	1	0	2	71	180	3	1	10	090
1	3	17.50	25	2	2	15	50	4	3	3	0	18	2	1	*	*	70	175	3	3	11	001
1	3	18.00	29	1	2	20	0	6	2	2	1	21	1	1	*	2	74	262	*	3	9	027
1	3	15.91	37	1	3	5	7500	4	0	0	0	35	2	1	*	2	67	190	3	3	18	069
1	3	6.84	30	1	2	7	50	11	0	0	0	28	1	5	1	2	67	180	1	1	11	044
1	3	10.32	28	1	12	11	100	4	1	0	0	20	1	1	0	*	68	170	1	1	13	066
1	3	16.20	26	1	2	15	50	6	2	2	0	24	5	1	0	2	70	165	3	3	12	071
1	3	14.90	22	1	16	10	200	4	0	0	0	21	1	1	0	2	72	150	2	2	12	080
1	3	21.25	31	2	3	14	100	4	5	3	3	24	2	1	0	2	67	145	3	3	12	076
1	3	20.74	38	1	3	20	10000	4	2	2	0	19	1	5	0	2	76	193	3	2	12	022
1	3	21.70	37	1	9	5	50	4	3	2	0	32	1	4	2	2	71	195	2	1	16	107
2	1	34.34	26	1	1	10	50	9	12	6	3	18	1	1	*	2	71	140	3	3	13	028
2	1	22.61	33	2	16	9	0	12	4	3	3	19	*	5	*	2	69	165	3	4	9	035
2	1	27.37	29	1	9	5	50	11	24	*	0	20	2	1	0	2	74	*	2	1	12	059
2	1	29.19	24	1	16	8	0	9	*	*	*	1	1	0	2	64	118	3	4	9	042	
2	1	30.53	34	1	9	4	50	11	6	6	3	27	1	1	0	2	74	260	2	1	16	052
2	1	32.63	35	1	2	5	50	6	23	12	5	16	2	2	2	2	72	170	2	3	12	058
2	1	37.78	39	1	16	16	5150	4	25	17	9	20	3	4	1	2	73	232	3	3	12	067
2	1	27.09	32	2	9	3	0	4	5	5	2	21	1	5	0	2	73	255	3	3	7	086
2	1	26.32	26	1	3	9	100	4	11	4	3	19	2	1	0	2	73	160	3	2	11	084
2	1	23.84	20	1	2	20	5910	4	0	0	0	18	1	1	0	2	70	160	1	1	12	093
2	2	28.77	28	1	16	10	150	4	7	6	3	19	5	1	*	2	66	155	3	4	11	032
2	2	23.69	38	1	3	20	30000	11	0	0	0	*	1	3	1	*	71	140	3	3	13	037
2	2	23.63	35	1	3	12	100	4	16	4	0	19	3	2	2	2	72	183	2	1	12	043
2	2	22.50	36	1	16	14	24249	13	14	10	1	21	1	5	2	2	74	160	3	4	12	061
2	2	29.79	34	2	16	5	626	4	23	17	4	18	1	*	3	2	67	145	3	2	12	065
2	2	25.53	35	1	6	5	0	4	7	5	1	21	2	2	1	76	290	2	1	10	062	
2	2	32.61	23	1	2	9	50	11	*	*	*	*	*	1	0	2	66	150	3	3	10	070
2	2	34.34	31	1	16	10	50	13	11	7	7	16	2	4	0	2	70	140	3	2	8	094
2	2	30.96	29	1	2	15	50	11	6	3	1	18	3	2	2	2	72	185	3	3	12	100
2	2	34.05	36	2	6	4	50	4	10	6	2	17	1	4	3	1	73	182	3	2	10	091
2	3	23.22	22	2	2	10	31292	11	0	0	0	20	1	1	0	2	73	150	3	3	9	024
2	3	29.48	38	1	2	24	*	4	3	2	2	23	4	5	0	*	69	155	3	4	*	039
2	3	24.11	32	1	16	71	450	12	8	1	1	20	1	1	0	2	70	135	3	3	12	040
2	3	33.00	33	1	6	15	100	4	14	7	3	13	1	2	1	2	71	195	3	4	8	055
2	3	36.73	32	1	16	58	0	5	12	*	*	14	1	1	0	1	66	144	3	4	8	047
2	3	34.45	32	2	1	5	50	4	16	15	9	19	1	4	2	2	71	168	3	2	11	064
2	3	24.21	31	2	16	25	0	12	10	3	0	18	1	1	0	2	71	150	3	4	9	063
2	3	27.23	29	2	16	13	50	4	8	3	1	19	1	1	1	2	73	180	3	4	11	073
2	3	30.79	35	1	3	17	50	5	5	3	2	22	3	5	1	2	68	150	3	4	9	085
2	3	29.90	33	1	2	5	50	6	27	17	6	17	4	3	1	2	70	175	2	1	12	088

