

**ASSESSMENT OF PSYCHOPATHY USING THE MMPI-A:
VALIDITY IN MALE ADOLESCENT FORENSIC PATIENTS**

by

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Title of Thesis/Project/Extended Essay

Assessment of Psychopathy Using the MMPI-A:

Validity in Male Adolescent Forensic Patients

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Abstract

Examined the validity and diagnostic efficiency of the Minnesota Multiphasic Personality Inventory - Adolescent version (MMPI-A; Butcher et al., 1992) with respect to a well-validated, clinical-behavioral measure of psychopathy, the Hare Psychopathy Checklist-Revised (PCL-R; Hare, 1991), in an adolescent forensic population. Participants were 95 male juvenile offenders court-referred to an inpatient assessment unit. Few MMPI-A Scale scores correlated positively and significantly with PCL-R Total scores. Correlations were higher with PCL-R Factor 2 than with Factor 1, as expected. No significant differences on PCL-R diagnoses were found for "invalid" versus "valid" MMPI-A Scale F scores (Stein, Graham, & Williams, 1995). Diagnostic efficiencies of MMPI-A Scales 4, 9, CON, and 4/9 and 4/CON profiles with regard to PCL-R score were poor (kappas = .05 to .30). MMPI-A scale CON had the best agreement with respect to PCL-R diagnoses (kappa = .30). Sensitivity, specificity, positive predictive power and negative predictive power were very low to moderate (.29 to .84) for a cutoff of $T \geq 65$. At a range of possible cutoffs other than $T \geq 65$, neither Scale 4 nor CON had acceptable diagnostic efficiency. These results indicate that the MMPI-A should be used only with caution to screen for psychopathy in young offenders.

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Table of Contents

Title Page	i
Approval Page	ii
Abstract.....	iii
Acknowledgements.....	iv
Table of Contents	v
List of Tables.....	vi
List of Figures	vii
Introduction.....	1
Method.....	20
Results.....	29
Discussion	43
References	54
Appendix A	61
Appendix B	63

List of Tables

1. Names and Abbreviations of MMPI-A Scales.....	5
2. Revised Psychopathy Checklist Items and Factor Loadings	12
3. Hypothesized Correlations Between MMPI-A Scales and PCL-R Scores	19
4. Validity Criteria for the MMPI-A.....	22
5. Part 1: Definition of Predictive Efficiency Terminology; Part 2: Definition of Terminology	28
6. Means for MMPI-A Scales by PCL-R Group.....	31
7a. Correlations of MMPI-A Scales Concurrently Associated with PCL-R Scores.....	32
7b. Correlations of MMPI-A Scales Convergently Associated with PCL-R Scores.....	33
7c. Correlations of MMPI-A Scales Not Predictably Associated with PCL-R Scores.....	34
8. Predictive Efficiency of MMPI-A Scales	41

List of Figures

1. Mean MMPI-A profiles for High, Medium, and Low psychopathy groups.	30
2. ROC curves for MMPI-A Scales 4 and CON.	42

Introduction

Adolescent offending is on the rise on North America, resulting in greater public interest in the matter and swelling the ranks of teenaged persons involved with the criminal justice system (Snyder & Sickmund, 1995). Assessing these individuals' personality functioning is vital for several reasons. First, answering the question of raising to adult court, sentencing issues (including treatment pre- and post-release), and risk to the community, are central to legal cases involving adolescents. Personality is relevant in these matters because, for example, Section 16(2) of the Young Offenders Act (regarding transfer to adult court) states that the maturity and character of the individual must be taken into consideration. In the interest of arriving at an appropriate disposition for the youth, a psychological assessment may be ordered to determine the individual's special needs, taking into consideration the notion of accountability and protection of society. Reasons for such an assessment include the strong link between personality and risk of reoffending, and availability of treatment in the various institutions. Second, determining fitness to stand trial or mental status at the time of the offense are of interest to the courts. It may be likely that an offender who experienced florid psychotic symptoms while committing the act was unable to distinguish between right and wrong or understand the consequences of their actions; however, there is little in the way of legal precedent to indicate that some personality disorders (e.g., Antisocial Personality Disorder) interfere sufficiently with volition to exempt the person from criminal responsibility. Finally, the community itself demands answers regarding causes of this escalation in delinquency, and possible solutions. These considerations can all be dealt with to differing degrees through psychological assessment. The state of the art of such assessment with adolescents includes both self-

report and interview methods, such as the Minnesota Multiphasic Personality Inventory for Adolescents (MMPI-A; Butcher et al., 1992), and Hare's Psychopathy Checklist-Revised (PCL-R; Hare, 1991). The current research aimed to establish the validity of the MMPI-A in a juvenile forensic population; specifically, the ability of the MMPI-A to identify the absence of psychopathy (as measured by the PCL-R) in this group was examined. In the following sections, these instruments will be discussed in detail, and their use in predicting psychopathic characteristics with juvenile forensic populations examined. However, as little research exists as yet regarding the assessment of psychopathy in adolescents, we must look to the ability of the MMPI to measure behaviour that is related to psychopathy. Delinquent, criminal, or aggressive behaviours are directly related to psychopathy; psychopaths start their criminal careers earlier, commit more numerous, more violent, and more varied types of crime, and recidivate at a higher rate than nonpsychopaths (Hart & Hare, in press). For this reason, the MMPI and its relationship to delinquency will be taken as a starting point for the review of the literature.

The Minnesota Multiphasic Personality Inventory

The MMPI (Hathaway & McKinley, 1942) and its successor, the MMPI-2 (Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989), are among the most widely used personality assessment devices in North America (Piotrowski & Lubin, 1990). Furthermore, they are the subject of several thousand research articles, books, and book chapters. The test's validity in identifying various types of psychopathology has been established repeatedly (e.g., Archer, Gordon, Giannetti, & Singles, 1988; Butcher & Williams, 1992; Roman, Tuley, Villanueva, & Mitchell, 1990). Besides its ability to detect personality pathology, the instrument's appeal stems from its objectivity, relative ease of

administration and scoring, rigorous standardization, enormous number of supplementary and content scales, and response-set measures, which help to quickly identify invalid or questionable profiles.

The MMPI has been used with varying degrees of success in adolescent samples since the earliest days of the device (e.g., Capwell, 1945a, 1945b, 1953; Hathaway & Monachesi, 1957, 1963). According to Archer (1992), the MMPI is the most frequently used objective personality assessment device with adolescents. Hathaway and Dahlstrom (1974) indicated that since an individual's personality and behaviours are largely predictable by adolescence, the results from personality assessment tools should be valid and replicable in this group. However, a lack of research into the use of the MMPI with this population has always existed (e.g., Archer, 1987). It was merely assumed that adult norms and scale descriptors would be valid with young subjects. Hathaway and Monachesi, in their landmark 1963 study of 15,300 grade 9 students from Minnesota, stated, "we do not advocate the use of special juvenile norms with the MMPI, since to do so would arbitrarily erase much of the contrast between adolescents and adults" (p. 39). Although this study did show that the MMPI was able to classify and predict adolescents' behaviour, this approach stifled analysis of the accuracy of applying adult norms and descriptors to adolescents. The unfortunate result of this was a dearth of information regarding use of the test with this group.

Research conducted since that time has led to the conclusion that adults and adolescents differ on the MMPI in terms of item endorsements, profile elevations, and code types (Butcher & Williams, 1992). According to Archer (1984), "adolescents, in contrast to adults, tend to report more unusual symptoms suggestive of serious psychopathology and

deviant social views (Scale F), greater impulsivity, rebelliousness, and antisocial attitudes (Scale Pd), and a greater sense of isolation and alienation from their social environments (Scale Si)" (p. 247). Adult norms and scoring procedures (e.g., application of K correction to scale scores) definitely should not be used with adolescent samples (Archer, 1984). In fact, even Marks, Seeman, and Haller's adolescent norms, established in 1974 and used as the unofficial standard for decades, were found to be inaccurate for contemporary teenaged subjects (Klinefelter, Pancoast, Archer, & Pruitt, 1990; Pancoast & Archer, 1988). Such revelations prompted the creation of a version of the instrument for adolescent subjects, the MMPI-A (Butcher et al., 1992).

The MMPI-A comprises of 478 items, of which the majority came from the original MMPI. Some items were reworded to make more sense with adolescents, whereas others were dropped because of offensive content. The only scale that underwent major revision was the F scale, because items from the adult version of this scale were endorsed too frequently by adolescents to accurately reflect unusual symptoms, as is the F scale's purpose. Many unnecessary items from Scale 5 were deleted in order to shorten the test for this group, as the MMPI-2 was deemed too long for teenagers to complete diligently. Several new validity scales, content scales, and supplementary scales were created to evaluate issues specific to this group, such as Immaturity, Conduct Problems, and School Problems. Clinical scale items require an average reading ability at the grade 6.7 level. The normative sample (N = 1,620) for the MMPI-A was designed to ensure agreement of the sample's demographics with the 1980 U.S. census, with good success (Archer, 1992). Table 1 presents the names and abbreviations of each MMPI-A scale for convenience.

Table 1

Names and Abbreviations of MMPI-A Scales

MMPI-A Scale Abbreviation	Scale Name or Description
<i>Validity Scales</i>	
VRIN	Variable Response Inconsistency
TRIN	True Response Inconsistency
F1	Infrequency (first half of test)
F2	Infrequency (second half of test)
F	Infrequency
L	Lie
K	Defensiveness
<i>Clinical Scales</i>	
1 (Hs)	Hypochondriasis
2 (D)	Depression
3 (Hy)	Hysteria
4 (Pd)	Psychopathic Deviate
5 (Mf)	Masculinity/Femininity
6 (Pa)	Paranoia
7 (Pt)	Psychasthenia
8 (Sc)	Schizophrenia
9 (Ma)	Hypomania
0 (Si)	Social Introversion
<i>Harris-Lingoes Subscales</i>	
D ₁	Subjective Depression
D ₂	Psychomotor Retardation
D ₃	Physical Malfunctioning
D ₄	Mental Dullness
D ₅	Brooding
Hy ₁	Denial of Social Anxiety
Hy ₂	Need for Affection
Hy ₃	Lassitude-Malaise
Hy ₄	Somatic Complaints
Hy ₅	Inhibition of Aggression
Pd ₁	Familial Discord
Pd ₂	Authority Problems
Pd ₃	Social Imperturbability
Pd ₄	Social Alienation
Pd ₅	Self-Alienation
Pa ₁	Persecutory Ideas
Pa ₂	Poignancy
Pa ₃	Naivete

table continues

MMPI-A Scale Abbreviation	Scale Name or Description
Sc ₁	Social Alienation
Sc ₂	Emotional Alienation
Sc ₃	Lack of Ego Mastery - Cognitive
Sc ₄	Lack of Ego Mastery - Conative
Sc ₅	Lack of Ego Mastery - Defective Inhibition
Sc ₆	Bizarre Sensory Experiences
Ma ₁	Amorality
Ma ₂	Psychomotor Acceleration
Ma ₃	Imperturbability
Ma ₄	Ego Inflation
Si ₁	Shyness/Self-Consciousness
Si ₂	Social Avoidance
Si ₃	Alienation - Self and Others
<i>Supplementary Scales</i>	
MAC-R	MacAndrew Alcoholism Scale - Revised
ACK	Alcohol/Drug Problem Awareness
PRO	Alcohol/Drug Problem Proneness
IMM	Immaturity
A	Anxiety
R	Repression
<i>Content Scales</i>	
ANX (A-anx)	Adolescent - Anxiety
OBS (A-obs)	Adolescent - Obsessiveness
DEP (A-dep)	Adolescent - Depression
HEA (A-hea)	Adolescent - Health Concerns
ALN (A-aln)	Adolescent - Alienation
BIZ (A-biz)	Adolescent - Bizarre Mentation
ANG (A-ang)	Adolescent - Anger
CYN (A-cyn)	Adolescent - Cynicism
CON (A-con)	Adolescent - Conduct Problems
LSE (A-lse)	Adolescent - Low Self-Esteem
LAS (A-las)	Adolescent - Low Aspirations
SOD (A-sod)	Adolescent - Social Discomfort
FAM (A-fam)	Adolescent - Family Problems
SCH (A-sch)	Adolescent - School Problems
TRT (A-trt)	Adolescent - Negative Treatment Indicators

