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PSYCHOPATHY: CAUSES, CORRELATES AND REHABILITATION

by

Paul D. Knott, Ph.D.

Assistant Professor  
Department of Psychology  
University of Denver

Denver, Colorado 80210

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## Preface

The major purpose of the present research was to provide some test of most of the major hypotheses concerning the causes of psychopathy. Psychopathy is one of the four major forms of psychological typology that are normally observed in populations of delinquents and, according to some research, it is the most common form of psychological typology among adult criminal offenders. The causes of psychopathic behavior patterns are shrouded in considerable controversy and confusion. It is therefore important to attempt to delineate the causes of psychopathic behavior patterns, especially if the ultimate goal of crime control programs is in fact crime prevention. That is, the causes of psychopathy must be determined before an effective early treatment or prevention program can be expected to be reasonably effective. Thus, the immediate goal of the present research was to throw more light upon the causes of psychopathic behavior among adult criminals. The longer range goal of the present work was to initiate some guidelines for the development of early prevention programs. The assumption here is that over the long run the most effective and economic way of dealing with rising crime rates is to develop effective early prevention programs. Successful prevention programs, however, rely upon a reasonably clear understanding of the basic causes of the phenomenon being treated.

I wish to thank several individuals for their work in this project. Bruce Drost, John Martinez, David Rainey, Fred Townsend, and Sally Cook, all students at the University of Denver, have been extremely helpful in seeing to it that this project was implemented. Dr. Linda Dixon of the University of Colorado has provided invaluable assistance in the conductance of the chromosomal analyses. The officials of the Colorado State Penitentiary, Canon City, were very helpful in the implementation of this research and, in particular, I wish to express warmfelt gratitude to Mr. George Levy, Chief Psychologist of the Penitentiary, for his invaluable help in this research.

## Summary

The major objective of the present research was to provide some tests of most of the major hypotheses on the causes of violence-proneness among psychopathic adult male inmates. A group of chronically overcontrolled inmates was also included in this study since some available data indicate that this type of individual is often involved in extremely violent acts. However, the available data suggest that most adult high recidivist criminals are psychopathic; thus, the main object of study was the adult psychopathic inmate. Psychopathic behavior, especially its causes, is poorly understood. It is often stated that the traditional therapeutic approaches have less success with psychopaths than with any other diagnostic category. If effective behavior modification programs are to be developed with regard to the psychopathic criminal, then it is imperative that a clearer understanding of the causes of psychopathic behavior be realized. Thus, the main objective of this study was to shed more light on the causes of psychopathic behavior patterns.

An exhaustive selection process was utilized in which a large number of inmate subjects in the Colorado State Penitentiary at Canon City were exposed to the three psychometric tools which have been used in previous studies to ascertain psychopathy. Subjects who met the criteria for all three of these measures were included in the psychopathic groups. There were two such

groups since a review of the personal data at the Penitentiary indicated that there were two somewhat different behavior patterns among the subjects in our experimental group. One group of psychopathic inmates was referred to as chronically-undercontrolled since they showed a pattern of aggressive behaviors both before they were committed to the prison and within the prison as well. The second group was referred to as manipulative-undercontrolled since these men showed a pattern of aggressive acting-out before they were committed to prison but within the prison they were able to control aggressive impulses and thereby manipulate the prison situation in order to maximize their chances of early parole. A third experimental group was labeled chronically overcontrolled since the men in this group showed virtually no preprison history of aggressive behavior nor did they show any within-prison tendency toward aggressive behavior; yet they had usually been committed for what would normally be considered to be the most violent of all acts—murder. A control group composed of a randomly drawn sample of inmates was also included in this study. Thus, there were four groups of subjects: chronically-undercontrolled, chronically-overcontrolled, manipulative-undercontrolled and a comparison group. All groups were matched on age, intelligence and length of incarceration. Ethnic background and type of crime for which committed were confounded with experimental groups (discussed in text).

In addition to the psychometric data that were utilized in the selection of subjects, other psychological tests were used to obtain indices of self-esteem, dogmatism and aggression-guilt in order to delineate any differences among our groups on these dimensions. Also, all subjects experienced a conditioning procedure in which the following measures were obtained: (1) sensory detection, (2) pain threshold, (3) pain tolerance, (4) baseline levels of aggressivity, (5) conditioning for nonaggressivity and (6) post baseline measures of aggressivity. Both behavioral and physiological (GSR and plethysmograph) measures were obtained during the three conditioning phases. These data were obtained in order to test a variety of hypotheses concerning the conditionability of the psychopathic and chronically overcontrolled individual in avoidance conditioning situations. This matter is at the crux of most of the controversy surrounding psychopathy. It has been contended that the psychopath has a deficient ability to benefit from experience as the result of his inability to be modified through avoidance conditioning experiences. Thus, the psychopath does not learn to avoid those situations and people which have a high probability of resulting in punishment for him. Our procedures were aimed at providing at least partial answers to the following two basic questions: (1) is it in fact true that the psychopath does not benefit from avoidance conditioning situations if confounding factors can be ruled out? (2) If in

fact the psychopath does not benefit through avoidance conditioning, then what are the causal factors that are preventing him from experiencing avoidance conditioning? In addition to the various measures associated with the conditioning situation, measures of testosterone and chromosomal configurations were also obtained on all subjects. The testosterone measure was obtained in order to test the hypothesis that this male sex hormone is associated with violence-proneness. Considerable animal data has indicated that there is a significant positive relationship between testosterone and aggressivity. It is not known, however, whether or not this relationship also holds for the human specie? This study was the first systematic attempt to inquire into this possibility. Also, there has been considerable speculation in recent years that particular chromosomal abnormalities, especially the XYY syndrome, are associated with violence-proneness. Measures for the XYY syndrome were obtained and relationships between this syndrome and all the other measures of this study are being investigated in an attempt to determine what the mediating factor of the extra Y chromosome may be. In particular, the possibility that the "aggression effect" of the extra Y chromosome, if indeed there is an effect, is mediated through increased testosterone levels is being investigated.

The results clearly indicated that neither group of psychopathic subjects were modified by the avoidance conditioning situation utilized. Thus, even though the paradigm employed in this study was freer from possible confounds than those used in previous studies, the results unequivocally indicated that the psychopathic subjects did not show any behavioral changes in the direction of becoming less aggressive in the avoidance conditioning situation. In contrast, the overcontrolled and control subjects showed a significant change in the direction of less aggressiveness during the avoidance conditioning situation. These behavioral results may have to be modified when the physiological (GSR and plethysmographic) data are analyzed; however, the behavioral data are striking. These data are not encouraging of attempts to develop effective modification programs for the majority of adult male inmates who are, in our typology, psychopathic. However, by no means should these data be taken as indication of a "dead end". The physiological data, for example, may indicate that the psychopathic subject has a hypoactive autonomic nervous system. If this is the case, then a variety of procedures including chemical stimulation may possibly be utilized to stimulate ANS activity in the psychopath which in turn may lead to a significantly increased susceptibility to avoidance conditioning procedures. And, considerable data suggest that the psychopath is responsive to social reinforcers.