Coding for Raw Data:
SAT/ABLE Scores

Column	Data
1	Psychopathy level 1=Low psychopathy, 2=High psychopathy
2	Reinforcement condition 1=Continuous reinforcement, 2=Partial reinforcement, 3=Partial helplessness
3	SAT/ABLE Reading Comprehension
4	SAT/ABLE Vocabulary
5	SAT Mathematical Comprehension/ ABLE Problem Solving
6	SAT Mathematical Applications/ ABLE Number Operations
7	SAT Mathematical Concepts
8	SAT Language
9	SAT/ABLE Spelling
10	SAT Listening Comprehension
11	Average education score
12	Psychopathy Checklist total (averaged) score
13	Subject's research number

Note. * indicates missing data.
Raw data follows coding information.

1	1	12.9	12.9	9.5	9.3	10.5	10.4	12.9	8.1	10.8	18.34	012
1	1	12.9	12.9	8.6	8.3	9.4	10.6	10.8	11.6	10.6	9.69	036
1	1	12.9	12.9	9.4	12.9	12.4	12.9	12.9	12.9	12.4	6.22	038
1	1	12.9	10.2	8.1	9.9	12.1	7.1	12.9	11.4	10.6	10.41	041
1	1	12.9	11.6	8.1	12.9	10.5	8.9	12.9	8.1	10.7	20.00	046
1	1	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	5.72	075
1	1	11.2	8.5	12.9	9.9	8.5	8.4	8.7	12.9	10.1	14.67	060
1	1	12.9	12.9	11.1	12.9	12.9	7.9	12.9	12.9	12.1	14.45	079
1	1	12.9	12.9	11.1	12.9	12.9	7.9	12.9	12.9	12.1	20.78	077
1	1	12.9	10.1	11.5	9.9	*	*	8.6	*	10.6	13.17	097
1	2	11.2	12.9	8.1	8.7	12.1	8.5	9.8	10.1	10.2	13.24	015
1	2	10.6	8.5	8.6	10.6	8.7	9.7	8.3	12.9	9.7	21.11	021
1	2	12.9	12.9	12.9	12.9	12.9	9.7	12.9	11.4	12.3	3.16	011
1	2	11.6	12.9	12.0	12.0	12.0	12.9	10.2	8.8	11.6	5.97	031
1	2	12.9	12.9	8.1	12.3	9.4	7.8	12.9	10.8	10.9	17.23	049
1	2	12.9	12.9	11.1	12.9	9.0	12.3	12.9	8.8	11.6	11.95	056
1	2	12.9	12.9	10.5	12.9	*	*	12.9	*	11.7	7.23	081
1	2	11.2	8.5	10.2	10.6	8.0	11.2	10.4	8.8	9.9	19.45	092
1	2	12.9	12.9	10.2	12.9	12.1	12.9	7.4	12.9	11.8	20.90	083
1	2	10.1	9.2	12.9	10.6	12.1	12.3	8.0	8.2	10.4	14.50	090
1	3	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	17.50	001
1	3	12.9	12.9	11.1	12.9	12.9	12.9	12.9	12.9	12.7	18.00	027
1	3	12.9	12.9	12.9	12.9	11.7	12.0	12.9	12.9	12.6	15.91	069
1	3	12.9	12.9	7.6	11.6	7.2	9.7	12.9	6.9	10.2	6.84	044
1	3	12.9	12.9	10.2	12.3	11.7	6.6	7.7	8.5	10.4	10.32	066
1	3	12.9	12.9	9.5	12.9	8.5	12.9	8.7	8.1	10.8	16.20	071
1	3	12.9	12.9	12.9	12.9	10.5	10.4	10.7	12.9	12.0	14.90	080
1	3	12.4	9.0	12.9	10.3	10.3	11.2	6.3	8.1	10.1	21.25	076