As explained above, very little research has been conducted with adolescents using any version of the MMPI; the similarities between the original and the newer versions have been given as an excuse to avoid focusing on this sample. Given this lack of information specific to the instrument involved in the current study, research into use of the test with topics of juvenile and/or forensic interest conducted with the original MMPI must suffice.

The MMPI as a Measure of Aggression and Delinquency

Investigators who initially applied the MMPI to adolescent populations immediately saw the advantage of using the instrument to attempt to comprehend the escalating problem of juvenile delinquency (e.g., Capwell, 1945b; Hathaway & Monachesi, 1957, 1963). Hathaway and Monachesi (1957) acknowledged that while the MMPI was not created with assessment of juvenile delinquents in mind, it was not unreasonable to conclude that adult antisocial tendencies begin to appear in adolescence. They followed up 1,958 males who took the test in the ninth grade two and four years later, by checking police and court records, records of private agencies, as well as interviews with persons involved with the subject. The advantage of this method of data collection involves the common conception that not all delinquent behaviours are met with recorded legal involvement. Although 41% of boys had some sort of legal involvement by the four-year follow-up, only 7.5% of the sample had committed *serious* illegal acts. Regarding personality profiles, Scales 0, 2, and 5, and subjects with no high point-profiles showed lower rates of illegal acts; these scales were labeled "inhibitory scales" by Hathaway and Monachesi. Equal percentages of delinquents and non-delinquents were discovered to have elevations on Scales 1, 3, 6, and 7; therefore the authors inferred that these scales assessed factors not related to delinquency. Scales 4, 8, and 9 were correlated with increased rates of delinquency, and the

elevations of these scales were even higher if the illegal behaviours were rated as 4, highly delinquent. These scales Hathaway and Monachesi called "excitatory scales." Also, if more than one of Scales 4, 8, or 9 were elevated on a boy's profile, the delinquency rate was even higher. Scales 0, 2, and 5 were not only found to be associated with lower delinquency rates, but elevations on these inhibitory scales when combined with elevations on excitatory scales acted to suppress the delinquent effect of the factors that raised scores on 4, 8, or 9. This occurred even when the excitatory scale score was higher than that of the inhibitory scale. Most importantly, it was invalid profiles that were associated with the highest delinquency rate; 20% of these subjects were severely delinquent. Most of these invalid profiles had elevated F scores. The significance of high F scale scores will be dealt with below.

Huesmann, Lefkowitz, and Eron (1978) attempted to identify a weighted combination of scale scores that would provide a single score that could predict aggressive behaviour in adolescents. Not surprisingly, Scales 4 and 9, and to a lesser degree Scale 8, were found to be the highest correlates of aggression in males, while 4 and F were associated with aggression in females. The researchers arrived at a final regression equation of $F + 4 + 9$. Applying this equation to a delinquent sample, the authors found that the technique successfully differentiated delinquent from nondelinquent samples. One problem with this study involves the fact that the original sample of children were quite young when administered the MMPI; age 8 (grade 3) is much younger than the stated minimum required reading level of grade 6. This begs the question of whether the children were able to comprehend the items.

Weaver and Wooton (1992) found using discriminant analysis that with original MMPI and forensic adolescents, the MacAndrew Alcoholism Scale (MAC), Scale 4, and a special scale called Social Responsibility (Re) differentiated between high and low recidivists. Scale 4, Harris-Lingoes subscales Pd₂ (Authority Problems) and Ma₁ (Amorality), MAC, and Re differentiated between offenders with high and low levels of property offenses. However, no apparent correction was made for Type I error given the large number of correlations in this study. The authors conclude that the MMPI has poor discriminant validity with regard to assault and crime severity.

F scores. Other research has looked further at the "invalid" F score and its relation to criminality. Gynther (1961) found that the younger part of his 24-31 year old "behaviour disordered" sample of offenders more often had F scale raw scores greater than 16. Also, when matched for age and IQ, the neurotic subgroup obtained none of the invalid F scores, the psychotic group obtained 33% of these scores, while the behaviour disordered group had 67% of the F scores greater than 16. Finally, F scores were almost able to differentiate between violent and nonviolent criminals: aggressive criminals had F > 16 more often than "passive" criminals. Hathaway and Monachesi (1957) speculate that high F scores may be elevated in predelinquent (and therefore possibly adult criminal) populations for several reasons: carelessness in responding, poor reading skills, or presence of true psychopathology. Other studies have corroborated the mental illness, dissimulation, delinquency, and carelessness theories of high F scores (Archer, 1992; Gynther, 1961).

Stein, Graham, and Williams (1995) assessed the ability of the MMPI-A Validity scales to identify nonclinical adolescents instructed to fake-bad and both clinical and nonclinical subjects who received standard instructions. They found that the Validity scales

were capable of identifying those subjects who were faking-bad. The typical profile produced by such students included a highly elevated F scale T-score; L and K T-scores less than or equal to 50; spike elevations on Scales 6 and 8; and elevated scores on other scales, with the exception of Scale 5. A raw score cutoff of $F \geq 26$ was suggested to best discriminate between nonclinical male subjects who were faking-bad and those who responded honestly. This resulted in accurate classification of 72.4% of boys' faked profiles, and 98.3% of honest boys' profiles. To best discriminate between honest clinical responders and nonclinical fake-bad subjects, a raw F cutoff of ≥ 23 was suggested for use with either boys or girls. Accurate classification of 72.4% of boys who were faking and 100% of the boys in the clinical sample was achieved with this cutoff.

Summary. This body of research, initiated by Hathaway and Monachesi, has confirmed the notion that the MMPI is able to identify and predict delinquency in adolescents. Williams and Butcher (1989) and Archer and Klinefelter (1992) compared the code-type distribution of several samples used in the creation of the MMPI-A to those produced by the sample from the Marks et al. (1974) study. The researchers concluded that the responses to both the original and revised versions of the MMPI were highly similar, indicating that the MMPI-A is strongly related to the original MMPI. Therefore, the MMPI-A is quite likely able to assess constructs such as delinquency in the same manner as the original MMPI. Creation of the MMPI-A led to even higher hopes for this predictive ability, in that the newer test includes several scales specifically dealing with antisocial behaviours and correlates. However, as outlined above, little research has studied these new scales. Their correlation with other valid personality assessment instruments has yet to be thoroughly established. For this reason, the MMPI-A will be used in the current study in

conjunction with the Psychopathy Checklist-Revised (Hare, 1991) in furthering our comprehension of adolescent offenders.

Psychopathy and the Revised Psychopathy Checklist

The construct of psychopathy was most clearly described by Cleckley (1976), who outlined 16 characteristics of the psychopathic personality. These included: (1) superficial charm and above average intelligence; (2) freedom from psychosis; (3) freedom from neurosis; (4) irresponsibility; (5) lying; (6) lack of remorse or guilt; (7) antisocial acting out; (8) failure to benefit from experience; (9) narcissism; (10) poverty of affect; (11) poor insight; (12) lack of consideration for others; (13) tendency toward alcoholism and extreme loss of inhibition as a result; (14) low probability of suicidal tendencies; (15) promiscuity; and (16) poverty of life goals. In an effort to establish a reliable and accurate method of assessing psychopathy, particularly in prison populations where sentencing and treatment considerations can be strongly affected by this construct, Hare (1980, 1991) created a rating scheme based on these attributes (see Table 2). The current version of the checklist, the Hare Psychopathy Checklist-Revised (PCL-R), has 20 items which are scored as a 0 (*does not apply*), 1 (*item applies in some respects*), or 2 (*item definitely applies*). Possible scores range from 0 to 40, with scores higher than 30 considered diagnostic of psychopathy. The PCL-R has been found to consist of two correlated factors, one of which is similar to the DSM-IV (American Psychological Association, 1994) diagnosis of Antisocial Personality Disorder, entailing a persistently changeable lifestyle and criminal behaviour; the other involves personality traits such as lack of guilt, empathy, and emotional involvement with others (Hare et al., 1990; Harpur, Hakstian, & Hare, 1988; Harpur, Hare, & Hakstian, 1989). A semi-structured interview has been developed to assist in administration.

Table 2

Revised Psychopathy Checklist Items and Factor Loadings

Item Number	Description
Factor 1: Interpersonal and affective disturbances	
1.	Glibness/superficial charm
2.	Grandiose sense of self-worth
4.	Pathological lying
5.	Conning/manipulative
6.	Lack of remorse or guilt
7.	Shallow affect
8.	Callous/lack of empathy
16.	Failure to accept responsibility
Factor 2: Chronically unstable and unstable lifestyle	
3.	Need for stimulation
9.	Parasitic lifestyle
10.	Poor behavioral controls
12.	Early behavior problems
13.	Lack of realistic long-term goals
14.	Impulsivity
18.	Juvenile delinquency
19.	Revocation of conditional release
Items which do not load on either factor	
11.	Promiscuous sexual behavior
17.	Many short-term marital relationships
20.	Criminal versatility

Although both the semi-structured interview and file review are desirable in assessing psychopathy, Wong (1988) has shown that scoring the PCL-R from files alone is reliable. It has been found to be valid and reliable with male prison and forensic psychiatric populations (Hare, 1980, 1985, 1991; Harpur et al., 1988; Harpur et al., 1989; Hart & Hare, 1989; Hare et al., 1990) and most importantly for the current study, young male offenders (Forth, Hart, & Hare, 1990). Psychopathy, as measured by the PCL-R, predicts recidivism over and above demographic and criminal history information (Hart, Kropp, & Hare, 1988).