There are at least three other main findings in this study. First, chronically overcontrolled subjects not only showed very different psychological patterning from the undercontrolled (psychopathic) subjects, but also showed significant differences in the patterning of their criminal histories. Essentially, overcontrolled subjects showed a significantly lesser tendency than undercontrolled subjects to behave in an aggressive manner regardless of the general environment. Second, within the undercontrolled subjects, two potentially different kinds of psychopathic patterning was determined. One group of psychopaths showed a greater ability to manipulate situations and people accompanied by a greater ability to control aggressive impulses. The other group showed a consistently poor ability to control aggressive tendencies either outside of or inside the prison. Apparently significant differences in the child rearing patterns that these two groups of psychopaths had experienced was observed on the CRPI. The more manipulative psychopaths seemed to come from ultra-permissive, nonphysically punitive homes, whereas the chronically undercontrolled subjects seemed to come from unusually restrictive and physically punitive homes. These data, if verified, have of course important implications for prevention and treatment programs. Third, the hormonal data indicated that in general the testosterone levels of all of the subjects were unusually high for a group of men of this age. And, the data

clearly indicated that the chronically undercontrolled subjects were higher in testosterone levels than the other groups of subjects. Whether this effect is a cause or an effect of greater aggressivity cannot be determined by the data of this study. However, this study is the first systematic investigation which has clearly indicated that increased testosterone levels are correlated with aggressivity in human beings (or at least in males).

These data and the experiences of the author have led to several recommendations. For the most part, these recommendations come down to two factors. First, it is clear that a great deal more work must be done with adult male psychopaths, especially in the determination of those variables and parameters which will allow for successful avoidance conditioning to occur, before a great deal of optimism can be expressed with regard to the possibility of effective rehabilitation programs for the adult offender. Second, in light of the first point, it would seem desirable to focus considerable energy at this time on the development of effective prevention programs for the young offender, without of course neglecting the adult offender, but realizing that at least for the time being the greater promise lies with prevention programs.

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# PSYCHOPATHY: CAUSES, CORRELATES AND REHABILITATION

## I. Introduction

Systematic research on human aggression has been confined for the most part to studies with college student samples. The generalizability of these data beyond the original samples and situations is a cause for concern among most, if not all, aggression researchers. Research that utilizes samples of "obviously aggressive" individuals, e.g., penitentiary inmates, would appear to be one fruitful way of supplementing research with student samples. The present study was an attempt to provide some test of most of the major, current hypotheses on the causes and correlates of "violent-proneness" in a sample of adult male inmates who had been convicted for committing "violent" (in legal-social terms) acts. There is little systematic research available on violence-proneness (e.g., see Hare, 1970); the little that is available suggests that individuals convicted for aggressive acts tend to fall into one of two groups: the psychopathic or undercontrolled and the chronically overcontrolled.

Psychopathy was the primary focus of the present research. Several studies have reported that psychopathic behavior patterns are predominant among one of the four major categories of psychological pathology of delinquent offenders (e.g., Quay and Peterson, 1970). Previous research by the present investigator has found

that a clear majority of adult male offenders are classifiable as psychopathic (Knott, 1970). This report is concurrent with that of Hare (1970) and suggests that, whereas a minority of delinquent offenders are psychopathic, a clear majority of adult offenders are psychopathic. In other words, the delinquent offender who is most likely to continue engaging in criminal behavior past the adolescent years apparently is the psychopathic delinquent. Most young offenders tend to "burn out", that is, most of them do not continue to engage in criminal behavior past the years of adolescence. However, it is obvious that some of them do continue to engage in criminal behavior on into adulthood and, of course, it is well documented that most adult offenders were delinquent offenders. It is therefore important to determine what kinds of delinquent offenders are most likely to become adult offenders or, in other words, long-term recidivists. This is critical information for the planning of early prevention programs. Since it will be virtually impossible for any kind of prevention program to deal with all delinquent offenders, such programs will have to be selective in terms of the kinds of offenders that they can deal with. Clearly, prevention programs can have the greatest impact and experience the greatest success in reducing the nation's crime rate if they deal with those young offenders who have the greatest likelihood of becoming adult offenders. Our data would indicate that prevention programs should probably focus their

major efforts on the treatment of psychopathic offenders. Unfortunately, however, psychopathic behavior is one of the most poorly understood syndromes in psychological practice. The causes of psychopathic behavior are shrouded in considerable controversy. The psychological literature abounds with well more than a dozen definitions of the concept. However, Albert, Brigante and Chase (1959), in a systematic content analysis of the concept, have reported a "striking" level of agreement on the following psychopathic characteristics: antisocial aggression, lack of ability to delay satisfaction, lack of insight, inadequacy of superego functioning, deficiency in planning ability, hyperactivity, and callousness in interpersonal relations. This report singles out antisocial aggression as the most frequently cited psychopathic trait in the clinical literature. Interestingly, however, our literature review (approximately 500 studies) revealed virtually no studies on psychopathic aggression. In fact, the most recent, well written, and comprehensive publication on psychopathy does not list a single empirical study in this area (Hare, 1970). The importance of a better understanding of the dimensions and causes of psychopathic aggression cannot be overemphasized since the aggressive behavior of the psychopath is a major factor in the present crime rate of the nation.

A second major typology which appears among adult male offenders is that of the chronically overcontrolled syndrome. These individuals appear to be in some ways dramatically different from the psychopathic offenders. Both Megargee (1966), who studied juvenile offenders in this country, and Blackburn (1968), who studied adult offenders in England, have reported that a discriminable subset of their samples can be described as chronically overcontrolled individuals. Very little is known about these persons except that they appear to be oversocialized in the sense of being highly guilt-prone, somewhat obsessive, and high-anxious; and when they do experience an aggressive outburst, which seems to be quite rare, it usually is of an extreme nature. The data from both of these studies suggests that chronically overcontrolled individuals are more often committed for extreme acts of violence such as murder, whereas chronically undercontrolled or psychopathic individuals are more likely to be committed for "less extreme" acts such as assault and robbery.

In the present study, both psychopathic (undercontrolled) and chronically overcontrolled subjects were administered a variety of dependent measures which relate to many of the major hypotheses concerning "violence-proneness". A rationale for these measures now follows in order to provide an overview of the project.

## II. Dependent Measures

For most current investigators and theoreticians the central issue in the area of psychopathy focuses on the conditionability or, rather, the nonconditionability of the psychopathic offender. Psychopaths respond to verbal conditioning (e.g., Blaylock, 1960) and social reinforcements (e.g., Hetherington and Klinger, 1964) as well as nonpsychopaths, but the available data suggest that psychopaths are generally inferior to nonpsychopaths in avoidance conditioning situations. Lykken (1955) and Hare (1965, 1966, 1968, 1970) have reported evidence that psychopathic offenders are significantly slower to respond in avoidance conditioning situations than groups of controlled subjects. This apparent finding is not related with intelligence. Several studies have indicated that psychopathic subjects are average to above average in intelligence. These reports by Hare and Lykken supposedly explain the relative inability of the psychopath to benefit from experience and thereby learn from his mistakes. They argue that avoidance conditioning plays a primary role in the socialization process so that individuals who are deficient in the capacity to benefit from avoidance conditioning would be less socialized than others. Both Lykken's and Hare's results suggests that the diminished ability of the psychopath to benefit from avoidance conditioning situations is the result of a relative inability to acquire fear responses and to generalize fear responses. This can be