1	3	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	20.74	022
1	3	13.0	13.0	12.5	13.0	*	*	13.0	*	12.9	21.70	107
2	1	12.9	12.9	12.9	12.9	12.9	10.2	10.4	*	12.2	34.34	028
2	1	9.4	7.3	8.8	7.8	*	6.4	11.7	*	8.6	22.61	035
2	1	12.9	12.9	8.1	10.3	8.2	12.9	12.9	12.9	11.4	27.37	059
2	1	12.9	9.2	11.1	11.6	12.9	10.8	8.7	9.4	10.8	29.19	042
2	1	12.9	12.9	12.9	12.9	12.9	12.9	12.9	11.4	12.7	30.53	052
2	1	13.0	13.0	13.0	13.0	13.0	12.0	13.0	13.0	12.9	32.63	058
2	1	10.0	11.6	10.2	9.1	8.2	12.3	9.2	12.6	10.4	37.78	067
2	1	12.9	8.6	10.5	8.5	*	*	8.5	*	9.8	27.09	086
2	1	12.9	10.8	12.9	12.9	*	*	12.9	*	12.5	26.32	084
2	1	12.9	12.9	12.4	12.9	12.9	9.7	11.7	12.9	12.3	23.84	093
2	2	12.9	12.9	12.9	12.9	12.9	11.1	12.9	12.9	12.7	28.77	032
2	2	12.9	12.9	12.1	9.3	11.7	12.3	12.9	12.9	12.1	23.69	037
2	2	7.8	9.2	7.0	8.3	8.6	8.5	9.8	7.4	8.3	23.63	043
2	2	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	22.50	061
2	2	11.2	9.4	8.3	8.5	*	*	12.9	*	10.1	29.79	065
2	2	12.9	12.9	12.9	10.6	12.9	12.9	12.9	7.4	11.9	25.53	062
2	2	8.2	11.6	9.7	9.3	8.1	9.0	9.2	8.8	9.2	32.61	070
2	2	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	34.34	094
2	2	12.9	12.9	9.5	10.6	12.1	10.4	12.9	8.8	11.3	30.96	100
2	2	12.1	8.5	10.2	8.3	9.1	8.5	12.9	10.1	10.0	34.05	091
2	3	12.1	9.2	6.5	7.9	6.7	11.2	7.4	13.0	9.3	23.22	024
2	3	12.9	12.9	12.4	12.9	9.7	12.9	12.9	12.9	12.4	29.48	039
2	3	12.9	11.2	8.5	9.6	8.5	7.3	12.9	8.5	9.9	24.11	040
2	3	9.5	9.0	12.9	11.1	8.7	9.5	12.7	6.0	9.9	33.00	055
2	3	12.9	12.9	12.9	12.9	10.1	12.9	12.9	12.9	12.6	36.73	047
2	3	12.9	10.5	12.9	12.9	12.9	9.7	12.9	12.9	12.2	34.45	064
2	3	8.7	*	6.7	6.7	7.0	7.0	6.3	*	7.1	24.21	063
2	3	10.0	9.0	10.2	8.0	9.4	10.2	8.5	8.0	9.2	27.23	073
2	3	12.9	12.9	9.0	11.6	9.0	9.0	8.7	12.9	10.8	30.79	085
2	3	12.9	12.9	12.1	11.6	12.9	12.9	8.5	12.9	12.1	29.90	088

Coding for Raw Data:
Three Dependent Variables

Column	Data
1	Psychopathy level 1=Low psychopathy, 2=High psychopathy
2	Reinforcement condition 1=Continuous reinforcement, 2=Partial reinforcement, 3=Partial helplessness
3	Total number of extinction trials
4	Ratio of number of crucial responses during extinction to total number of extinction trials
5	Standard deviation of the alternate responses during extinction
6	Subject's research number

Note. * indicates missing data.
Raw data follows coding information.