Researchers have assessed the validity of the PCL-R with adolescent male offenders (Forth et al., 1990) as well as with children aged 6 to 13 (Frick, O'Brien, Wootton, & McBurnett, 1994). Frick et al. (1994) found a version of the PCL for children, the Psychopathy Screening Device (PSD), to have a factor structure similar to that observed with adult populations described above. With adolescents (i.e., above age 13), the PCL-R performed very much as it does with adults in terms of score distributions, reliability and validity, correlations with crime variables, and psychopathy base rates. Therefore it is assumed that research with the PCL-R in adults is generalizable to adolescent populations. For use with young persons, the PCL-R requires modification in several respects, to account for their limited life experiences. Because it is thought that youths will have had less practice at being glib than adults, Item 1 (Glibness/Superficial Charm) is scored as 2 if the participant attempted to be charming, regardless of the success of the attempt. Item 5 (Conning/Manipulative) does not require the participant to have been involved in elaborate frauds in order to be scored as 2; smaller scale scams, and threatening behaviour aimed at obtaining material gain or revenge are sufficient for receiving the full score. Most adolescents are expected to be dependent on their parents or other caregivers to some

extent, which necessitates a change to Item 9 (Parasitic Lifestyle): an attitude of unrealistic entitlement is scored as a 2. The lifespan of adolescents precludes them from having had many marital relationships of any length, so Item 17 (Many Short-term Marital Relationships) is coded as 2 if the participant has had more than three sexual relationships lasting less than four months, or if longer relationships were highly unstable. Finally, the shorter lifespan of these individuals also limits the number of different types of offenses in which they can have engaged. Therefore, Item 20 (Criminal Versatility) is scored as 2 if the participant has committed four or more types of offenses, rather than six as in the case of adults. Occasionally insufficient information prohibits scoring of an item, or the item does not apply in certain cases; these items are omitted, and the remaining items are prorated to a possible maximum score of 40.

Only a small number of studies have attempted to determine the extent of agreement between the PCL-R and personality inventories. Hart, Forth, and Hare (1991) examined the concurrent validity of the PCL-R with the Millon Clinical Multiaxial Inventory-II (MCMI-II; Millon, 1987), a self-report personality assessment device. They found that while the MCMI-II adequately tapped the more behavioural components of psychopathy (Factor 2), it failed to evaluate the personality variables inherent in psychopathic individuals (Factor 1). The self-report nature of the instrument was seen as an explanation for the low correlations between the observer rating-based PCL-R and MCMI-II. Similar results were observed by Hare (1985) when he correlated the PCL with several tests, including self-reports such as the Socialization scale of the California Psychological Inventory (CPI; Gough, 1969), a paper and pencil version of the PCL, and the original MMPI. Discriminant analysis with extreme (high and low) psychopathy groups showed the MMPI was able to correctly

classify 73% of inmates into these groups. However, the self-reports again correlated to a lower degree with the PCL than did procedures based on clinical judgment (e.g., global ratings of psychopathy). As Hart et al. (1991) assert, the relationship between clinical and self-report methods of assessment should not be expected to be very high, because of response styles, the self-report/observer method discrepancy, and unreliability in assessment. As long as these issues are understood, however, they do not preclude use of self-report methods in assessment; such methods can be extremely valuable in terms of screening for psychopathology.

Statement of the Problem

The lack of research involving the MMPI-A or the MMPI and adolescents (either general samples, or adolescent offenders more specifically) detracts from the MMPI-A's usefulness with this group. Questions regarding its validity and reliability in populations outside of the standardization group remain unanswered. Such uncertainty is most undesirable in any situation where the test is used in diagnosis, but it is especially detrimental in cases where the justice system is involved. Sentencing, decisions regarding criminal responsibility due to a mental disorder, and ability to stand trial can all be affected by the results of personality tests. No mental health professional relishes the idea of having to defend in court a decision based on a test whose validity is in doubt; however, through oversight or poor judgment, the possibility exists that the MMPI-A may be used in situations where there is little evidence of the inventory's validity. In a juvenile forensic population, one of the most important questions is whether the individual shows psychopathic traits, as the presence of such characteristics can impact on legal decision-making.

As described above, certain codetypes on the MMPI, such as the 4-9 profile, appear to be reasonably successful at distinguishing offenders from nonoffenders. It is doubtful, though, that this code-type would be uniquely related to the diagnosis of psychopathy; therefore although most psychopaths may have a 4-9 profile, so would most general offenders. However, it was seen as probable that offenders who did not display the 4-9 code-type would not be psychopaths. Therefore, while few would expect (given past research, e.g., Hare, 1985; Hills, 1995) that the MMPI-A could successfully predict the *presence* of psychopathy, it may be possible that the MMPI-A can predict the *absence* of psychopathy. This quality could be useful in terms of screening for the disorder, allowing clinicians to save time by not administering the lengthy interview to individuals who are likely not psychopathic.

Therefore, the major question of this research was: what is the relation between the MMPI-A and the PCL-R in a juvenile forensic population? The purpose of this study was first, to examine the pattern of correlations between the PCL-R and MMPI-A, and second, to determine how well MMPI-A scale scores predicted the absence of psychopathy as measured by the PCL-R in young offenders.

Given the results of the research with the MMPI, MMPI-2 and crime/antisocial behaviour/psychopathy (e.g., Hare, 1985; Hathaway & Monachesi, 1957), the following hypotheses were put forth (see Table 3):

1. *Concurrent validity*. Scores on the PCL-R (i.e., more psychopathic traits) will be associated to a moderate degree ($r \approx .30$) with scores on several scales of the MMPI-A: 4, including Harris-Lingoes subscales; 9, including all Harris-Lingoes subscales; and Adolescent-Conduct Problems (A-CON; hereafter referred to as CON).

2. *Convergent validity.* Other scales expected to be positively correlated with PCL-R scores are F (including F₁ and F₂), 8 (including Harris-Lingoes subscales), Adolescent-Alienation (A-ALN), -Anger (A-ANG), -Cynicism (A-CYN), -Family Problems (A-FAM), and -School Problems (A-SCH). These positive correlations were predicted because of the obvious similarity of these difficulties and those from which many psychopaths suffer. Some supplementary scales also should be related to PCL-R scores. As psychopathy is seen to be related to substance abuse problems (Cleckley, 1976; Hemphill, Hart, & Hare, 1994; Smith & Newman, 1990), PCL-R scores were expected to be positively correlated with scores on the MacAndrew Alcoholism Scale-Revised (MAC-R), Alcohol/Drug Problem Proneness scale (PRO), and Alcohol/Drug Problem Acknowledgment scale (ACK). Finally, many researchers believe that the root of psychopathy is impaired (slowed) development, moral and otherwise (Chandler & Moran, 1990; Kegan, 1986). Therefore, it was believed that higher scores on the PCL-R should be related to high Immaturity scale scores (IMM).
3. *No or negative association.* Slight negative or no correlations were expected with the remaining Validity, Clinical, and Content scales (see Table 3), as past research has demonstrated their inhibitory effect on delinquency (Scales L, K, 2, 5, and 0; Hare, 1985; Hathaway & Monachesi, 1957), or because these problems are incompatible with the construct of psychopathy (e.g., Cleckley, 1976).
4. *Exploratory correlations.* To better understand the pattern of observed correlations with PCL-R Total score, partial correlations were conducted controlling for the two factors of the PCL-R. Factor 1 is made up of several items relating to personality style and interpersonal relations, whereas Factor 2 relates to the antisocial behaviour and

unstable lifestyle aspect of the disorder, which is correlated with the DSM diagnosis of Antisocial Personality Disorder. It was thought that Factor 2 would be more highly correlated with most of the scales of the MMPI-A, since they tend to assess more of the behavioural or social deviance components of psychopathy. These analyses were not tested for significance as they were purely aimed at clarification of the existing correlations with PCL-R Total score.

Diagnostic efficiency. The results of past research with personality disorders other than psychopathy (e.g., Hills, 1995; Schotte, De Doncker, Maes, Cludyts, & Cosyns, 1993) indicate that the MMPI may be capable of identifying the absence of personality disorders (i.e., screening for disorders). This, combined with general prediction research suggesting that the positive prediction of abnormal behaviour is very difficult (Cooke, 1996) points to the hypothesis that the MMPI-A will perform better at screening out the possibility of a disorder than screening in or suggesting the diagnosis.

Table 3

Hypothesized Correlations Between MMPI-A Scales and PCL-R Scores

Hypothesis	Relevant MMPI-A Scales	Expected Association with PCL-R
H ₁	4 (Pd; Pd ₁ , Pd ₂ , Pd ₃ , Pd ₄ , Pd ₅) 9 (Ma; Ma ₁ , Ma ₂ , Ma ₃ , Ma ₄) CON	Moderate and positive ($r \approx .30$)
H ₂	F (F ₁ , F ₂) 8 (Sc; Sc ₁ , Sc ₂ , Sc ₃ , Sc ₄ , Sc ₅ , Sc ₆) MAC-R ACK PRO IMM ALN ANG CYN FAM SCH	Small and positive ($r \approx .15 - .30$)
H ₃	VRIN TRIN L K 2 (D) 3 (Hy) 5 (Mf) 6 (Pa) 7 (Pt) 0 (Si) Remaining Harris-Lingoes and Content scales	None or negative ($r \approx 0$)

Method

Participants

This study used the files of 95 male adolescents admitted to Youth Court Services Inpatient Assessment Unit (IAU) for a court-ordered psychological evaluation under Section 13 of the Young Offenders Act. This setting is an 11 bed short-term psychological and psychiatric assessment unit of the Ministry of Health Forensic Psychiatric Services Commission in Burnaby, BC. The sample used in the present study comprised approximately 27% percent of the 300 to 400 individuals who pass through the IAU per year. Participants were those residents of the IAU between September 1992 and July 1995 who had completed the MMPI-A and had a PCL-R assessment conducted. Difficulties arose during data collection which precluded recording of full demographic data for each participant. A random selection of files were examined in more depth to estimate the range of ages and offense types, and to ensure that the sample was not comprised of a disproportionate amount of certain types of offenders. Ages ranged from 13 to 18. Offenses ranged from breach of probation, to multiple property offenses, to first degree murder, with some individuals being assessed for transfer to adult court. No identifying characteristics were recorded, beyond client file numbers to cross-reference information. There was no contact between the researcher and participants. Ethical approval was obtained from the clinical director of research at Youth Court Services, and from the Simon Fraser University ethics committee.