related to Eysenck's (1964) notion that psychopaths are essentially extreme extroverts who are difficult to condition as a result of constitutional factors. However, not all investigators accept the proposition that psychopaths are not modifiable in avoidance conditioning situations. Looking over the Lykken and Hare studies, we were struck by the fact that the pain threshold for the noxious stimulus used in the avoidance conditioning situation was determined in a very loose way. As a general rule, subjects were merely asked to report when the shock stimulus became "painful". This kind of procedure would appear to be open to a variety of response-attitudinal biases. For example, it seemed to us that psychopathic individuals might manipulate this situation in the sense of reporting that a given stimulus was noxious when, in fact, it was something less than noxious, i.e., less than pain threshold. This possibility seems reasonable in light of the report by Hare (1966) that psychopaths, even more than normal subjects, attempt to avoid immediate discomfort if at all possible. It is therefore possible that the failure to obtain positive results in previous studies where avoidance conditioning has been employed with psychopathic subjects was due to the use of a "noxious" stimulus which, in fact, was not noxious. Of course, under these conditions, by definition avoidance conditioning will not occur. In the previous studies the reported pain thresholds of psychopathic and nonpsychopathic subjects were comparable, but this seems

suspect in light of the report by Hare (1968) that psychopathic subjects had higher sensory detection thresholds for shock than nonpsychopathic subjects, and Schalling's and Levander's (1964) data suggesting that pain and detection thresholds are positively related. Extensive procedures for both detection and pain threshold were employed in this study in order to obtain data pertinent to this possible confound and to try to insure that the noxious stimulus was in fact noxious for all subjects.

The procedure itself was a modified avoidance conditioning paradigm—essentially that used by Hokanson and his colleagues (1960) and Knott and his colleagues (1971). This procedure provides data on baseline for aggressive responding and also provides for conditions where either aggressive or nonaggressive responding can be reinforced or punished. This study is the first report in the literature where aggressive behavior is the form of behavior that is manipulated and measured in a conditioning study with psychopaths. This form of behavior has obvious relevance for both theoretical notions of psychopathy and for the potential social importance of the work. In previous studies on psychopathy the behaviors that were the focus of conditioning were for the most part highly laboratory-bound behaviors and tasks (e.g., nonsense syllables, maze and serial learning, etc.). Also, in the present study both behavioral and autonomic (GSR and plethysmograph) responses were obtained on all subjects in the conditioning

procedure. We were concerned with the possibility of a "schizokinesis" effect (Gantt, 1960). Schizokinesis refers to differential response patterns between behavioral and physiological responses which have been reported in some studies (e.g., Hokanson, et al, 1968). This seemed particularly important in this study in light of the speculations and some data that the psychopath has difficulty acquiring fear responses because of a hypoactive autonomic nervous system (Hare, 1970). That is, it has been suggested that the relative inability of the psychopath to acquire fear responses (and thus benefit from avoidance conditioning situations) is primarily the result of an hypoactive autonomic nervous system. Thus, by this line of reasoning, the psychopath, quite unlike the neurotic, is deficient in the physiological concomitants of "fear". In the present study, measures of the autonomic nervous system (ANS) activity of our psychopathic and nonpsychopathic subjects were obtained through the measures of (1) spontaneous GSR measures in rest periods and (2) plethysmographic (peripheral vascular) continuous records. Thus, in this study measures of conditionability for aggressivity and nonaggressivity (in a modified avoidance conditioning paradigm) and autonomic nervous system activity were obtained on psychopathic, chronically overcontrolled, and control subjects.

Another dependent measure concerned the Child Rearing Practices Inventory (CRPI, Block, Hahn, and Smith, 1969). Probably the major current theory of the causation of psychopathic behavior is that advanced by Maher (1966). Maher's speculations are roughly along the same lines as those described above but with a major difference. Maher does not accept the proposition that the psychopath is defective in a particular kind of learning ability because of constitutional factors. Rather, he points to a particular kind of home environment, one that might be referred to as "ultra-permissive", as being the progenitor of psychopathic behavior. Maher argues that the psychopath is not suffering from some kind of constitutional defect but that he is the product of a home environment in which punishment has usually been forestalled or reduced in severity by suitable expressions of repentance on the part of the child. If this environment is such that the child is consistently able to avoid punishment in this way, then the parents are reinforcing repentance behavior while extinguishing the fear of punishment that may otherwise inhibit forbidden acts. When a child is unusually attractive or appealing in appearance and behavior, many parents may find it difficult to punish the child. Under these circumstances, argues Maher, the stage is set for the child to learn that being charming and lovable can lead to the removal of any unpleasant consequences for his own actions. In brief, the child learns to become a manipulator of people, using

charm to gain his ends; in this way, he learns to avoid punishment for many forbidden behaviors. Also, the child is indulged in a highly consistent way by the mother. He learns that he rarely has to wait long for desired rewards. He develops a repertoire of his social skills and manipulative talents. The child is deprived of experiences that would teach him self-control, normally called "self-control". The child gets little opportunity to learn to work for and wait for long term rewards. He does not learn to tolerate frustration. One implication of this theory, whereas the psychopath seems indifferent to punishment, an accurate statement would be that in most cases he has not experienced punishment. His social skills usually enable him to avoid punishment for antisocial acts. Thus, in Maher's theory, a highly permissive home in which punishment and frustration are rarely experienced by the child is the prototypical environment that is likely to generate psychopathic behavior patterns. This theory, however, has never received any kind of empirical test. In the present study the CRPI was administered; the CRPI consists of 100 items that provide retrospective data on a large variety of versions of child rearing practices. Each item is administered twice—once in relationship to the mother and once in relationship to the father. It was expected that these data would provide insight into the child rearing backgrounds of the psychopaths and thus provide some test of Maher's theory.

As Knott (1971) points out, the most consistent finding in aggression research with animals has been that testosterone—the primary male sex hormone—is correlated with aggressive behavior. Studies using a within-subjects replication design have indicated that aggressive behavior is decreased when male subjects are castrated but subsequently increased when subjects later receive injections of testosterone. This kind of design of course cannot be used with human subjects for obvious ethical reasons. However, correlational data can be obtained with human subjects. In this study a 100 mL blood sample was withdrawn from all subjects and subsequently analyzed in our laboratories for plasma testosterone content in order to determine if the finding from a great variety of animal species could be generalized in some way to human beings. It has been argued that testosterone plays a role in aggressive behavior by affecting what can be called the "threshold" for neural firing in aggression zones of the brain (Knott, 1971). According to this notion, the greater the testosterone level, the lower the threshold for firing in these particular parts of the brain, and vice versa. This hypothesis implies that testosterone is not a direct elicitor of aggression in the sense of being some kind of "energy source" for aggressiveness but rather affects aggressive behavior indirectly by influencing the threshold for firing in the aggression zones of the limbic system in the brain. However, before conducting research with animals that would test

this hypothesis, we felt that it was imperative to determine first if indeed there is a correlation between testosterone and aggressivity among human subjects.

There has been considerable speculation in recent years that violence-proneness is in some cases related to chromosomal aberrations (Shah, 1970). There have been some reports, although they have been plagued by considerable methodological difficulties, that the XYY syndrome is associated with a tendency toward aggressive acting-out behavior. In the present study, a 10 mL sample of blood was withdrawn from all subjects and later subjected to analysis for chromosomal aberrations (karotyping) in the laboratories of Dr. Dixon at the Behavioral Genetics Institute of the University of Colorado. Since we also obtained testosterone measures on all subjects, we can test the hypothesis that any "aggression effect" of the XYY syndrome is mediated through increased testosterone levels. That is, one effect of the extra Y chromosome may be to increase testosterone levels, which in turn increases the probability that aggressive behaviors will be expressed. In this study testosterone levels of XY subjects can be compared with those of XYY subjects and thereby provide a test of this hypothesis. Of course, this study suffers from the same deficit as many of the XYY studies, namely, the sample of XYY subjects is likely to be so small as to place severe restrictions on the generalizability of the data.