1	1	250	.304	2.466	012
1	1	20	.200	1.668	036
1	1	67	.104	2.503	038
1	1	105	.038	2.847	041
1	1	64	.094	2.483	046
1	1	37	.081	2.614	075
1	1	161	.075	2.233	060
1	1	250	.596	1.851	079
1	1	12	.167	1.414	077
1	1	42	.071	1.709	097
1	2	7	.429	1.915	015
1	2	214	.075	1.529	021
1	2	18	.389	1.662	011
1	2	57	.123	2.451	031
1	2	130	.092	2.607	049
1	2	31	.194	2.582	056
1	2	191	.346	1.610	081
1	2	89	.124	1.657	092
1	2	43	.209	2.614	083
1	2	95	.137	2.378	090
1	3	8	.625	1.155	001
1	3	69	.217	1.586	027
1	3	43	.209	1.643	069
1	3	174	.351	1.652	044
1	3	170	.318	2.469	066
1	3	34	.382	1.673	071
1	3	79	.152	2.365	080
1	3	32	.406	1.619	076
1	3	12	.500	2.733	022
1	3	101	.396	1.613	107
2	1	39	.128	2.347	028
2	1	43	.093	2.312	035
2	1	172	.564	2.574	059
2	1	31	.097	2.582	042
2	1	250	.412	2.457	052
2	1	109	.073	1.718	058
2	1	20	.200	1.544	067
2	1	175	.029	1.188	086
2	1	250	.044	2.478	084
2	1	34	.176	2.438	093
2	2	26	.115	2.746	032
2	2	41	.195	1.685	037
2	2	55	.164	2.384	043
2	2	250	.016	2.136	061
2	2	20	.400	1.732	065
2	2	24	.208	1.619	062
2	2	14	.214	1.572	070
2	2	88	.080	2.616	094
2	2	59	.424	2.133	100
2	2	52	.135	1.651	091
2	3	97	.113	2.272	024
2	3	250	.532	2.619	039
2	3	250	.192	2.431	040
2	3	32	.281	1.649	055
2	3	11	.364	2.795	047
2	3	212	.250	1.646	064
2	3	27	.370	2.657	063
2	3	250	.228	2.423	073
2	3	47	.298	2.582	085
2	3	62	.339	1.574	088

Coding for Raw Data:
Ad Hoc Experimental Variables

Column	Data
1	Psychopathy level 1=Low psychopathy, 2=High psychopathy
2	Reinforcement condition 1=Continuous reinforcement, 2=Partial reinforcement, 3=Partial helplessness
3	Number of crucial trials in extinction
4	Total number of trials in learning task
5	Number of pretraining trials
6	Number of training trials
7	Average time per trial in seconds
8	Number of minutes in learning task
9	Feedback at conclusion of learning task 1=lower than average, 2=average, 3=higher than average, 4=much higher than average
10	Final score in learning task
11	Psychopathy Checklist total score
12	Subjects's research number

Note. * indicates missing data.
Raw data follows coding information.