Procedure

The MMPI-A. Scores on the MMPI-A Clinical, Supplementary, Harris-Lingoes, and Content scales were collected from a computerized database of individuals from the

IAU. The test was administered under the conditions suggested by Butcher et al. (1992; e.g., private desk, quiet surroundings) as part of a standard assessment battery in the IAU. The administrators were trained psychometric assistants who were unaware of the current research. MMPI-A responses were scored by a computer program obtained from National Computing Services and T-scores were entered directly into the database by the participant's institutional file number.

The effect of invalid profiles on the pattern of correlations between the PCL-R and concurrently-related scales (Scale 4, 9, CON, and ANG) was explored. Both possibly invalid ($n = 26$) and definitely invalid ($n = 4$) profiles (Butcher & Williams, 1992; see Table 4) were considered. Rules for classifying a profile as possibly invalid include meeting any or all of the following: (1) VRIN or TRIN between T-scores of 70 and 74; (2) Scales L or K greater than or equal to $T = 65$; or, (3) Scale F T-score between 80 and 109. A profile is classified as definitely invalid if: (1) VRIN or TRIN are greater than $T = 75$; or, (2) F is greater than or equal to $T = 110$. Any profiles which met these criteria were dropped from analyses and in a second set of analyses were also partialled out. As no significant differences were found in the patterns of correlations, both possibly and definitely invalid profiles were included in subsequent analyses to maximize generalizability and power. Moreover, since only four profiles were classified as definitely invalid, it is unlikely that these few would make a significant impact on overall results.

The PCL-R. PCL-R Factor 1, Factor 2, Total scores were used to identify characteristics of psychopathy; both file and interview information were used in the scoring of the PCL-R for young offenders, as discussed above. These assessments were

Table 4

Validity Criteria for the MMPI-A

Level of Invalidity	MMPI-A Scale and Required T-Score
Possibly Invalid	(1) TRIN or VRIN = 70-74, (2) L or K \geq 65, or (3) F = 80-109
Definitely Invalid	(1) TRIN or VRIN \geq 75, or (2) F \geq 110

completed by research assistants trained in the scoring of the PCL-R who were not associated with the current researcher and who were unaware of this research. Again, problems during data collection precluded collection of complete PCL-R data (e.g., item scores) for each participant. As only summary PCL-R data and scores from one rater were available for this study, no validity indices could be calculated. However, past research at this site using adolescent sexual offenders and with the individuals who conducted the PCL-R assessments in this study indicate that the PCL-R is reliable in this setting (Gretton, McBride, Lewis, O'Shaughnessy, & Hare, 1994; Lewis et al., 1994).

In the present sample, PCL-R Total scores ranged from 11.8 to 36, with a mean of 25.35 ($SD = 5.62$). All PCL-Rs were valid; that is, not more than five items were omitted. Forth et al. (1990) in a similar sample reported a mean of 26.2 ($SD = 7.5$). The means for PCL-R factors were 10.24 ($SD = 2.69$, range: 4 to 15) and 11.33 ($SD = 2.64$, range: 5 to 16), for Factors 1 and 2, respectively. The base rate for psychopathy was 26% (24 of 92 subjects), which is similar to that reported by Forth et al., at 36% (27 of 75 inmates).

Analyses

Descriptive analysis. Mean T-scores for all MMPI-A scales were calculated for the entire sample, as well as by Low ($n = 16$), Medium ($n = 52$), and High ($n = 24$) psychopathy groups (based on PCL-R scores of < 20 , 20 to 29.9, and ≥ 30 , respectively). The profile for each group was inspected visually in comparison to the results of past research (Hare, 1985); results were found to be generally consistent with expectations, with peaks at Scales 4 and 9. As Hare also observed, some T-scores of High and Medium psychopathy groups tended to be quite close, especially on Scales 4 and 6.

Correlations. Given the large number of MMPI-A scales, Type I error rate for the correlations was controlled by using a Bonferroni correction applied according to the following rationale (see Table 3): because not all possible MMPI-A scales were expected to correlate meaningfully with PCL-R scores, subsets of scale scores were correlated with PCL-R scores according to their hypothesized relationship. According to Hypothesis 1, Scales 4, 9, and CON were expected to correlate most highly with psychopathy.

Correlations with PCL-R Total scores were tested at the level $\alpha_{\text{one-tailed}} = .05/3 = .02$.

Secondly, in accordance with Hypothesis 2, scales providing convergent information were tested as a cluster, including A-SCH, A-FAM, A-ANG, A-CYN, A-ALN, MAC-R, ACK, PRO, and IMM, at $\alpha_{\text{one-tailed}} = .05/11 = .005$. Finally, in accordance with Hypothesis 3, correlations with PCL-R Total scores were tested at $\alpha_{\text{two-tailed}} = .05/20 = .003$.

Predictive efficiency: Traditional analyses. One drawback to correlational analyses is the fact that they provide little information regarding the ability of the scales to predict behaviour or scores on other tests. To be useful in prediction or diagnosis, a test does not have to predict with perfect accuracy, but those errors that it does make must be in predictable or understandable directions. For example, a test can make many false positive errors (meaning it is relatively useless for suggesting diagnoses), but as long as it reliably makes few false negatives, it can be used in screening to rule out the possibility of a diagnosis. To evaluate the possibility that scales of the MMPI-A may have such abilities, the diagnostic efficiencies of Scales 4, 9, CON, and the 4-9 and 4-CON profiles were calculated with respect to low versus high scores on the PCL-R. The cutoffs for the MMPI-A scales for initial analyses was the suggested clinical "suspicion" cutoff (Butcher et al., 1992) of $T \geq 65$. For the PCL-R, individuals were separated into low (i.e.,

nonpsychopathic) versus high psychopathy on the basis of the accepted cutoff for diagnosis of psychopathy of 30 ($\geq 30 =$ psychopath, $< 29.9 =$ nonpsychopath). Several traditional indices of diagnostic efficiency were calculated, following the methods set out by Baldessarini, Finkelstein, and Arana (1983), and Widiger, Hurt, Frances, Clarkin, and Gilmore (1984) (see Table 5).

Sensitivity is the true positive rate, the conditional probability of having the symptom in question, given that the individual has the disorder (see Table 5); it is independent of the base rate of the disorder. A sensitivity of 70% for a given symptom indicates that 70% of individuals with the disorder will also have the symptom. *Specificity*, the true negative rate, is the conditional probability of not having the symptom, given the absence of the disorder.

Although this information is interesting, it is not that with which most clinicians are primarily concerned. Part of the reason for this is that it is possible to have a high conditional probability of the presence of a symptom given the existence of the disorder, but a low conditional probability of the disorder's existence given the presence of the symptom. Clinicians typically want to know the opposite information, the probability of having a diagnosis of psychopathy given the presence of the symptom, for example, elevation on Scale 4. Furthermore, prediction of abnormal behaviour is very difficult, especially when it is associated with a low base rate, as is most abnormal behaviour (Cooke, 1996). As the base rate of a disorder diverges from .50, it becomes increasingly troublesome to predict above chance levels, because the *positive predictive power* (PPP; identification of presence of a disorder; see Table 5 for definition) is low with low base rates, while *negative predictive power* (NPP; ruling out presence of a disorder) increases with lower base rates

(Baldessarini et al., 1983). For this reason, the present study focused on screening out the diagnosis of psychopathy, rather than identifying or confirming the diagnosis of the disorder. This is the approach generally taken in medicine, and past research agrees (Cooke, 1996; Hills, 1995; Schotte et al., 1993), furthermore, it is the most ethically defensible approach. As NPP and PPP are mathematically independent, it is possible that a symptom is not an efficient marker for inclusion (i.e., low PPP) but is very efficient as an exclusion criterion (i.e., high NPP).

Predictive efficiency: Receiver operating characteristics. Sensitivity, specificity, PPP, and NPP are calculated for only one possible cutoff score, in this case on the MMPI-A. They give no information about any other possible cutoffs, which may be useful if a clinician sees the need to change the cutoff in a certain setting, where the base rate may be significantly different from that in which the test was validated, or when the risks involved in making a certain type of error (false positives, false negatives) are overriding. According to Mossman (1994), receiver operating characteristic (ROC) methods "describe accuracy with indices of performance that are unaffected by base rates or by clinicians' biases for or against Type I or Type II prediction errors" (p. 783). The test's total performance can only be displayed by plotting the true positive rate (TPR, also known as sensitivity) against the false positive rate (FPR, or $1 - \text{specificity}$) for each desired possible cutoff. This produces a curve which is known as an ROC curve, since the receiver of the test information (i.e., a clinician) can choose to operate at any cutoff point along the curve (Metz, 1978). The computer program ROCFIT was used to calculate the ROC curve points. It is designed to perform a maximum likelihood estimation of the binormal curve (Metz, Shen, Wang, & Kronman, 1989).

The area under the ROC curve (AUC) is a common method of summarizing the overall predictive efficiency of the scale across the entire range of, in this case, possible MMPI-A cutoff values. AUC is the probability that an actually psychopathic individual, randomly selected from the sample, would be classified as psychopathic by the test; it ranges from perfect accuracy of 1.0 to chance-levels of accuracy, at .50. To evaluate the diagnostic efficiency of different MMPI-A cutoffs in identifying or screening for psychopathy, ROC curves were calculated for Scales 4 and CON, which were predicted to be moderately positively correlated with PCL-R scores. As the predictive efficiency of Scale 9 traditionally calculated was poor, an ROC curve for it was not calculated.

Table 5

Part 1: Definition of Predictive Efficiency Terminology

Test Result	Diagnosis		Total
	Positive	Negative	
Positive	a (True positives)	b (False positives)	a + b
Negative	c (False negatives)	d (True negatives)	c + d
Total	a + c	a + d	a + b + c + d; N

Part 2: Definition of Terminology

Term	Definition	Computation
Sensitivity	True +/all Dx	$a/(a + c)$
Specificity	True -/all no Dx	$d/(b + d)$
False positive rate	False +/all no Dx	$b/(b + d)$
False negative rate	False -/all Dx	$c/(a + c)$
Positive Predictive Power	True +/all +	$a/(a + b)$
Negative Predictive Power	True -/all -	$d/(c + d)$
Hit rate	True results/all tests	$(a + d)/N$
Base rate	All Dx/all participants	$(a + c)/N$

Note: After Baldessarini et al. (1983) and Widiger et al. (1984). + = positive test result; - = negative test result; Dx = diagnosis present; no Dx = diagnosis absent.