In summary, then, the following measures were obtained on all subjects in the study: (1) a detection threshold measure, (2) pain threshold and pain tolerance measures, (3) GSR's during rest periods and plethysmographic records during conditioning periods, (4) baseline measures of aggressivity and subsequent measures for the conditionability of nonaggressive responding, (5) child rearing practices data and other psychometric data (discussed later), (6) testosterone levels and (7) measures for chromosomal aberrations.

### III. Selection of Subjects

There is considerable controversy in the field over exactly what the term "psychopath" means. Well better than a dozen definitions can be found for the concept in research and clinical literature. A great deal of the empirical research in this area has been unnecessarily clouded by the use of ambiguous definitional techniques and by the use of different measurement devices in different studies. Over the past ten years, however, there has been some progress on this problem; in the more recent literature usually one of three measurement devices is used to define psychopathy: (1) the Pd scale of the MMPI, (2) the Quay-Peterson Delinquency Scale, and (3) the Cleckley Checklist. In the present study all three of these measurement tools were utilized. There were 925 inmates in the maximum security section of the Colorado State Penitentiary when this study was initiated. Out of this

initial sample a selected sample of 440 inmates were subjected to intensive testing. The second sample was derived on the basis of the subjects' scores on the MMPI and the delinquency scale: inmates who had scored in the top and lower third of the psychopathy subscales of both the MMPI and delinquency scale were selected out for further study. These 440 inmates were subsequently evaluated on the Cleckley Checklist by a panel of ten inmates. Inmates rather than guards were used since our experiences in the prison suggested that guards were notoriously unreliable sources of information on inmate behavior. The ten inmates on our board were all high-status individuals within the prison who wielded considerable power and influence among the other inmates. Each had been in the penitentiary for a minimum of five years and each knew a large proportion of the present inmate population. Members of the panel independently ranked each of the 440 subjects on the fifteen items of the Cleckley Checklist. Panel members were instructed not to rank any man whom they did not know well. Any man of the sample of 440 who received less than three independent rankings was excluded from further consideration. The mean ranking for each man was computed. Inmates who were scored in the top third of the Cleckley and the bottom third of the Cleckley were then retained for further testing.

In order for a subject to be referred to as "psychopathic" or "undercontrolled" in this study, he had to meet the following criteria. First, he had to be scored in the top third of the Cleckley Checklist by the inmate board. Second, he had to score in the top third on the Pd scale of the MMPI. Third, he had to score in the top third of the psychopathic scale of the Quay-Peterson Delinquency Scale. Fourth, he had to score below the median on the Welsh Anxiety Scale as derived from the MMPI scores. In contrast, in order for a subject to qualify as "chronically overcontrolled", he had to meet these criteria. First, he had to be ranked in the bottom third of the Cleckley Checklist by the inmate board. Second, he had to score in the bottom third on the Pd scale of the MMPI. Third, he had to score in the bottom third on the psychopathic scale of the Quay-Peterson Delinquency Scale. Fourth, he had to score above the median of the Welsh Anxiety Scale as derived from the MMPI. When all of these data were computed, we were left with 73 undercontrolled and 63 overcontrolled subjects. The files on each of these individuals, that is, their court, police, FBI, and in-prison records were subsequently reviewed and evaluated in order to determine any differences in patterning between the two groups of subjects. The first major difference that we noted between these two groups of subjects was that, whereas most of the overcontrolled subjects had no offenses on their records prior to the crime that they

had been committed for, which was murder in 73 per cent of the cases, the undercontrolled subjects showed in every case prior offenses on their records but usually they had been convicted for either armed robbery and/or assault rather than murder (76 per cent of the cases). These data are in essence similar with those of Megargee (1966) and Blackburn (1968) who reported that in their samples chronically overcontrolled subjects committed few crimes outside of the one violent incident which they had been convicted (usually murder), whereas chronically undercontrolled subjects normally have a long history of "minor violent" crimes against persons but rarely are convicted for murder. We also noticed that the overcontrolled subjects usually been model prisoners within the penitentiary. In other words, the only black mark on their records was usually murder. Also, their victims were usually either friends or members of their immediate families. The circumstances surrounding the murder usually indicated that there had been a long relationship between the murderer and his victim which eventually resulted in murder. This report is congruent with some of the research of Marvin Wolfgang (1970). In contrast, the undercontrolled subjects showed a long and usually highly consistent history of repeated offenses against both property and persons during the penitentiary setting. Thus, the undercontrolled subjects showed a pre-prison history of repeated offenses, in

going back to the prepubertal years. However, when we looked at the in-prison records of the undercontrolled subjects, a very interesting difference emerged between two subsets of individuals within this large group. Some of the undercontrolled subjects had continued their aggressive behavior within the prison, e.g., they had several delinquency reports in their files (usually involving a physical assault or a verbal altercation with another inmate that had been "broken up just in time"), whereas other undercontrolled subjects apparently had been "model prisoners". We discussed this discrepancy individually with our ten-man inmate board and found that all of them were in essential agreement that there were two different patterns of behavior within our psychopathic sample. One "type"--which comprises what we now call the chronically undercontrolled group (CU)--shows poor impulse control and repeated offenses both before he is sent to prison and within the prison as well. The other group--which we call the manipulative undercontrolled group (MU)--shows a record of repeated offenses before prison, but within prison they are able to curb aggressive behavior and "play the game" of being a "good con" in order to maximize chances of early parole. In accordance with these observations, we now had three experimental groups: the CU, MU, and CO (chronically overcontrolled) groups. A comparison group was formed at this time consisting of a randomly drawn sample of inmates in order to provide a group composed of a "representative" sample of the inmate population.

To the best of our knowledge, the above described selection process is the most extensive technique which has been used in any study on psychopathic and/or offender populations. However, we now felt the necessity for determining if there were differences among our groups on such dimensions as ethnic background, intelligence, age, and length of incarceration. With some sifting out of subjects we were able to roughly match all of the groups on age, I.Q., and length of incarceration, but not on ethnic background. The CU group was over represented by Chicanos, while the CO group was over represented by whites. Blacks were about equally represented in all groups. Thus, ethnic background is confounded with two of the experimental groups. This matching procedure resulted in all groups having roughly 25 subjects per group for a total N of 100. However, due to parole, illness, and the refusal of a few subjects to participate in this study, we concluded the study with 20 subjects per group for a total N of 80. Table 1 provides the pertinent information on the characteristics of the different groups.

#### IV. Experimental Procedures

After the prison, court, police, and FBI records of all subjects had been reviewed and matching procedures completed, the remaining subjects in each of the four groups were administered the CRPI, the MIST (Mosier Incomplete Sentence Test, 1961), the Rokeach Dogmatism Scale, and the Coopersmith Self-Esteem Scale.