1	1	76	367	20	97	.668	25	1	0300	18.34	012
1	1	4	93	25	48	.798	5	3	1650	9.69	036
1	1	7	109	12	30	1.137	9	1	1200	6.22	038
1	1	4	158	20	33	.666	10	3	1650	10.41	041
1	1	6	98	9	25	1.065	6	2	1250	20.00	046
1	1	3	100	19	44	.135	6	3	1700	5.72	075
1	1	12	236	21	54	.410	15	1	0950	14.67	060
1	1	149	295	17	28	1.337	25	1	300	14.45	079
1	1	2	48	11	25	1.338	5	4	1750	20.78	077
1	1	3	81	11	28	.399	8	3	1700	13.17	097
1	2	3	49	10	32	.983	4	3	1400	13.24	015
1	2	16	255	12	29	1.408	25	1	450	21.11	021
1	2	7	60	10	32	.880	4	1	900	3.16	011
1	2	7	108	14	37	1.710	10	1	900	5.97	031
1	2	12	182	13	39	1.609	24	1	650	17.23	049
1	2	6	86	12	43	1.236	9	1	950	11.95	056
1	2	66	237	9	37	.983	19	1	300	7.23	081
1	2	11	132	8	35	2.452	17	1	700	19.45	092
1	2	9	76	7	26	1.155	4	1	800	20.90	083
1	2	13	147	7	45	.675	13	1	600	14.50	090
1	3	5	49	12	29	.918	10	3	1800	17.50	001
1	3	15	125	12	44	.568	10	1	300	18.00	027
1	3	9	108	18	47	1.360	9	1	500	15.91	069
1	3	61	230	7	49	1.306	20	1	300	6.84	044
1	3	54	241	8	63	.289	17	1	300	10.32	066
1	3	13	88	12	42	.548	7	1	300	16.20	071
1	3	12	170	14	77	.601	15	1	350	14.90	080
1	3	13	88	8	48	1.377	9	1	300	21.25	076
1	3	6	44	7	25	1.188	3	4	1250	20.74	022
1	3	40	159	10	48	.353	11	1	300	21.70	107
2	1	5	87	15	33	.383	4	3	1600	34.34	028
2	1	4	104	24	37	.684	8	3	1650	22.61	035
2	1	97	222	11	39	.746	28	1	300	27.37	059
2	1	3	68	12	25	.565	6	3	1700	29.19	042
2	1	103	284	9	25	.835	23	1	300	30.53	052
2	1	8	172	36	27	.521	10	1	1150	32.63	058
2	1	4	55	10	25	.791	4	3	1650	37.78	067
2	1	5	208	7	26	1.228	20	3	1600	27.09	086
2	1	11	284	9	25	1.141	27	1	1000	26.32	084
2	1	6	67	8	25	1.471	6	2	1250	23.84	093
2	2	3	73	11	36	.892	6	3	1400	28.77	032
2	2	8	89	11	37	1.002	6	1	850	23.69	037
2	2	9	114	13	46	.947	18	1	800	23.63	043
2	2	4	363	25	88	.933	34	3	1350	22.50	061
2	2	8	80	11	49	1.332	6	1	850	29.79	065
2	2	5	67	10	33	.097	4	2	1000	25.53	062
2	2	3	92	19	59	1.092	6	3	1100	32.61	070
2	2	7	142	12	42	.991	12	1	900	34.34	094
2	2	25	113	10	44	1.047	10	1	300	30.96	100
2	2	7	97	8	37	.881	8	1	900	34.05	091
2	3	11	190	23	70	1.388	25	1	400	23.22	024
2	3	133	295	14	31	.355	24	1	300	29.48	039
2	3	48	335	9	76	.458	22	1	300	24.11	040
2	3	9	84	9	43	.601	7	1	500	33.00	055
2	3	4	85	7	67	.385	5	4	750	36.73	047
2	3	53	270	12	46	.363	14	1	300	34.45	064
2	3	10	128	15	86	.639	12	1	450	24.21	063
2	3	57	298	8	40	.419	17	1	300	27.23	073
2	3	14	107	17	43	1.671	7	1	300	30.79	085
2	3	21	115	9	44	.823	7	1	300	29.90	088

Coding for Raw Data:
Post-Experiment Questionnaire

Column	Data
1	Psychopathy level 1=Low psychopathy, 2=High psychopathy
2	Reinforcement condition 1=Continuous reinforcement, 2=Partial reinforcement
Individual Items (answered 1 through 7 on Likert-type scale, with 1=strongly disagree and 7=strongly agree)	
3	I liked the computer game.
4	I would play another computer game if I could.
5	I would play another computer game even if I could not win food items.
6	I was frustrated while playing the game.
7	I was able to pay close attention all throughout the game.
8	I was bored by the game.
9	The game could have been improved.
10	The game was difficult.
11	The instructions for the game were hard to understand.
12	I tried to beat the average score of the people who already played the game.
13	I believed that I would be able to exchange my points for food items.
14	I wanted to win food items.
15	I wanted to win points on the computer screen.
16	I reached the highest score possible in the game.
17	I was challenged by the game.
18	It was hard to predict the outcome before the game was over.
19	I controlled the outcome of the game.
20	If I played the game again, I would get a higher score.
21	If I had stayed longer in the game, I would have gotten a higher score.
22	The researcher helped me do well in the computer game.
23	Most people would do better at this computer game than I did.
24	I usually win at games I play.
25	I do not mind losing at games.
26	If I lose at a game, it is usually because I do not try very hard.
27	If I lose at a game, it is usually because the game is boring.
28	If I lose at a game, it is usually because I do not have enough skill.
29	Even if I lose at one game, I will likely win at the next one I play.
30	The chances are good that I can do well at anything I want to.