Results

MMPI Profiles

The mean T scores for each Validity, Clinical, Supplementary and Content scale are presented in Table 6. Figure 1 shows the Validity and Clinical scale profiles in graphical form. Means were subdivided into those for Low, Medium, and High psychopathy groups; means for the total sample are presented as well. As expected, psychopaths (High group) were most elevated on MMPI-A Scales F, 4, 8 and 9. Unexpectedly, psychopaths were also highest on Scales 6 and 7. It is understandable, given their legal situation, that psychopaths feel somewhat persecuted, leading to their endorsement of apparently paranoid symptoms. Why psychopaths should feel this more so than nonpsychopaths, or why psychopaths should endorse symptoms of anxiety and obsessiveness (Scale 7) is unclear, however.

Association Between PCL-R and MMPI-A Scales

Concurrent validity. MMPI-A scale correlations with PCL-R Total, Factor 1, and Factor 2 scores are presented in Table 7a. Significant positive correlations were expected and found between PCL-R Total scores and MMPI-A Scales 4 and CON. Unexpectedly, no significant association was found between Scale 9 and PCL-R scores. Correlations between PCL-R scores and Harris-Lingoes subscales for Scales 4 and 9 were examined only to understand the pattern of correlations observed with the Clinical scales and therefore were not tested for significance. Subscales that correlated at least moderately with PCL-R Total scores were Pd₂ (Authority Problems), Pd₅ (Self - Alienation), Ma₂ (Psychomotor Acceleration), and Ma₄ (Ego Inflation). These subscales all relate on an obvious level to the construct of psychopathy. Interestingly, the scales which did not

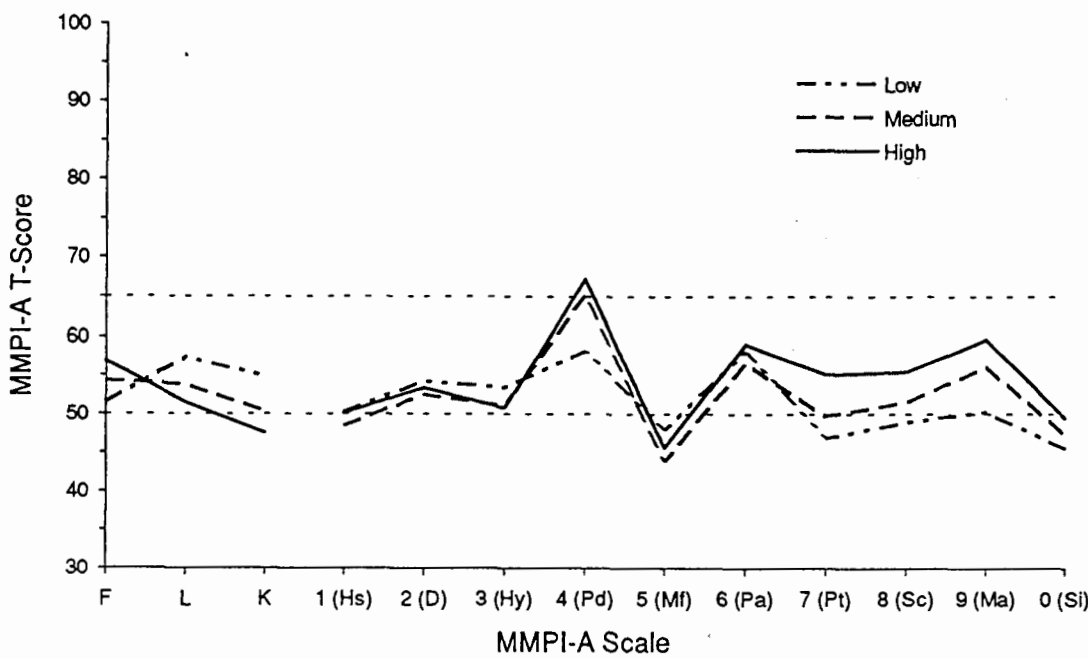


Figure 1. Mean MMPI-A profiles for High, Medium, and Low psychopathy groups.

Table 6

Means for MMPI-A Scales by PCL-R Group

MMPI-A Scale	Psychopathy Group			Total Sample
	Low	Medium	High	
F	51.50 (9.40)	54.27 (8.79)	56.79 (10.68)	54.45 (9.47)
L	57.31 (10.68)	53.75 (9.82)	51.50 (9.87)	53.78 (10.05)
K	54.88 (11.56)	50.29 (9.93)	47.50 (7.38)	50.36 (9.84)
1 (Hs)	50.25 (10.31)	48.38 (8.02)	50.08 (8.73)	49.15 (8.58)
2 (D)	54.19 (8.50)	52.44 (7.70)	53.38 (9.70)	52.99 (8.34)
3 (Hy)	53.38 (7.84)	51.06 (8.80)	50.75 (8.46)	51.38 (8.51)
4 (Pd)	58.13 (10.14)	65.25 (12.72)	67.25 (9.01)	64.53 (11.73)
5 (Mf)	47.81 (11.21)	43.79 (9.00)	45.58 (9.96)	44.96 (9.67)
6 (Pa)	58.19 (10.46)	56.60 (10.64)	59.08 (13.11)	57.52 (11.23)
7 (Pt)	46.81 (8.55)	49.69 (10.55)	55.13 (13.13)	50.61 (11.24)
8 (Sc)	48.94 (12.53)	51.44 (11.75)	55.46 (11.97)	52.05 (12.01)
9 (Ma)	50.19 (7.47)	56.10 (14.58)	59.63 (11.11)	56.00 (13.00)
0 (Si)	45.50 (11.08)	47.40 (9.80)	49.50 (10.85)	47.62 (10.27)

Note: Standard deviations in parentheses.

Table 7a

Correlations of MMPI-A Scales Concurrently Associated with PCL-R Scores

MMPI-A Scale	PCL-R Score		
	Total	Factor 1	Factor 2
4 (Pd)	.23*	.02	.17
Pd ₁	.13	.13	.04
Pd ₂	.20	-.02	.16
Pd ₃	.01	.03	.03
Pd ₄	.16	.08	.04
Pd ₅	.20	-.06	.17
9 (Ma)	.18	.14	.08
Ma ₁	.05	.04	.00
Ma ₂	.27	.05	.20
Ma ₃	-.10	.03	-.07
Ma ₄	.18	.19	.01
CON	.29**	.15	.06

Note: Only Scales 4, 9, and CON were tested for significance. Inflated Type I error rate was controlled by setting familywise α (one-tailed) at $.05/3 = .02$. Correlations involving Factor 1 and Factor 2 are two-tailed partial correlations not tested for significance. * $p_{\text{familywise}} < .05$; ** $p_{\text{familywise}} < .01$.

Table 7b

Correlations of MMPI-A Scales Convergerly Associated with PCL-R Scores

MMPI-A Scale	PCL-R Score		
	Total	Factor 1	Factor 2
F	.21	.13	.09
F1	.16	.12	.06
F2	.19	.11	.11
8 (Sc)	.17	.03	.16
Sc ₁	.08	.08	.03
Sc ₂	.11	.08	.09
Sc ₃	.27	-.02	.22
Sc ₄	.19	.06	.17
Sc ₅	.27	.05	.19
Sc ₆	.14	-.00	.16
MAC-R	.21	-.10	.22
ACK	.34**	-.01	.32
PRO	.17	-.02	.14
IMM	.17	.04	.12
ALN	.05	.11	-.06
ANG	.34**	-.03	.29
CYN	.21	.12	.03
SCH	.21	.02	.13
FAM	.11	.11	.02

Note: Only Scales F, 8, and Supplementary and Content scales were tested for significance. Inflated Type I error rate was controlled by setting familywise α (one-tailed) at $.05/11 = .005$. Correlations involving Factor 1 and Factor 2 are two-tailed partial correlations not tested for significance. * $p_{\text{familywise}} < .05$; ** $p_{\text{familywise}} < .01$.

Table 7c

Correlations of MMPI-A Scales Not Predictably Associated with PCL-R Scores

MMPI-A Scale	PCL-R Score		
	Total	Factor 1	Factor 2
VRIN	.07	.10	-.03
TRIN	.06	.05	-.06
L	.14	.06	-.13
K	-.19	-.01	-.12
1 (Hs)	.02	-.17	.13
2 (D)	-.00	-.15	.19
D ₁	.10	-.08	.18
D ₂	-.09	.03	-.07
D ₃	-.06	-.10	.06
D ₄	.20	-.10	.25
D ₅	.07	-.11	.15
3 (Hy)	-.06	-.15	.15
Hy ₁	.03	.00	.05
Hy ₂	-.17	-.07	-.08
Hy ₃	.18	-.08	.23
Hy ₄	-.08	-.21	.11
Hy ₅	-.10	.13	-.12
5 (Mf)	-.04	.01	.06
6 (Pa)	.07	.12	.03
Pa ₁	.11	.09	.05
Pa ₂	.18	.17	.04
Pa ₃	-.26	-.08	-.12
7 (Pt)	.24	.03	.19
0 (Si)	.12	.05	.07
Si ₁	-.04	.01	-.04
Si ₂	.05	.12	-.11
Si ₃	.38*	.09	.24
ANX	.19	.06	.17
OBS	.30	.05	.21
DEP	.06	-.01	.08
HEA	.02	-.18	.18
BIZ	.09	.12	-.01
LSE	.05	-.07	.13
LAS	.19	-.11	.26
SOD	.06	.13	-.13
TRT	.24	.09	.13

Note: Harris-Lingoes subscales were not tested for significance. Inflated Type I error rate was controlled by setting familywise α (two-tailed) at $.05/20 = .003$. Correlations involving Factor 1 and Factor 2 are two-tailed partial correlations not tested for significance. * $p_{\text{familywise}} < .05$; ** $p_{\text{familywise}} < .01$.

correlate with Total scores on the PCL-R involved having a lack of morals, the ability to conduct oneself in social situations, and being socially isolated. These would also be consistent with theory on psychopathy, so the lack of association with PCL-R Total scores is remarkable.

Convergent correlations. ACK (Alcohol Drug Problem Acknowledgment) and ANG (Adolescent-Anger) were the only scales to be significantly associated with PCL-R Total scores (see Table 7b). The correlation of PCL-R Total scores with ACK is unusual given theory on psychopathy. ACK is conceptually related to personal insight, in which psychopaths are typically deficient. Furthermore, MAC-R and PRO were unexpectedly nonsignificant. It is possible that in this population, these scales related to drug and alcohol abuse do not measure these constructs as they were created. ANG was significantly correlated with Total scores, of which the majority of the association seems to be accounted for by Factor 2; if expression of anger is seen as a Factor 2 trait, this is consistent with theory.

Contrary to expectations, IMM, CYN, FAM, and SCH were uncorrelated with PCL-R Total scores. Examination of partial correlations with the PCL-R Factor scores revealed that IMM, CYN, and SCH were correlated slightly more with Factor 2 than with Factor 1. FAM, on the other hand, correlated more with Factor 1 than with Factor 2. In every case, though, the correlations with PCL-R Total and Factor scores were small in magnitude and nonsignificant.