TABLE 1

Group	Mean Age in Years	Mean I.Q. Score	Length of Incarceration	Ethnic Background	Mean Number of Prior Convictions	Mean Number of In-Prison Delinquency Reports
Chronically Overcontrolled Subjects	27.32	104.71	3.71 years	3-Blacks 3-Chicanos 14-Whites	0.3	0.2
Chronically Undercontrolled Subjects	28.91	98.89	2.91 years	4-Blacks 12-Chicanos 4-Whites	5.1	4.6
Manipulative Undercontrolled Subjects	28.04	101.16	3.03 years	3-Blacks 6-Chicanos 11-Whites	4.7	1.2
Control Subjects	27.90	101.70	3.20 years	3-Blacks 7-Chicanos 10-Whites	1.7	1.0

The CRPI has been discussed previously; the MIST was administered in order to obtain a measure of aggression-guilt on the subjects in the different groups. The MIST has been used before in studies by Knott and has been found to be a valid index of the degree of guilt which the individual experiences in relation to actual acts of aggression (Knott, 1971). Since this is the first psychometric measure of aggression-guilt which has received some substantial validation, it was administered in order to have some test of the hypothesis that psychopathic individuals experience very little guilt over antisocial acts.

Each subject was subsequently exposed to a one day procedure in which sensory detection thresholds, resting state GSR's, pain thresholds and pain tolerance thresholds were obtained. In the detection threshold procedure, three threshold values were obtained using a method of limits procedure with ascending and descending stimulus intensity sequences. All subjects were started at .25 volts (at 5,000 ohms resistance level) with increments of .25 volts until the subject reported feeling the shock on three successive trials. On the descending sequences, trials ended when the subject reported that he no longer felt the shock on three consecutive trials. Each threshold value was subsequently tested with a forced choice technique. The subject was informed that through the intercom he would hear the numbers 1-2-3-4 and that he would receive a shock immediately following one of these numbers. His

task was to detect and report the number immediately preceding the shock. Each threshold value was randomly presented after one of these numbers over ten trials. In circumstances where the 75 per cent threshold was not obtained due to inaccurate sensory discrimination, additional blocks of ten forced choice trials were used with lower thresholds. All subjects were presented with the same instructions to report the slightest "tingling" at the electrode site. This was done in order to minimize intervening subject response criteria (Swets, 1961). During these procedures all subjects were comfortably reclined on an adjustable cot in a quiet room.

The pain threshold was obtained using five sequences (more than the normal procedure of one sequence) of ascending and descending limits. Initial voltage was set at 10 volts and was increased at increments of 2 volts for each trial. The subject was informed that the increasing levels of shock would be presented by the experimenter and he was asked to report the level at which he determined the electrical current to be "clearly unpleasant" and also the level at which he was unwilling to tolerate any further increase in intensity. These two levels are defined respectively as the "pain threshold" and the "pain tolerance" levels. Although there is some evidence that a few subjects do not experience electrical stimulation as painful, although they may find it intolerable, the word "pain" was entirely avoided during the

procedure (Schalling and Levander, 1964). In these we hoped that we could obtain a better approximation of pain threshold of the psychopathic and nonpsychopathic than what had been obtained in previous studies of pain. In the conditioning procedure the level of shock utilized as a mean of subjects' pain threshold and pain tolerance was felt that this procedure increased our chances of using a noxious stimulus in the conditioning procedure while the time allowed us to stay within the bounds of acceptable experimental ethics.

After a one-hour break for lunch, the same subject returned to the experimental room where the conditioning was implemented. In this procedure subject was instructed he was to be involved in a nonverbal social interaction with another inmate. The subject never saw the other inmate (an accomplice of the experimenter) who was housed in the same room. The interaction between the subject and the other was preprogrammed in all cases and occurred in three phases: the first phase a baseline for aggressive responding was established for the subject. In this period the subject was instructed he could administer either a shock or a nonshock (reward) to the other subject. Administrations of the nonshock mean that the other subject gained a point that could later be exchanged for one cigarette. Cigarettes are powerful reinforcers

men in the penitentiary. Even those few who do not smoke use the cigarettes in exchange for other desired materials. Thus, cigarettes provided a strong incentive for the inmate subjects. There were eight different levels of shock the subject could administer, ranging from level one (very mild) to level eight (very strong shock). Thus, the behavioral level of aggressiveness was defined along two dimensions: number of shocks administered and intensity of the shocks administered. Thirty trials comprised the first phase of the interaction. During this time and at all times the subject was free to administer as many shocks or nonshocks as he wished. In the first phase the confederate was programmed to respond randomly to whatever pattern the subject showed. In other words, shocks by the subject were followed a random half of the time by shocks from the confederate and the other half of the time by nonshocks. Nonshocks by the subject were followed a random half of the time by shocks and the rest of the time by nonshocks. In this phase neither aggressive nor nonaggressive (nonshock) responding was systematically reinforced during the initial baseline period.

In the second phase of the study, nonaggressive responding was reinforced by the confederate for all subjects. That is, during the second period whenever the subject administered a nonshock to the confederate, this was immediately followed by a nonshock (reward) by the confederate on 90 per cent of the trials.

subject administered a shock, this was followed 90 per cent of the time by countershock by the confederate. Thus, in this phase nonshocks were reinforced and shocks were punished. There were sixty trials in this phase.

In the third phase, there were thirty additional trials in which the same procedures as in the baseline period were employed so that the final phase was a post baseline period. During all 120 trials of this conditioning procedure, GSR and plethysmographic recordings were obtained on all subjects. Before the procedure began, GSR electrodes were attached to the back of the nondominant hand, and the plethysmographic electrode was attached to the index finger of the nondominant hand. These electrodes fed into a Grass four-channel polygraph that was located in a shielded, adjacent room. The intertrial interval was held constant throughout the experimental procedure (thirty seconds). The plethysmographic recovery time can thus be calculated by determining any increase in the response curve from the point at which subject administers his counterresponse to the confederate to the start time of the next trial (e.g., Hokanson, et al, 1968). There was a five second interval between the confederate's response and the subject's counterresponse; thus, the complete trial cycle lasted for 35 seconds.

Two weeks after the subject had undergone the conditioning procedure, he was called into the penitentiary infirmary where 10 mL and 100 mL samples of blood were withdrawn. These samples were maintained at room temperature and immediately taken to the campus of the University of Denver, where the 100 mL sample was analyzed for plasma testosterone content, and to the campus of the University of Colorado, where the 10 mL sample was analyzed for chromosomal configurations. These blood samples were taken on all subjects at the same time of day (9:00 A. M.) and in the same way in order to control for the cycle of hormonal excretion.

The procedure used for analysis of testosterone in plasma was a modification of the one used by Guerra-Garcia (Steroids 2:6, 1963, 605-611). The plasma was extracted three times with 2 volumes of anhydrous ether. The combined ether phases were washed with 1/10 volume of 1N sodium hydroxide, followed by washing with 1/10 volume 2% sodium bicarbonate. After two washings with distilled water, the solution was evaporated to dryness under reduced pressure. The residue was dissolved in 50 mL of 70% methanol and placed under  $-4^{\circ}\text{C}$  temperature for 24 hours. The solution was then centrifuged at  $0^{\circ}\text{C}$  and decanted to remove lipids. After washing with an equal volume of benzene, the solution was evaporated to dryness under reduced pressure. The residue was silylated with 30 microliters of Tri-Sil Z from Pierce Company and allowed to stand for five minutes. Testosterone

was quantitatively analyzed as its silyl ether with a Hewlett-Packard Research Gas Chromatograph with flame ionization detector. Exactly 10 microliters of silylated testosterone solution was injected into a column packed with SE-52 (3%) on 80-100 mesh Chromasorb W. The column temperature was 210°C with the testosterone peak appearing in 12 minutes. Recovery of testosterone using this method was 88%. The correction for recovery rate has been added to all calculations.