31 Subject's research number

Note. * indicates missing data.
 Raw data follows coding information.

1 1 7 7 7 1 1 1 1 1 1 7 7 7 1 7 7 1 4 4 4 7 7 1 1 7 4 7 012
1 1 6 6 6 2 6 3 4 3 5 4 6 5 6 4 6 6 5 4 3 4 4 3 5 6 5 5 5 036
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2 2 4 5 4 6 6 3 4 4 1 2 7 5 7 1 6 7 6 4 3 1 4 5 3 3 3 3 4 6 094
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2 3 4 4 5 1 7 7 7 4 1 4 7 4 7 1 4 7 4 7 3 4 4 7 3 1 5 1 7 7 088

Coding for Raw Data:
Post-Experiment Interview

Column	Data
1	Psychopathy level 1=Low psychopathy, 2=High psychopathy
2	Reinforcement condition 1=Continuous reinforcement, 2=Partial reinforcement, 3=Partial helplessness
Individual Questions	
3	What did you hear about the game before you came today, other than what I told you? 1=nothing, 2=other
4	At what time did you eat you last meal? 1=more than one hour ago, 2=within the last hour
5	Would you say it was a heavy meal, light meal, or average meal? 1=light, 2=average, 3=heavy
6	In your household growing up, which parent was the primary disciplinarian? 1=mother, 2=father, 3=both/shared, 4=neither
7	Was either parent absent a lot from the home? 1=no, 2=yes
8	How did your parents discipline you? 1=no physical punishment, 2=physical punishment
9	Which method of discipline did they use most often? 1=not physical punishment, 2=physical punishment
10	Did they ever hit you? 1=no, 2=yes
11	Did they ever hit you with anything other than their hands? 1=no, 2=yes
12	How long after your parents found out you had done something wrong would they punish you? 1=right away always, 2=other
13	If you broke a rule, did your parents always punish you, or did they sometimes let you get by with it? 1=other than always, 2=always
14	Were you able to often get away with breaking the rules and not get caught? 1=no, 2=yes
15	Did your parents allow you a lot of freedom to do as you wished growing up? 1=no, 2=yes
16	Was either of your parents a heavy drinker? 1=no, 2=yes
17	Did either abuse drugs? 1=no, 2=yes
18	Would you say that either or both of your parents physically abused you? 1=no, 2=yes

- 19 Would you say that either or both of your parents
 verbally abused you?
 1=no, 2=yes
- 20 Psychopathy Checklist total score
- 21 Subject's research number

Note. * indicates missing data.
 Raw data follows coding information.

1	1	1	1	3	2	1	2	*	2	2	2	1	1	1	1	1	1	1	1	18.34	012
1	1	1	1	3	1	1	2	2	2	2	1	1	*	2	2	1	2	*	9.69	036	
1	1	2	1	3	1	2	1	1	2	2	1	1	1	*	2	1	1	1	6.22	038	
1	1	1	1	3	1	2	2	1	2	2	2	1	2	2	1	1	1	1	10.41	041	
1	1	2	1	2	1	2	2	2	2	2	1	1	2	2	2	1	1	1	20.00	046	
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2	1	2	1	3	1	2	2	2	2	2	1	2	1	*	2	2	2	2	27.37	059	
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2	1	1	1	1	1	1	2	2	2	2	1	2	1	1	2	1	2	2	26.32	084	
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2	2	1	1	1	2	1	*	1	2	2	1	2	2	1	2	1	1	2	34.05	091	
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2	3	1	1	3	1	1	2	2	2	2	2	*	1	1	1	1	2	29.90	088		

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