No predicted association. An unexpected significant correlation was found for PCL-R Total score and Scale Si₃ (Alienation - Self and Others) (see Table 7c). According to psychopathy theory, psychopaths should be somewhat alienated from both themselves

(through poor insight) and from others (through lack of empathy). The finding of a significant correlation between PCL-R Total and a complementary association with Factor 2 scores, although unexpected, is therefore not seen to be discrepant with regard to the construct of psychopathy. Scales that tended toward significance with Total scores were OBS (Obsessiveness), Pa₃ (Naivete), Sc₃ (Lack of Ego Mastery - Cognitive), and Sc₅ (Lack of Ego Mastery - Defective Inhibition), but as they were nonsignificant, they do not warrant further comment.

Exploratory factor correlations. As explained above, correlations were expected to be higher between MMPI-A scales and PCL-R Factor 2 scores than Factor 1. Partial correlations support these hypotheses to a limited extent. For the most part, any significant findings for PCL-R Total score were matched by correlations with Factor 2 scores. This was true for Scale 4, ACK, ANG, and Ma₂ (Psychomotor Acceleration). Notably, the correlation of CON with PCL-R scores was sizable for Factor 1, whereas for Factor 2 the correlation was much smaller. However, the majority of the association between CON and the PCL-R is accounted for by Total scores. Although CON was constructed to assess conduct disordered *behaviour* (i.e., Factor 2-type issues), the results suggest that it does a slightly better job of measuring the interpersonal aspects of psychopathy (Factor 1).

Diagnostic Efficiency of MMPI-A Scales

Traditional analyses. Appendix A presents contingency data for Scales 4, 9, CON, and the codetypes 4-9, and 4-CON; the latter were selected by identifying those cases that had elevations on both scales, in the traditional MMPI sense of the term codetype. Table 8 displays the diagnostic efficiencies of these scales. In general, sensitivities and specificities of greater than .90 are viewed as being useful or important. None of the scales examined in

this study met this criterion. Regarding the prediction of psychopathy, Scale 4 had the highest sensitivity (63%) but the lowest specificity (53%) of the scales investigated. In other words, of the psychopathic participants in this study, 63% were identified by an elevated Scale 4. Of the nonpsychopathic participants, 53% were classified as nonpsychopathic by having a nonelevated Scale 4. However, the standard error of this value is .10. The 95% confidence interval for Scale 4 then is $.63 \pm .20$; the possible range of sensitivities for Scale 4 is .43 to .82. Whereas at the upper end of this range, sensitivity is moderately good, at the lower end it is very poor. The more important point to be made is that the estimate of the sensitivity and specificity of each scale lacks precision. CON had the highest specificity (84%; considered to be moderate to high). Eighty-five percent of nonpsychopathic adolescents were correctly identified as such by CON by having a low score on this scale. However, approximately 15% of the sample would be misclassified as psychopathic using CON alone, and the rate becomes dramatically worse with other scales; for example, Scale 4 would falsely classify 47% of the sample as psychopathic if it were used alone as an index of psychopathy.

As outlined above, the interpretation of sensitivity and specificity is limited by the fact that they predict in the opposite direction to that in which most clinicians are interested. With regard to indices of diagnostic efficiency in clinical applications, then, the measure of interest is the NPP, which tells the probability of not having psychopathy given the absence of a symptom (i.e., no elevation on Scales 4, 9, CON, or a combination of these). Ideally, to be an efficient screening instrument, a scale should have an NPP of greater than .90, so that at most 10% of those who are psychopathic would be misclassified as being nonpsychopathic. This is not the case with any scales of the MMPI-A. The best screening

scale at the suggested cutoff of $T \geq 65$ (Butcher et al., 1992) is CON, with an NPP of .81. The probability that the individual was not psychopathic given that they did not have an elevation on CON was 81%. In other words, CON identifies 81% of actually nonpsychopathic individuals as such, but 19% of those who are truly psychopathic would be missed, and wrongfully classified as nonpsychopathic. This is a very high rate of error in a situation where missing a diagnosis of psychopathy can be a grave mistake. When the ratio of the NPP to the base rate of non-psychopathy is calculated, CON predicts at near-chance levels, $.81/.74$ (i.e., the base rate of nonpsychopathy) = 1.09.

The independence of PPP and NPP can be seen with CON, where PPP was also highest. Using elevation on CON as an inclusion criterion (as opposed to an exclusion criterion as with the NPP), 50% of psychopathic participants would have been correctly identified as such, but 50% of nonpsychopaths would be wrongfully classed as psychopathic. Again, this error rate is probably too high to be useful. When the ratio of the PPP to the base rate of psychopathy is calculated, CON suggests diagnoses of psychopathy approximately two times better than chance ($.50/.26 = 1.92$), but it will still be wrong in suggesting this diagnosis 50% of the time. It is important to recall that these values are for only one possible cutoff on the MMPI-A; different cutoffs will be evaluated below.

Negative predictive power (NPP) was similarly moderate for all scales, ranging from 75% to 80%. CON maximized the hit rate or correct classification, at 74%, but this index does not take into account the probability of a correct classification on the basis of chance. CON also maximized the association between the scales and PCL-R Total score, at 30% beyond chance alone (kappa). All other kappas were very low (range from .05 to .15), indicating that the overall diagnostic agreement of the PCL-R and MMPI-A is poor.

Receiver operating characteristic analyses. The ROC curves for Scale 4 and CON are presented in Figure 2. Note that, moving from the upper right corner to the lower left corner, possible MMPI-A cutoffs become increasingly strict or high. As the cutoff score is raised, the curves tend to move to the left (increasing specificity) and downward (increasing sensitivity). The diagonal straight line is commonly referred to as the line of no information; it can be thought of as chance-levels of prediction. As already discussed, there is relatively little penalty for false positive predictions of psychopathy, but a false negative error could be costly. Under these circumstances, the true positive rate (TPR) should be kept large, even if the false positive rate (FPR) is therefore also large (Metz, 1978). Thus, the optimal operating point is high and on the right of the ROC curve. Appendix B presents the cutoff data points for Scale 4 and CON without smooth curves applied. At the upper right region of the curve in Figure 2 and Appendix B, Scale 4 is slightly better (provides a higher TPR for the FPR), than CON. At an FPR of .80 for example, Scale 4 (at $T \geq 55$ or 60) provides a TPR of approximately .96, whereas CON (at $T \geq 50$) gives a TPR of approximately .92. What this indicates is that Scale 4 performs best in the "normal" range of scores, where it is relatively good at identifying the absence of psychopathy. This is ironic given that the scale was originally designed to diagnose psychopathy, as its name implies. At higher cutoffs, CON is more diagnostically efficient with regard to psychopathy than Scale 4, although TPR becomes increasingly and intolerably low relative to FPR. For acceptable TPR and FPR, the optimal cutoff for CON seems to be approximately $T \geq 50$ or 55, whereas for Scale 4, $T \geq 60$ or 65 appears best, although this would still produce a high FPR. Unfortunately with regard to CON, even a cutoff of 50 does not achieve a high TPR; it is doubtful that cutoffs as low as those suggested by this curve would be used.

For Scale 4, the AUC is .61, and for CON, AUC is .67. Methods are available to assess the statistical difference between the AUCs of different curves (Mossman & Somoza, 1989; Murphy et al., 1987). Yet the curves cross twice, so that the ratio of TPR to FPR changes and hence the relative efficiencies of the scales change, depending on the cutoff chosen (Habicht, 1980). In other words, because the curves cross twice, the AUCs of the curves can be the same, whereas their efficiencies may be very different depending on the cutoff, as occurred in this case. In this situation, the AUC gives no useful information, so this was not pursued. The combination of information from the ROC curves and the traditional efficiency analyses indicates that although it is far from perfect, CON is the best overall predictor of psychopathy on the MMPI-A in adolescent forensic patients.

In conclusion, then, neither Scale 4 nor CON are acceptably efficient at any possible T-score cutoff. It is likely for the best that cutoffs other than $T \geq 65$ are no better or worse diagnostically, as it is questionable whether clinicians would make use of alternate cutoffs; the T-score of 65 is very strongly ingrained in the minds of most users of the MMPI.

Table 8

Predictive Efficiency of MMPI-A Scales (Using $T \geq 65$)

	Sensitivity	Specificity	PPP	NPP	Hit Rate	Kappa	Odds Ratio
4	.63 (.10)	.53 (.06)	.32	.80	.55	.12	1.88
9	.38 (.10)	.76 (.05)	.36	.78	.66	.14	1.95
CON	.46 (.10)	.84 (.04)	.50	.81	.74	.30	4.38*
4/9	.46 (.09)	.71 (.05)	.35	.79	.64	.15	2.03
4/CON	.38 (.10)	.68 (.04)	.29	.75	.60	.05	1.25

Note: * $p < .01$. Standard errors in parentheses. PPP = positive predictive power; NPP = negative predictive power.

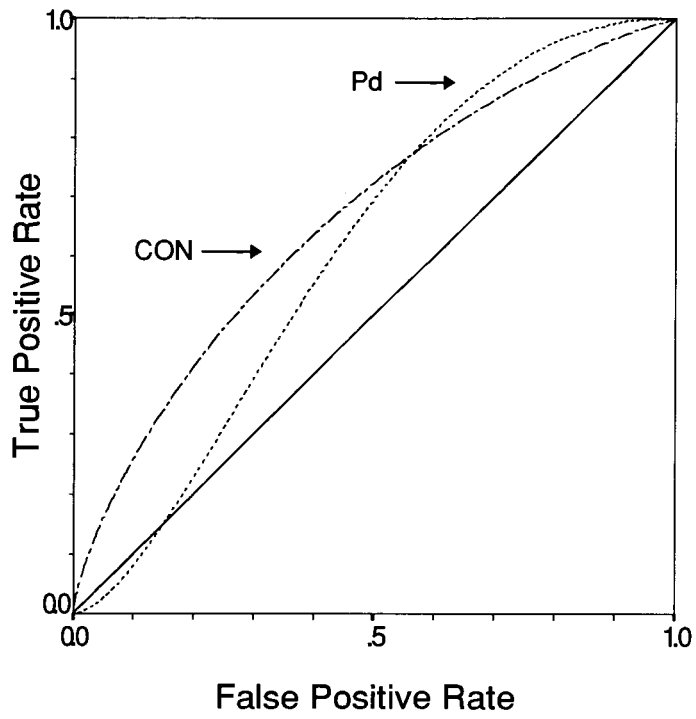


Figure 2. ROC curves for MMPI-A Scales 4 and CON.