All measurements were calculated to micrograms of testosterone per 100 mL of plasma. The normal range of testosterone in plasma from adult males (ages 22-40) is 0.1 to 0.98 micrograms per 100 mL of plasma (this average is generally agreed to by all researchers in the area of steroid hormones). The general mean within the normal range is 0.56 micrograms per 100 mL of plasma.

Reasons for choosing this analytical method:

- 1) The levels of testosterone expected were well above the range in which radioactive tritium labeled testosterone was needed. None of the samples tested were expected to be below 0.1 microgram which is the probable limit with this procedure without radioactive tracers. The sensitivity of the flame ionization detector on the gas chromatograph is 0.00001 micrograms, well within the expected levels of testosterone.

- 2) The purification by thin-layer chromatography was found to be unnecessary in this procedure. The recovery rate of testosterone when thin-layer chromatography purification was used averaged only 38%. It was found that the purification was unnecessary if the column temperature used in gas chromatography was lowered to 210°C. At this temperature the extraneous lipids and other steroids could be easily separated from the testosterone peak. Without thin-layer chromatography the recovery rate averaged 88%. "Spiking" with additional testosterone again proved that the testosterone peak could be separated and calculated without additional purification.
- 3) The use of Tri-SilZ as the silylating reagent for testosterone also provided extra purification. The hindered steroids did not appear to silylate with this reagent and hence were not detected by gas chromatography. The sample was only allowed to stand for five minutes in the silylating reagent before injection which again prevented any hindered steroids from forming silyl ethers. All testosterone, as indicated with samples of known weight, was silylated within this period of time. Since it is possible for keto-steroids to form additional silyl ethers

(therefore giving more than one peak in gas chromatography) by the reversion of the keto group to an enol group, a solution of methoxyamine hydrochloride in pyridine was used to block the keto group. It was found that the addition of this reagent made no difference in the quantitative analysis of testosterone. Known amounts of testosterone were tested with and without the addition of methoxyamine and were comparable. No extraneous peaks were detected when methoxyamine was not used, therefore this step was eliminated.

The details of the chromosomal analyses will be discussed by Dr. Dixon in an appendix in a supplementary final report which will be submitted in a few months when the chromosomal analyses are completed.

## V. Results

The results will be discussed in three subsections. First, the psychometric data will be discussed, then the behavioral and physiological data on the conditioning phases, and then the additional physiological data obtained from the analyses of the blood samples.

### Psychometric data

The mean scores for all four groups on the various testing scales can be observed in Table 2. On the Rokeach Dogmatism Scale, an analysis of variance (one-way) indicated a significant F ratio:  $F = 5.20, p < .05$ . The Duncan Multiple Range Test further indicated that the MU group was significantly different from the other three groups, that the CO and CU groups were not significantly different from each other in their scores, and that the control group was significantly different from all the other groups. Thus, the control group scored lower on the dogmatism scale than any of the three experimental groups, and among the experimental groups, the manipulative-undercontrolled subjects scored the highest. Whereas the MU group would appear to be the "smartest" inmates, i.e., they are able to manipulate a variety of situations and they can usually "con" their way out of the prison setting in a fairly fast period of time, in terms of rigidity of beliefs the dogmatism scale scores would indicate that the MU group is the most inflexible of the four groups of inmates tested in this study. It is possible

that the relatively high dogmatism scores of the experimental subjects, and in particular the MU subjects, may be related to the apparent inability of many of these individuals to benefit from experience. It would seem reasonable that the more dogmatic or inflexible an individual is in terms of basic beliefs, the more difficult it is going to be for him to benefit or learn from mistakes.

An analysis of variance indicated no significant differences among the four different groups of subjects in terms of their scores on the Coopersmith self-esteem score. This is somewhat surprising since one might assume that psychopathic subjects, who apparently are not guilt prone, might have higher self-esteem scores than nonpsychopathic subjects in the prison setting. However, this was not observed in this study. An interesting finding, however, is that self-esteem scores for all four groups of subjects were significantly below scores reported for nonincarcerated subjects in other studies. For example, Coopersmith (1969) and others have generally reported mean scores on this scale among normal subjects to range around 70. The mean scores for the groups of subjects of this study were in the range of 33 to 43. Clearly, these scores are significantly lower than those scores obtained from normal subjects in other studies using the same inventory that was used in this study. This report, that incarcerated subjects have significantly lower self-esteem than

normal subjects, is of course not surprising and one that many persons would have predicted, but to the best of our knowledge, this is the first time that this has been reported with an objective measure of self-esteem in a study of prison inmates.

On the Quay-Peterson Delinquency Scale, there are five subscales: Psychopathy, Neuroticism, Family Dissension, Inadequacy, and Scholastic Maladjustment. On the psychopathy scale, the analysis of variance indicated a significant F ratio:  $F = 7.88$ ,  $p < .05$ . The Duncan test indicated that the control group and the overcontrolled group had significantly lower psychopathy scale scores than the other two groups and further indicated that whereas the scores for the two undercontrolled groups were higher than those of the overcontrolled and control groups, the mean scores of the CU and MU groups were also significantly different from each other ( $p < .05$ ). These data are highly similar to the data obtained from the Pd scale scores except that on the Quay-Peterson Scale, the CU and MU groups are significantly different from each other; this was not true on the Pd scale. These scores and the Pd scores clearly indicate that the two psychopathic (undercontrolled) groups score higher on both measures of psychopathy than the overcontrolled and control groups. The Quay-Peterson data suggest that the CU group may be a "purer" psychopathic group than the MU group. However, this is merely a suggestion from the data; considerably more research into the different dimensions of

psychopathy that these two scales measure would have to be done to determine the validity of this suggestion. There were no significant differences among the four groups on any of the other four subscales of the Quay-Peterson Delinquency Scale. It is especially surprising that there were no differences among the groups on the neuroticism scale since there were significant differences among the groups in their scores on the Welsh Anxiety Scale as derived from the MMPI discussed earlier. Of course, the neuroticism scale of the Quay-Peterson is not a direct measure of anxiety; however, one might expect a greater relationship between this scale and anxiety scale scores than was observed in this study.

Factor analyses of the CRPI data are currently in progress and will be reported at length in the supplementary final report to follow this report. To date, the CRPI items that "stand out" (in terms of eye-balling the data) indicate that the kind of permissive home environment that Maher describes as the prototypical environment for the teaching of psychopathic-like behaviors does seem to be the case for the manipulative-psychopathic subjects. That is, the items that stand out for the MU group indicate a pattern of considerable permissiveness (or perhaps neglect would be a better word) in the home environments of these subjects. In contrast, however, subjects in the chronically undercontrolled group show a pattern highly similar to the kind of home environments

observed for low guilt-aggression males in the previous Knott studies (1971, in press). That is, in contrast with the highly permissive, nonpunitive environment which characterize the MU subjects, the CU subjects come from physically punitive and highly restrictive home environments. These data thus far suggest that one kind of psychopath (MU) seems to fit the pattern described in Maher's theory, but another kind of psychopath (CU) would appear to come from a very different kind of home environment from that described by Maher. However, more detailed analyses may also reveal some similarities in these two constellations of family background factors. The CRPI items for the chronically overcontrolled subjects indicate some striking correspondence to the data for the high aggression-guilt subjects in the previous Knott studies in that both parents would appear to be (1) relatively protective and indulgent, (2) reinforcing a high need for achievement (stressing competition with others) and (3) considerable use by the parents of "psychological" kinds of punishment. That is, parents of these boys appeared to use guilt-arousal techniques in their attempts to control the boy's behavior. However, unlike the high aggression-guilt subjects in the previous Knott studies, who were college students, chronically overcontrolled subjects in this study also reported a physically punitive environment as well as the use of guilt-inducing techniques. Thus, it would appear that these subjects