Discussion

The purpose of this study was twofold: first, to examine the pattern of correlations between the PCL-R and MMPI-A, and second, to determine how well MMPI-A scale scores predicted the diagnosis of psychopathy as measured by the PCL-R in young offenders. This second purpose was primarily concerned with whether the MMPI-A could be used to screen for the absence of psychopathy. Regarding the first purpose, few of the MMPI-A scales correlated significantly in the predicted direction. MMPI-A Scales 4 and CON did correlate significantly, as predicted, but this did not occur with other scales such as Scale 9 or the Harris-Lingoes scales for 4 and 9. The greatest number of significant correlations occurred with the Content scales (e.g., ACK, ANG, CON, and OBS). Unexpected significant or near-significant relationships were found for Harris-Lingoes scales Si₃ (Alienation - Self and Others), Pa₃ (Naivete), Sc₃ (Lack of Ego Mastery - Cognitive), and Sc₅ (Lack of Ego Mastery - Defective Inhibition).

Regarding the second purpose, sensitivity of the selected MMPI-A scales was very low, suggesting that it would yield a high number of false negative diagnoses of psychopathy, that is, it cannot screen in or suggest the diagnosis of psychopathy. More importantly, the negative predictive power of the scales investigated was also only moderate. This indicates that a low score on these scales cannot reliably be used as a criterion for exclusion of psychopathic diagnosis. These results imply that the MMPI-A is relatively unreliable for screening out those individuals who are definitely not psychopathic. Therefore, the MMPI-A should likely not be used to identify the absence of psychopathy in adolescent offenders, unless the impact of misclassifying an individual as nonpsychopathic is

minimal; this is unlikely to be the case in forensic settings, however, where psychopathy is a highly salient construct.

Correlation Between PCL-R and MMPI-A Scale CON

The observed correlation of Scales 4 and CON with PCL-R scores indicated that these scales may be related to the construct of psychopathy in an adolescent forensic setting, but the discussion of the ROC curves below provides more detail on this topic. The unexpected significant correlation of CON with Factor 1, but not Factor 2, is worthy of further discussion. Whereas the scale was constructed to assess conduct disordered *behaviour* (i.e., Factor 2-type issues), the results suggest that it may do a better job of measuring the interpersonal aspects of psychopathy (Factor 1). Factor analysis of MMPI-A scales (Archer, Belevich, & Elkins, 1994) shows that CON loads on two factors, Immaturity and Disinhibition/Excitatory Potential. Of all MMPI-A scales, it is the only one to load in this pattern. Other psychopathy-related scales load on one or the other of these factors, but not both: Scale 4 is associated with General Maladjustment, Immaturity, and Naivete; Scales 9, ANG, CYN, and Si₃ load either singly or primarily on Disinhibition/Excitatory Potential. It could be that CON has some unusual properties that distinguish it from other scales. Examination of the scale reveals it contains items relating primarily to antisocial behaviours characteristic of Factor 1 (e.g., lying, taking advantage of others, being intimidating). Therefore it seems that it is possible for the MMPI-A to tap Factor 1 issues; why other self-reports or even other versions of the MMPI do not do so is unclear. Further analysis of this scale and replication of these results in forensic settings is warranted (see below).

Is the MMPI-A a Good Measure of Psychopathy?

This question begs the further question: What is psychopathy? How is psychopathy best defined? If one views the PCL-R as the gold standard for the diagnosis of psychopathy, then the MMPI-A was not a good measure of psychopathy in this study, either dimensionally (in terms of correlations) or categorically (in terms of diagnostic efficiency). However, if other conceptualizations are preferred, such as the DSM-IV diagnosis of Antisocial Personality Disorder, then the PCL-R is not gold. Yet the PCL-R is increasingly viewed as the best available diagnostic tool with regard to psychopathy (e.g., Fulero, 1995; Rogers, 1995; Stone, 1995), so it is likely that most clinicians and researchers would accept the PCL-R as the gold standard for psychopathy, at least for the time being.

There are several possible reasons why the MMPI-A was not a good measure of psychopathy in this particular sample; these are discussed in more detail below. It may be that factors existed that affect the observed correlations. These could include unusual sample characteristics, such as low prevalence of psychopathy. However, this is not likely, as the base rate is not much different from past research (Forth et al., 1990). Other possible instances of sampling bias could include disproportionate amounts of certain types of offenders (e.g., sexual offenders, property offenders), the participants could have been of low intelligence, and so forth. However, the data were analyzed in several different ways (i.e., dimensionally, categorically, explorative in terms of cutoff scores), and the results seem to be uniformly negative, so it is doubtful that the MMPI-A is a good measure of psychopathy.

Are These Results Surprising?

Several potential reasons for the null results exist. First, it could be that the sample in this study was too small. Cohen (1992) reports that at the .10 level of significance (i.e., $p < .05$ one-tailed), 617 subjects are necessary to detect a small effect while 68 subjects are necessary to detect a medium effect size. The effects expected in this study were moderate, and sample size was planned in accordance with this; power to detect a small effect was unnecessary. However, a larger sample size is necessary to provide a more precise estimate of the sensitivity and specificity of the MMPI-A scales.

Second, the reliability of PCL-R diagnoses is unclear in this situation, as they were conducted prior to this study, by persons not associated with the researcher. Ideally, the next step will be to go back and do file-review PCL-R assessments on these participants to determine the raters' accuracy. As explained above, past research indicates that the PCL-R is valid and reliable in this setting (Gretton et al., 1994; Lewis et al., 1994).

Third, the representativeness of the adolescents in this study is also uncertain. The particular unit in which this study was conducted has a slightly lower proportion of psychopaths than other settings, likely because its purpose is to assess acute psychopathology rather than personality disorders. Therefore the results may not be typical of other adolescent forensic settings. Data on offense types was not available, because of difficulties which arose during data collection. This is unfortunate since, as described above, this particular group of adolescents may have been comprised of a high proportion of certain types of offenders which may not be representative of other offenders. Also, offense data could have been used to evaluate the predictive and construct validity of the MMPI-A relative to the PCL-R regarding criminality. Crime variables could have served as

an external criterion for assessing validity of the MMPI-A, other than the PCL-R.

Intellectual assessments were also not available, for the same reasons as with crime variables. Without knowing the distribution or the range of IQs it is not possible to know how representative these individuals were of adolescent offenders in general. Also, extremes of intelligence might have affected the responses to the MMPI-A, although such influences would probably have been detected on the validity indices. For example, both Scales VRIN and F would likely have been elevated if the subject was either of low intelligence or illiterate (Butcher & Williams, 1992). The small number of subjects in this study with elevations on either of these scales indicated it is doubtful that low IQ or illiteracy was a problem here.

Finally, it is conceivable that subjects may have attempted to present themselves favourably on the MMPI-A, given their legal situation, which would affect results. However, psychopaths in this study tend to be elevated on F, indicating malingering rather than minimization. Furthermore, most of the profiles used in this research were found to be valid, and controlling for profile validity did not change results significantly. Finally, this study does not aim to generalize beyond forensic settings, so if this group of offenders was characterized by a particular response set, other forensic groups will probably do so as well. Therefore, most of the significant potential limitations to this study do not hold up to scrutiny.

Also, these results are not particularly surprising because in adults, the MMPI and MMPI-2 do not accurately predict diagnoses of psychopathy. Several studies have demonstrated low to moderate correlations between self-report scales and psychopathy or PCL-R scores (e.g., Cooney, Kadden, & Litt, 1990; Hart et al., 1991). For example, Hare

(1985) compared various measures of psychopathy and found that self-reports (including the MMPI) typically correlated only about .30 with global rating or structured checklist assessments of psychopathy, including the original PCL. Such results indicate that the magnitude of the correlations observed in this study are to be expected. Reasons for this include the fact that self-report measures of psychopathy tend to better assess Factor 2-type facets of psychopathy, ignoring Factor 1 (Harpur et al., 1989), possibly because psychopaths tend to be unable to accurately report on their interpersonal or emotional functioning, or because self-report items tend not to be phrased in such a way as to tap these issues. This neglect automatically limits the possible correlation with PCL-R score. Most self-reports, the MMPI included, do not have separate norms for offender or forensic psychiatric populations (Hart, Cox, & Hare, 1995; Hart & Hare, in press). Even though the validity scales of the MMPI are among the best available, and they correct for defensiveness, they can recognize but cannot correct for certain other types of responding such as lying, malingering, random responding, and so forth (Hart et al., 1995). This limits the usefulness of the test with individuals who by definition tend to lie a great deal. Considerable experimental research into the construct of psychopathy indicates that psychopaths may have difficulty processing emotional language, which may also interfere with their performance on self-report measures (Patrick, 1994; Williamson, Harpur, & Hare, 1991). Given this evidence, the negative results of this study are likely not out of the ordinary.

How is the MMPI Most Useful?

The negative results of this study should in no way be taken as suggesting that the MMPI-A is not useful with regard to disorders other than psychopathy; as the current study

focused only on psychopathy, no conclusions can be drawn beyond those dealing with this disorder. However, inferences can be drawn regarding the ability of the MMPI-A to suggest or diagnose acute psychopathology or other personality disorders from research with the MMPI-2 in adults.

Hills (1995) studied adult outpatients to evaluate the diagnostic efficiency of the MMPI-2 with regard to personality disorders. She concluded that the MMPI-2 was more efficient at ruling out diagnoses than at identifying diagnoses, in line with the results of the current study, but it was a more conservative estimator of personality disorders than was the Millon Clinical Multiaxial Inventory - II (MCMI-II; Millon, 1987). Furthermore, these self-reports agreed more with each other than with the Structured Clinical Interview for DSM-III-R - Axis II (SCID-II; Spitzer, Williams, & Gibbon, 1987), and there was a lack of association between either of the self-reports and the SCID-II diagnosis of Antisocial Personality Disorder. This bears a striking resemblance to both the current study and past research (e.g., Hare, 1985). Morey, Waugh, and Blashfield (1985) developed a set of MMPI scales designed to assess personality disorders which show promise in diagnosing personality disorders. However, some researchers (e.g., Dubro, Wetzler, & Kahn, 1988; Morey, Blashfield, Webb, & Jewell, 1988) question the diagnostic efficiency and validity of these scales. Research tends to indicate, then, that the MMPI has limited validity with regard to personality disorders in either adults or adolescents.

Another area in which the MMPI may be useful is in prediction of various types of behaviour. Most research regarding prediction with the MMPI involves criterion behaviours such as institutional adjustment, but results are inconsistent. For example, Boone and Green (1991) found that MMPI scores for adolescents in a forensic evaluation

center were only moderately associated with conduct disordered behaviour while at the center (r 's = .30). Hanson, Moss, Hosford, and Johnson (1983) found that the Megargee-Bohn MMPI typology (Megargee & Bohn, 1979) successfully predicted institutional adjustment (as measured by the number of rule infractions and episodes of aggression). With respect to the prediction of general criminal behaviour as assessed by the MMPI and PCL, Howard, Bailey, and Newman (1984) reported that MMPI scales performed better than chance in discriminating between offender groups in a forensic psychiatric sample, but did less well in discriminating these groups than the PCL. Simourd, Bonta, Andrews, and Hoge (1990) evaluated the association between MMPI Scale 4, the So scale on the California Personality Inventory, and the PCL with criminality. The association between Scale 4 and criminality was weak, ranging from .15 to .20, whereas the relationship between the PCL and criminality was moderate, approximately .30. As the MMPI had a smaller effect size with regard to crime than the PCL, it appears doubtful that the MMPI predicts recidivism better than the PCL, even if the MMPI and PCL are not correlated very highly themselves. Not only does the MMPI appear to be unsuccessful at predicting recidivism, it does not accurately back-classify adult male inmates in terms of assaultive behavior (Megargee & Carbonell, 1995; Megargee & Mendelsohn, 1962; Persons & Marks, 1971), nor can it discriminate between levels of assault and crime severity in adolescents (Weaver & Wooton, 1992). As yet, no research using the MMPI to predict violent recidivism has been conducted. The ability of any version of the MMPI to predict or discriminate behaviours of interest in forensic settings is questionable.

On the positive side, many studies assessing the ability of the MMPI to detect response style in various settings report that the test demonstrates moderate to good results.

Research using both clinical and normal subjects responding honestly or instructed to malingering (fake-bad) or minimize (fake-good) psychopathology have demonstrated that the MMPI is able to correctly classify participants using various cutoff points on the Validity scales and other scales such as the F - K index, and Gough's Dissimulation (Ds) scale (Graham, Watts, & Tinbrook, 1991; Rogers, Bagby, & Chakraborty, 1993; Wetter, Baer, Berry, Smith, & Larsen, 1992). Bagby, Rogers, and Buis (1994) found that with male and female forensic psychiatric patients, the malingering indices (F, F - K, Ds, and Wiener's Obvious-Subtle index) performed more accurately than did the indices of defensiveness (L, K, F - K, Obvious-Subtle, and Positive Malingering). As these investigators point out, though, no consensus exists for the optimal T-score cutoffs for malingerers, and that individuals who produce defensive profiles may be misclassified at a relatively high rate, indicating the need for caution in this regard.

Future Directions

Clearly, the need for further validation of the MMPI-A in forensic settings is great. While the present study assessed the relationship of the MMPI-A to the construct of psychopathy in an adolescent offender sample, no norms exist for young offender populations, which limits the interpretability of these results somewhat. The utility of the MMPI-A in measuring acute psychopathology in adolescent forensic settings is unclear. Furthermore, the construct validity of certain scales in such groups is questionable, based on these results. Additionally, there is a need to evaluate the validity of the MMPI-A with specific offender groups, such as nonpsychiatric young offenders, sex offenders, violent offenders, and females. It is possible that the MMPI-A is differentially useful with such individuals, or perhaps typical profiles could be developed for these subgroups. The validity

of the MMPI-A with female young offenders is of particular concern, as past research indicates the MMPI has differential predictive ability for institutional adjustment across boys and girls (Boone & Green, 1991). Future research must assess the generalizability of the present results to the above groups, as well as community offenders (i.e., those on probation as opposed to being incarcerated). Finally, the applicability to other samples of the MMPI-A T-score cutoffs for Scales 4 and CON suggested by these results must be examined.

The construct validity of CON in particular should be examined. The present results indicate that it may not assess conduct disordered behaviour as it was designed to do; in fact, it may have an important relationship to interpersonal or emotional functioning, which is unusual and potentially valuable in a self-report measure. Item response theory (IRT; see Nunnally & Bernstein, 1994) could be used to further understanding of CON. IRT relates an underlying personality trait, such as psychopathy, to the probability of a given response pattern on a test, in this case, the MMPI-A. It could assess whether the PCL-R and CON or the MMPI-A as a whole measure the same underlying construct of psychopathy.

Another possibly fruitful area of research is in the construction of a MMPI-A special scale to assess psychopathy. Although existing scales may not have great diagnostic efficiency with respect to psychopathy, individual items may be highly useful in this regard. Special scales for the MMPI and MMPI-2 have been constructed to measure antisocial personality (Weaver & Wooton, 1992), juvenile delinquency (Hathaway & Monachesi, 1963), Antisocial Personality Disorder (Rogers & Bagby, 1995), and other factors of relevance to offenders, with mixed results. For the reasons expounded throughout this

thesis, it is not expected that the PPP of any such scale for psychopathy would be high; the emphasis again should be on screening out the disorder.

With respect to the PCL-R, additional data is required regarding its validity with adolescent samples, and especially samples of female adults and adolescents. The lack of validity information for females with the PCL-R required that girls be excluded from this study. Some research and theory suggests that the typical presentation of psychopathy in females may not be that which is seen in males. Female offender populations have a high prevalence of hysteria or Histrionic Personality Disorder, and Antisocial Personality Disorder and hysteria cluster among male and female first-degree relatives of females with Histrionic Personality Disorder (Harpending & Sobus, 1987). This interesting theory should be explored, the prevalence and presentation of psychopathy in females determined, and the ability of the PCL-R to assess female psychopathy examined. Regarding adolescents, although Forth et al. (1990) do report that the PCL-R is useful with young offenders with slight modification to some items, no norms for such a sample exist.

In conclusion, the MMPI-A is not highly associated with the construct of psychopathy in adolescent offenders, nor is it efficient in screening for this disorder. It is suggested that the MMPI-A may be a reasonable starting point in the assessment of psychopathy, but due to the high false positive and negative rates, caution must be exercised in its use.

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Appendix A

Contingency Data for MMPI-A Scale 4

MMPI-A S0cale 4	PCL-R Diagnosis	
	Psychopath	Nonpsychopath
Positive (T ≥ 65)	15	32
Negative (T < 65)	9	36

Contingency Data for MMPI-A Scale 9

MMPI-A Scale 9	PCL-R Diagnosis	
	Psychopath	Nonpsychopath
Positive (T ≥ 65)	9	16
Negative (T < 65)	15	52

Contingency Data for MMPI-A Scale CON

MMPI-A Scale CON	PCL-R Diagnosis	
	Psychopath	Nonpsychopath
Positive (T ≥ 65)	11	11
Negative (T < 65)	13	57

Appendix A (Continued)

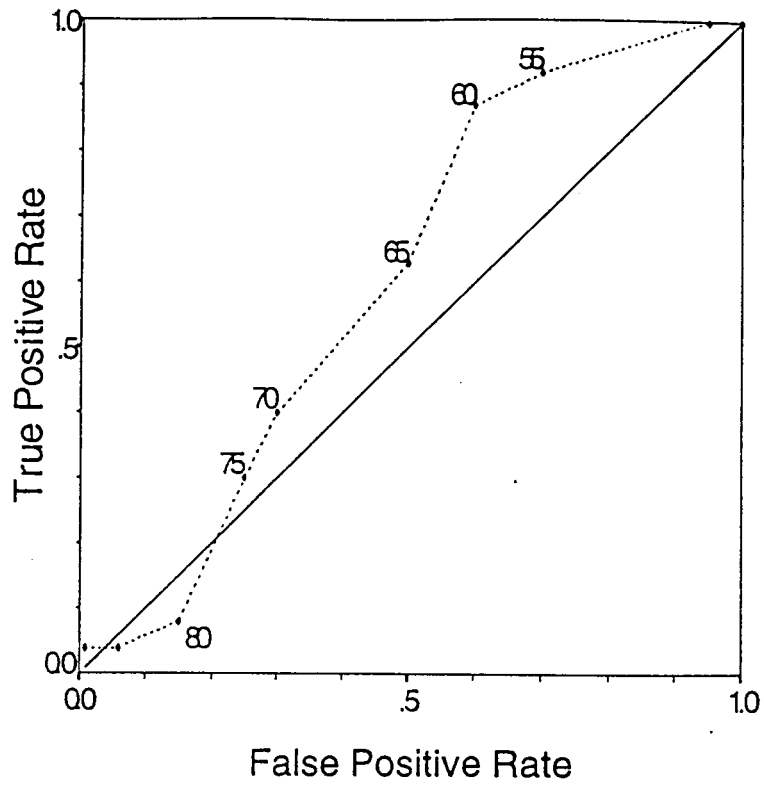
Contingency Data for MMPI-A Codetype 4-9

MMPI-A Scale 4/9	PCL-R Diagnosis	
	Psychopath	Nonpsychopath
Positive (T \geq 65)	11	20
Negative (T < 65)	13	48

Contingency Data for MMPI-A Codetype 4-CON

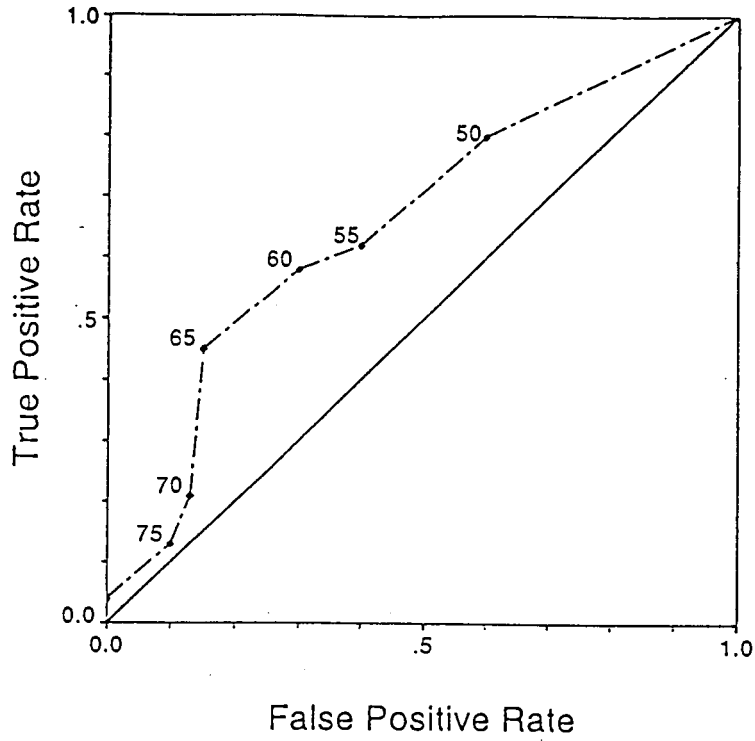
MMPI-A Scale 4/CON	PCL-R Diagnosis	
	Psychopath	Nonpsychopath
Positive (T \geq 65)	9	22
Negative (T < 65)	15	46

Appendix B



T-score cutoffs for Scale 4 ROC curve (unsmoothed).

Appendix B (Continued)



T-score cutoffs for CON ROC curve (unsmoothed).