TABLE 2

Group	Doematism	Self-Esteem	Psychopathy	Neuroticism	Family Dissension	Inadequacy	Scholastic Maladjustment	Aggression-Guilt (MISI)
Chronically Overcontrolled	133	43.11	231.23	579	185	172	252	43.63
Chronically Undercontrolled	154	38.16	469.37	552	216	162	283	14.02
Manipulative Undercontrolled	210	38.24	342.33	589	171	170	262	14.63
Control	107	34.17	203.11	530	203	191	241	27.12

were exposed to a variety of disciplinary techniques, both physical and psychological in nature, whereas the psychopathic subjects were exposed either to a physically punitive environment or one in which there were very few attempts of any kind of discipline (MU). Surprisingly, no significant items have yet been found to differentiate the control group subjects from the other groups of subjects. Of course, this discussion of the CU items must be regarded as highly tentative and open to modification when the factor analyses are completed.

The MIST (Mosier Incomplete Sentence Test) data very clearly indicate that both groups of psychopathic subjects score very low in the dimension of aggression-guilt: CU = 14.02 and MU = 14.5. These are the lowest mean MIST scores on the aggression-guilt index that we have ever observed. The control group is relatively low in aggression-guilt, but not as low as the extreme scores of our earlier college samples (e.g., Knott, et al, 1971). The mean MIST score for the chronically overcontrolled group was 43.63, which is as high as any average score on the index that we have ever obtained with normal subjects. In other words, the CO group has a MIST score that is quite comparable to that of high aggression-guilt scorers in our college samples and a MIST score which is in dramatic contrast to those of the two undercontrolled groups of subjects in this study. Thus, those particular men, most of whom have been convicted for murder, have very high scores on a mea-

of aggression-guilt as well as having high anxiety scores and low psychopathy scores. An analysis of variance indicated a significant F ratio for the MIST scores:  $F = 15.85$ ,  $p < .01$ . The Duncan test indicated that the two psychopathic groups were not significantly different from each other but were different from the other two groups ( $p < .05$ ) and that the CO group was significantly different from the other three groups.

#### Conditioning data

Analyses of variance indicated that there were no differences among the groups on the pain threshold measure. However, one-way analyses of the sensory detection ( $F = 5.16$ ) and pain tolerance data ( $F = 6.01$ ) indicated significant F ratios in both cases with alpha set at .05. For both analyses, the Duncan test indicated that the two psychopathic groups were not significantly different from each other but on both analyses they had significantly greater scores than those of the other two groups (see Table 3). Thus, the sensory detection data are congruent with those reported by Hare (1968) and the report on the pain tolerance level is that which would have been predicted by Levander and Schalling (1963). These data suggest that psychopathic subjects have a diminished capacity to detect sensory stimuli. Also, they suggest that the previous reports of no differences in pain threshold between psychopathic and nonpsychopathic subjects may have been the product of manipulation or a response bias in those

studies. That is, the report here that psychopathic subjects have higher sensory detection thresholds and higher pain tolerance thresholds would suggest that psychopathic subjects may report a lower than true pain threshold in order to minimize painful stimuli in experimental situations. Thus, previous comparisons of psychopathic and nonpsychopathic subjects in other conditioning situations would be confounded by such a factor. Of course, this is merely a suggestion from the data; more sophisticated research is needed to clarify the issue. For the time being the "fact" that psychopathic subjects have higher sensory detection and pain tolerance thresholds but normal pain thresholds must remain a mystery.

The behavioral conditioning data can also be observed in Table 3. A 4 by 3 analysis of variance (groups times conditioning phases) was utilized. Two analyses were run: mean intensity of shocks utilized and proportion of countershocks to shocks by the confederate (Hokanson, et al, 1968 and Knot, et al, 1971). On both analyses both main effects were significant and the A times B interaction was significant with alpha set at .05. On both measures the baseline period data indicated that the two psychopathic groups were not significantly different from each other but were significantly more aggressive than the overcontrolled and control groups, which were not significantly different from each other. In the conditioning phase, both of the psychopathic groups showed no significant changes on either measure, that is,

Group	Mean Sensory Detection (in volts)	Mean Pain Threshold (in volts)	Mean Pain Tolerance (in volts)	Conditioning Period	Phase	Conditioning
Chronically Uncontrolled	4.71	20.11	60.16	2.17 (MI) 50.81 (MP)	1.16 (MI) 25.17 (MP)	2.43 (MI) 48.63 (MP)
Chronically Controlled	7.12	22.17	74.20	4.60 (MI) 80.63 (MP)	4.72 (MI) 88.11 (MP)	4.80 (MI) 81.51 (MP)
Manipulative Uncontrolled	7.46	23.56	76.77	4.21 (MI) 83.44 (MP)	4.02 (MI) 84.52 (MP)	4.34 (MI) 85.65 (MP)
Control	5.02	19.16	58.92	2.70 (MI) 58.19 (MP)	1.30 (MI) 38.63 (MP)	2.60 (MI) 60.60 (MP)

\*MI = mean intensity of shocks used by subject

\*\*MP = mean proportion of countershocks to shocks used by subject

the two psychopathic groups showed no conditioning effect whatever. Both the control and overcontrolled groups showed significant conditioning effects on both measures with the overcontrolled group showing a greater but statistically nonsignificant effect according to the Duncan test. In the post baseline period the psychopathic groups, not surprisingly, showed no significant changes over the previous two phases, whereas the other two groups showed returns to approximate original baseline levels. Thus the results of this study are clearly in line with the results of those studies which have reported that psychopathic subjects do not respond to avoidance conditioning paradigms. The present results, however, are more impressive in this respect than those of previous studies for the following reasons. First, the level of noxious stimuli were somewhat better controlled in this study than in previous studies and were, in fact, higher for psychopathic subjects than for nonpsychopathic subjects, thereby minimizing the possibility of the level of noxious stimulation being a confounding factor. Second, the psychopathic subjects in this study went through a more exhaustive selection process than any in previous studies and would appear to be a somewhat "purer" group than those used in previous studies. Third, in this study meaningful reinforcement was used in the avoidance conditioning paradigm, i.e., the use of points for cigarettes was assumed to be a meaningful reinforcement for all the subjects.

the kind of behavior that constituted the target behavior in the avoidance conditioning situation, i.e., nonaggressive responding, would appear to be more socially meaningful as a target behavior than previous target behaviors utilized in other studies.

The GSR and plethysmograph data should add considerably to the interpretation of the conditioning data, especially since they should provide some test of the notion that the lack of responsivity of psychopaths to avoidance conditioning paradigms is due to their having deficient fear responses which in turn is due to their having hypoactive ANS. However, the scoring of these data is an exhaustive, time consuming process which will not be completed for several months to come. When these data are completed, they will be submitted to the Institute in a supplementary final report.

#### Hormonal and chromosomal data

The testosterone analyses indicated some striking results. It was noted earlier that the normal range for plasma testosterone levels, determined in terms of micrograms per 100 mL of blood, is .10 to .98 for normal adult males in the age range of 22 to 40. In this study the range was from .41 to 1.62. The mean testosterone level for all subjects was a remarkable 1.01 micrograms per 100 mL of blood. Thus, the mean for this group was higher than the upper range reported for nonincarcerated males of the same age. Of course, we expected testosterone levels to

be higher in this group since these men would be assumed to be more aggressive than a comparable age group of nonincarcerated males, but we did not expect such a striking difference. These data might be explained in terms of the possibility that institutionalized individuals, all of them on basically the same diet and perhaps experiencing more frustration than nonincarcerated males, should have higher testosterone levels. These factors may well have played some role in these exceptionally high testosterone levels but it is interesting to note that there were significant differences among the different groups of subjects in their mean testosterone levels. An analysis of variance indicated a significant F ration for the four group comparison:  $F = 14.60$ ,  $p < .01$ . The means for the different groups were: chronically undercontrolled = 1.22, manipulative undercontrolled = 1.02, chronically overcontrolled = 1.01, and the control group = .79. The Duncan test indicated that the CU group had a significantly higher level of testosterone content than the other three groups, that the MU and CO groups were not significantly different from each other, and that the control group had significantly lower testosterone levels than the other three groups ( $p < .05$  in each case). Furthermore, in line with a recent report by Rose (1971), a significant correlation was observed between age of first arrest and testosterone level:  $r = .71$ ,  $p < .01$ . These data thus comprise the first two systematic studies which have tested the notion that

the general finding for other animal species, namely that of a significant positive relationship between aggressiveness and testosterone, may also hold for the human specie.

The chromosomal karotyping is now in progress at the Behavioral Genetics Institute on the campus of the University of Colorado. This is a time consuming process and two to three more months will be required to complete the analyses. When the analyses are finished, any abnormal chromosomal configurations will be observed and related to all other data on that subject, including, of course, his testosterone level in order to test the hypothesis that the mediating effect of the XYY syndrome is through increased levels of testosterone. The chromosomal data will be compiled and reported in the supplementary final report.

## VI. Conclusions and Recommendations

First, the present data indicate that psychopathic subjects do not readily respond to avoidance conditioning situations, which is another way of saying that their likelihood of benefiting from experience is low. This study, however, is by no means a definitive study in this regard. It may very well be that psychopathic subjects, at least some psychopathic subjects, can benefit from avoidance conditioning experiences if more appropriate variables and parameters of those variables are utilized. Thus, a pressing need would be to encourage more research by behavioral scientists into those factors which will produce successful avoidance conditioning with psychopaths. One hopeful sign in this regard is that several studies have reported that psychopaths respond to social and monetary reinforcers as well as nonpsychopathic subjects (e.g., Hare, 1970). Thus, the psychopathic subject is not impervious to other kinds of conditioning influences and thus is modifiable to some degree. However, it would seem critically important that a successful avoidance conditioning paradigm be developed that would be effective with psychopathic subjects as well as with nonpsychopathic subjects, for it is certainly true that the psychopath's lessened capacity to learn to avoid certain situations and people because those situations and/or people often mean that punishment will follow is an important factor in high recidivism.

Second, the present data are in accord with those of Megargee (1966) and Blackburn (1968) in that subjects in this study convicted of extremely violent crimes, such as murder, tended not to be psychopaths but rather to be chronically overcontrolled, high-anxious, high-guilt individuals. Such inmates would probably be excellent, or at least good parole risks, and this factor is one that prison parole boards should be made aware of in those cases where they are not already aware of this possibility. Also, given the psychological configuration of these subjects, it is highly debatable that they should be in a prison setting. In all probability, these subjects would benefit considerably more from being placed into a mental hospital setting where they could receive psychiatric treatment for their difficulties with anxiety and guilt. This would of course mean a rather dramatic change in the attitude of the public and law enforcement and criminal justice officials with regard to the murderer. He would no longer be viewed as a "sick psychopath" but more often as an individual who is overcontrolled with regard to emotional expression and one who tends to suppress more than other people feelings of hostility so that on occasion the hostility is released in a violent manner. Thus, such individuals should be directed to receive therapy that would teach them how to express and deal with feelings of hostility and frustration in a more constructive, adult manner than that which they have learned in the past.

Of course, very careful psychological testing would be in order to delineate the overcontrolled murderer from murderers who would not fall into this psychological category.

Third, there has been considerable speculation over the last fifty years that there are many different kinds of psychopaths. Several different investigators and clinicians have offered different typologies of psychopaths. Using empirical data from this study has reported two different patterns of psychopathic behavior. The CRPI data suggest that these two different types of psychopaths come from what would appear to be different kinds of home environments. One such environment seems to fit the kind of situation described by Maher, whereas the other pattern seems to fit more closely the type of punitive, authoritarian home environment that has been often described by investigators delving into the family backgrounds of delinquents and murderers. This is potentially an important finding, for it stresses that different patterns of home environments will need to be taken into account with in what hopefully will be early prevention programs aimed at ferreting out and treating psychopathic-prone young people. Intervention workers will need to be sensitized to these differences and different treatment plans would be called for in different home settings. Of course, the reports of this study need to be replicated and further extended in subsequent studies by other investigators before they are taken as the basis of action.

program. Clearly, however, the present report indicates a significant direction for future research in this field.

Fourth, the testosterone data, if replicated by other investigators, also has important implications for a prevention program. They suggest that early prevention programs may want to assess testosterone levels of predelinquents and young delinquents. Those boys whose testosterone levels were unusually high could be considered to be prime targets for early intervention programs, since one inference from these data and those of Rose (1971) is that young adolescent boys with unusually high testosterone levels are likely to continue engaging in aggressive behaviors. More basic research is needed in this regard. For example, is the greater tendency toward aggressivity of the high testosterone male the product of a higher susceptibility to the learning of aggressive behaviors at the onset of puberty when testosterone levels increase dramatically or is it more the product of a lower threshold for aggressive responding as the result of a higher level of testosterone that continues throughout adolescence and adulthood? Or, even more basically, is the higher testosterone level in fact a cause of a greater tendency toward aggressive behavior (which would be suggested by the animal research) or is the high testosterone level a product of the aggressive behavior, that is, are increased levels of testosterone an effect or a cause of aggressive behavior?

Generally speaking, the major conclusion that this author has reached as the result of this research and related experiences over the last several years in working in reform school and penitentiary settings is that the major focus of crime prevention and crime control efforts should be on early detection and prevention of the development of delinquent-criminal behavior patterns. In other words, emphasis should be placed on delinquency prevention programs if there is to be any significant and enduring impact on the crime problem in this country. The present data and the data of others indicates that most adult recidivists are psychopaths. The fact is that at this time psychiatric and other forms of treatment for psychopaths is woefully lacking. Most psychotherapists and most mental health workers consider the psychopath to be the individual least likely to benefit from therapeutic experiences. A clear inference from our avoidance conditioning data is that we have a long way to go, a great deal to learn, before we will be in a position to deal with the adult psychopath in a therapeutic fashion. Rehabilitation remains at this point more of a myth, a hope, than a fact. Thus, it would appear that two factors stand out as having the highest priority. First, a great deal more basic research needs to be done on the causes and correlates of psychopathy before we will be in a position to provide reliably effective rehabilitation for the adult psychopath. Second, considerably more effort needs to be directed toward the

development of early detection and prevention programs for those who have just begun to engage in criminal behaviors. This second point should perhaps receive the higher priority since (1) the first factor could take a long time before a reasonable degree of success was obtained and (2) prevention-oriented programs generally turn out to be more effective and economical to run than rehabilitation-oriented programs.

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